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## **Embracing diversity and inclusivity in an academic setting: Insights from the Organization for Human Brain Mapping**

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**Abstract:** Scientific research aims to bring forward innovative ideas and constantly challenges existing knowledge structures and stereotypes. However, women, ethnic and cultural minorities, as well as individuals with disabilities, are systematically discriminated against or even excluded from promotions, publications, and general visibility. A more diverse workforce is more productive, and thus discrimination has a negative impact on science and the wider society, as well as on the education, careers, and well-being of individuals who are discriminated against. Moreover, the lack of diversity at scientific gatherings can lead to micro-aggressions or harassment, making such meetings unpleasant, or even unsafe environments for early career and underrepresented scientists. At the Organization for Human Brain Mapping (OHBM), we recognized the need for promoting underrepresented scientists and creating diverse role models in the field of neuroimaging. To foster this, the OHBM has created a Diversity and Inclusivity Committee (DIC). In this article, we review the composition and activities of the DIC that have promoted diversity within OHBM, in order to inspire other organizations to implement similar initiatives. Activities of the committee over the past four years have included (a) creating a code of conduct, (b) providing diversity and inclusivity education for OHBM members, (c) organizing interviews and symposia on diversity issues, and (d) organizing family-friendly activities and providing childcare grants during the OHBM annual meetings. We strongly believe that these activities have brought positive change within the wider OHBM community, improving inclusivity and fostering diversity while promoting rigorous, ground-breaking science. These positive changes could not have been so rapidly implemented without the enthusiastic support from the leadership, including OHBM Council and Program Committee, and the OHBM Special Interest Groups (SIGs), namely the Open Science, Student and Postdoc, and Brain-Art SIGs. Nevertheless, there remains ample room for improvement, in all areas, and even more so in the area of targeted attempts to increase inclusivity for women, individuals with disabilities, members of the LGBTQ+ community, racial/ethnic minorities, and individuals of lower socioeconomic status or from low and middle-income countries. Here, we present an overview of the DIC's composition, its activities, future directions and challenges. Our goal is to share our experiences with a wider audience to provide information to other organizations and institutions wishing to implement similar comprehensive diversity initiatives. We propose that scientific organizations can push the boundaries of scientific progress only by moving beyond existing power structures and by integrating principles of equity and inclusivity in their core values.

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## Commentary

## Embracing diversity and inclusivity in an academic setting: Insights from the Organization for Human Brain Mapping

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### A B S T R A C T

Scientific research aims to bring forward innovative ideas and constantly challenges existing knowledge structures and stereotypes. However, women, ethnic and cultural minorities, as well as individuals with disabilities, are systematically discriminated against or even excluded from promotions, publications, and general visibility. A more diverse workforce is more productive, and thus discrimination has a negative impact on science and the wider society, as well as on the education, careers, and well-being of individuals who are discriminated against. Moreover, the lack of diversity at scientific gatherings can lead to micro-aggressions or harassment, making such meetings unpleasant, or even unsafe environments for early career and underrepresented scientists.

At the Organization for Human Brain Mapping (OHBM), we recognized the need for promoting underrepresented scientists and creating diverse role models in the field of neuroimaging. To foster this, the OHBM has created a Diversity and Inclusivity Committee (DIC). In this article, we review the composition and activities of the DIC that have promoted diversity within OHBM, in order to inspire other organizations to implement similar initiatives.

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Activities of the committee over the past four years have included (a) creating a code of conduct, (b) providing diversity and inclusivity education for OHBM members, (c) organizing interviews and symposia on diversity issues, and (d) organizing family-friendly activities and providing childcare grants during the OHBM annual meetings.

We strongly believe that these activities have brought positive change within the wider OHBM community, improving inclusivity and fostering diversity while promoting rigorous, ground-breaking science. These positive changes could not have been so rapidly implemented without the enthusiastic support from the leadership, including OHBM Council and Program Committee, and the OHBM Special Interest Groups (SIGs), namely the Open Science, Student and Postdoc, and Brain-Art SIGs. Nevertheless, there remains ample room for improvement, in all areas, and even more so in the area of targeted attempts to increase inclusivity for women, individuals with disabilities, members of the LGBTQ+ community, racial/ethnic minorities, and individuals of lower socioeconomic status or from low and middle-income countries.

Here, we present an overview of the DIC's composition, its activities, future directions and challenges. Our goal is to share our experiences with a wider audience to provide information to other organizations and institutions wishing to implement similar comprehensive diversity initiatives. We propose that scientific organizations can push the boundaries of scientific progress only by moving beyond existing power structures and by integrating principles of equity and inclusivity in their core values.

## 1. Introduction

Scientific research aims to bring forward innovative ideas, and must constantly challenge existing knowledge structures and stereotypes. Nevertheless, scientific progress is severely hindered by a lack of diversity, despite there being clear evidence that diverse groups outperform highly skilled homogeneous groups (Hong and Page, 2004; Nielsen et al., 2017). Academia and the study of human health and behavior is often limited to a very narrow part of the population. This typically consists of a sub-group of western, educated, industrialized, rich, and democratic (WEIRD) individuals (Henrich et al., 2010). This results in a majority of scientific findings representing the upper/middle class, white, male individuals, and does not match the rich diversity of the human population. Additionally, research often makes the assumption that humans are able-bodied, and that gender identity is binary, in line with sex assigned at birth. Apart from being under-represented in scientific research, women, racial, ethnic and cultural minorities, individuals with disabilities, and LGBTQ+ individuals often also experience discrimination at multiple stages of their academic education and careers.

### 1.1. Lack of diversity in academia and scientific gatherings

Numerous examples of discrimination exist in academia including those related to sex and gender, race, disabilities and LGBTQ+ status. Women have historically been underrepresented in science, technology, engineering and mathematics (STEM). Historically, this stems from deeply rooted societal prejudices, which did not allow women to participate in higher education, and continue to this day as gender-based cultural stereotypes that start from a young age and impact academic trajectories (Master et al., 2017; Rogers and Meltzoff, 2017). Such stereotypes continue to manifest at later career stages. For example, compared with their male colleagues women are less likely to: publish as last authors (Fox et al., 2018), be invited as a symposium speaker (Schroeder et al., 2013), or be promoted to tenured positions (Pinho-Gomes et al., 2020; Weisshaar, 2017).

Members of racial and ethnic minority groups in academia suffer from racism and bias at all stages of the academic trajectory. Students belonging to ethnic minority groups report individual and institutional challenges to pursuing academic careers (Sánchez et al., 2013). At the faculty level, members of racial and ethnic minority groups are likely to earn less and experience workplace discrimination (Blackaby and Frank, 2000). They are also less likely to be promoted to associate or full professors (Fang, 2000). As a result, members of racial and ethnic minority groups hold fewer senior academic positions relative to their white colleagues<sup>1</sup> (Hoppe et al., 2019). As a notable recent example of the systematic underrepresentation of women or people of color, we high-

light a recent mini-symposium featuring more men named 'Matthew' than women or people of color<sup>2</sup>.

Academics with sensory and physical disabilities, such as hearing loss, report a lack of discussions about resources that may exist to accommodate their needs (Smith and Andrews, 2015). Students with visible and invisible disabilities not only need to perform additional labour to accommodate their needs due to a lack of structured support, but also often encounter negative attitudes from faculty (Hannam-Swain, 2018; Sniatecki et al., 2015). Similarly, the vast majority of faculty members with a mental health history or mental disabilities report that they are not familiar with on-campus resources, and rarely feel supported by colleagues (Price et al., 2017).

Trans individuals are less likely to pursue higher education than cis-gender individuals (Crissman et al., 2019), despite the fact that queer-spectrum (~5.3% of students) and trans (<0.1% of students) individuals are much more likely than others to plan on earning a doctorate (Greathouse et al., 2018). Apart from affecting educational and career prospects, underrepresentation also has a negative impact on the mental health of these students and researchers. A recent examination of LGBTQ+ doctoral researchers' experiences at UK institutions of higher education found that more than a third reported having been in situations where they felt the need to conceal their sexuality or gender at their academic institution (English and Fenby-Hulse, 2019). Additionally, LGBTQ+ scientists fear that they or their work will be viewed differently as soon as they correct assumptions of pervasive hetero- and cis-normativity (Mattheis et al., 2019; Prock et al., 2019).

The systematic discrimination that several groups face in academia because of their beliefs, culture, religion, sexuality, gender, abilities, socioeconomic background, or skin color, is morally wrong. It has a negative impact on the education, careers and well-being of individuals who are being discriminated against. In addition, the lack of diversity in academia is particularly harmful for scientific progress (Nielsen et al., 2017), and can lead to poorer, and in certain cases, inconsiderate or even harmful science (Hofstra et al., 2020; Reicherzer, 2008). A notable example is research surrounding transgender identity, which stemmed from examinations of trans identity as a medical curiosity and has resulted in the continuing pathologization of transgender and gender non-conforming identities (Reicherzer, 2008). The popular narrative that has resulted from this research continues to associate transgender identities with mental illness, which is a major source of anti-trans prejudice (Winter et al., 2009). Similar historical cases of discrimination have also been reported for several other groups, for instance concerning effects of race on IQ or of gender on math abilities, which are instead explained by cultural or socio-economic factors that often covary with race or gender (Fagan and Holland, 2002; Kersey et al., 2019).

One of the cornerstones of academic research are scientific gatherings. Conferences and educational events are important venues for

<sup>1</sup> <https://www.ucl.ac.uk/article/10360/Black-academic-staff-face-double-whammy-in-promotion-and-pay-stakes>.

<sup>2</sup> <https://www.humanbrainmapping.org/14a/pages/index.cfm?pageID=4021&activateFull=true>.

**Table 1**

Initial charge of the diversity and gender task force.

1. Create an OHBM diversity and gender plan. This will include collecting data to assist with understanding the current and past demographics within OHBM's leadership and membership. This will be used to map OHBM's diversity from historical and current perspectives.
2. Investigate best practices in research, as well as practices implemented by other organizations regarding diversity and gender integration.
3. Develop new policies and programs for creating a more inclusive environment, including leadership, teaching roles and mentorship. This will also include a critical look at the nomination process for Council and if needed, to make recommendations to Council.
4. Interface with the Communications Committee to interact with the OHBM community and keep the membership informed of progress.
5. Help OHBM achieve its diversity and gender goals as identified in the plan.
6. Evaluate the effectiveness of strategies identified and assess success of diversity and gender integration into the OHBM culture.

presenting state-of-the-art findings, accelerating scientific progress and introducing scientists to the usage of new techniques and methods. Scientific gatherings are also vital for creating and nurturing professional relationships that are essential to the development and advancement of scientific careers. In other words, they have a major positive impact on the visibility, training and networking of all scientists and especially early career researchers (Bielczyk et al., 2020; Dunn, 2007). Unfortunately, scientific gatherings often suffer from a lack of diversity. Non-inclusive meetings not only impede members of minority groups from creating successful careers, but can also lead to micro-aggressions or harassment, turning such meetings into unsafe environments (Shen, 2015). At the Organization for Human Brain Mapping (OHBM), one of the major scientific organizations in the field of neuroimaging, we saw the need for promoting underrepresented scientists, creating diverse role models in the field of neuroimaging, and ensuring that interactions within the OHBM community are inclusive, in addition to being intellectually stimulating and engaging.

## 2. Onset of diversity initiatives within OHBM

One of the primary goals of OHBM is to host a large yearly scientific meeting for the neuroimaging community. At the end of the meeting there is a gathering (General Assembly and Feedback Forum or GAFF) during which all attendees can voice their opinions regarding the meeting, and about OHBM in general. Meeting and membership numbers, as well as newly elected Council members are also presented at the GAFF. During the 22nd Annual Meeting of OHBM held in Geneva, Switzerland in 2016, all incoming Council members were male. Further, the fifteen-member Council at the time consisted of fourteen men and one woman. One young researcher approached the microphone during the GAFF and raised the simple question about gender diversity on the Council. During the Council meeting that followed the GAFF, there was considerable discussion on this topic, with the resulting creation of a Diversity and Gender Task Force. The primary mission of this task force and of the committee that eventually evolved from it are provided in Table 1.

The goal of the task force was to evaluate strategies for improving diversity, starting specifically in the two domains of gender and geographic representation. By gathering historical data from the early days of OHBM, we found that there was a 5:1 ratio between males and females in leadership and educational roles in OHBM. Awards presented by OHBM were nearly always received by males. Considering that approximately 50% of the membership of OHBM and 50% of those attending the conference are female, these numbers reflected an inequitable representation in OHBM leadership roles<sup>3</sup>. Note that historically OHBM only provided the options of self-identifying as 'male' and 'female,' which has

<sup>3</sup> <https://www.ohbmbrianmappingblog.com/blog/you-spoke-we-listened-steering-a-new-course-with-respect-to-gender-equity>.

**Table 2**

Summary of issues that the OHBM DIC has been addressing between 2016 and 2020, and actions taken to address each of them.

Issue	Action taken
Underrepresentation of women and/or scientists outside N.America / Europe in the council	Affirmative attention during the selection of new council members One seat of the Nominating Committee is allocated to the DIC
Underrepresentation of women scientists in keynote lectures, educational courses, symposia and awards	'Diversity of Presenters' is one of the selection criteria for symposia and educational courses, including diversity in gender, nationalities and topics.
Raising awareness on implicit bias and discrimination	Annual symposium / diversity roundtable Blog posts Interviews with scientists working on implicit bias
Discrimination / Harassment	Creation of a Code of Conduct
Difficulties for parent scientists to attend conferences	Childcare grants Onsite child-friendly activities Science outreach events for children
Lack of recognition for individuals working to increase diversity in academia	Creation of a new 'Diversity Award'
Lack of inclusivity for non-binary genders	Diversity symposium on LGBTQ+ and neuroscience Approval of pronoun stickers for OHBM badges Approval of gender neutral toilets
Lack of support to members of underrepresented racial and ethnic groups	Issuing a "Statement of Action", with a plan to address anti-Black racism Ongoing data collection to characterise the OHBM membership and understand its needs Plan to receive structured feedback from the OHBM membership on issues of racism
Potential sources of implicit bias in leadership	Diversity and inclusivity training for all committee chairs

since changed to include more options. The task force then assessed the historical perspective of geographic representation within the OHBM community. While OHBM was initiated over 25 years ago primarily by European and North American researchers, it currently draws members from over 50 countries worldwide (Fig. 1).

While approximately 15% of the OHBM membership are from Asia (note that this number is much higher when the Annual Meeting is held in Asia), none of the 2016 Council members were from Asia<sup>4</sup>. Thus, the task force set out to determine the best approaches for fostering greater diversity and inclusivity within OHBM. As a group we came up with three different options to foster diversity and inclusivity, and these were presented to Council. These options included:

- 1 Promoting education to reduce bias and promote inclusivity.
- 2 An Electoral Vote approach that would work to assure a match between the representation of the membership and of the leadership roles.
- 3 Affirmative Attention by the Nominating Committee that determines those who will be placed on the ballot for specific Council roles. By balancing the candidates and positions, for example by only includ-

<sup>4</sup> <https://www.ohbmbrianmappingblog.com/blog/diversity-and-equitable-representation-among-leadership-and-educational-roles-within-ohbm>.



Fig. 1. The distribution of OHBM members in June 2020. From OHBM blog, courtesy of Dr. Nils Muhlert (<https://www.ohbmbrianmappingblog.com/blog/a-guide-to-experiencing-the-virtual-ohbm-2020-annual-meeting>).

ing women or only including members from Asia for a given position, it is possible to shift the distribution to one that is more equitable. To assist with the selection, a member of the Diversity and Gender Task Force would serve on the Nominating Committee.

Affirmative Attention was the approach chosen, and has resulted in striking changes since the 2016 OHBM meeting in Geneva. OHBM Council is now more diverse, with respect to sex and gender and geographic representation than at any time earlier in the history of the organization. Currently 41% of the Council members are women and 31% are from Asia (Fig. 2). It should be noted that an Affirmative Attention approach will only work if those on Council are keen on assuring that diversity and inclusivity remains a priority. Importantly, following the 2017 meeting, or approximately one year after its initial creation, the Gender and Diversity Task Force evolved into a full standing committee.

In addition to continuously improving equity in gender and geographic representation, the Diversity and Gender Committee, now with a name change to the Diversity and Inclusivity Committee (DIC), is also addressing additional issues. This includes, but is not limited to, age, culture, ethnicity, gender identity or expression, sexual orientation, language, national origin, profession, race, religion, disabilities and socioeconomic status.

### 3. Composition of the diversity and inclusivity committee and interactions with other OHBM committees and special interest groups

The members of the OHBM DIC serve a 5-year term. Some of the members serve as liaisons to Council, as well as other committees and

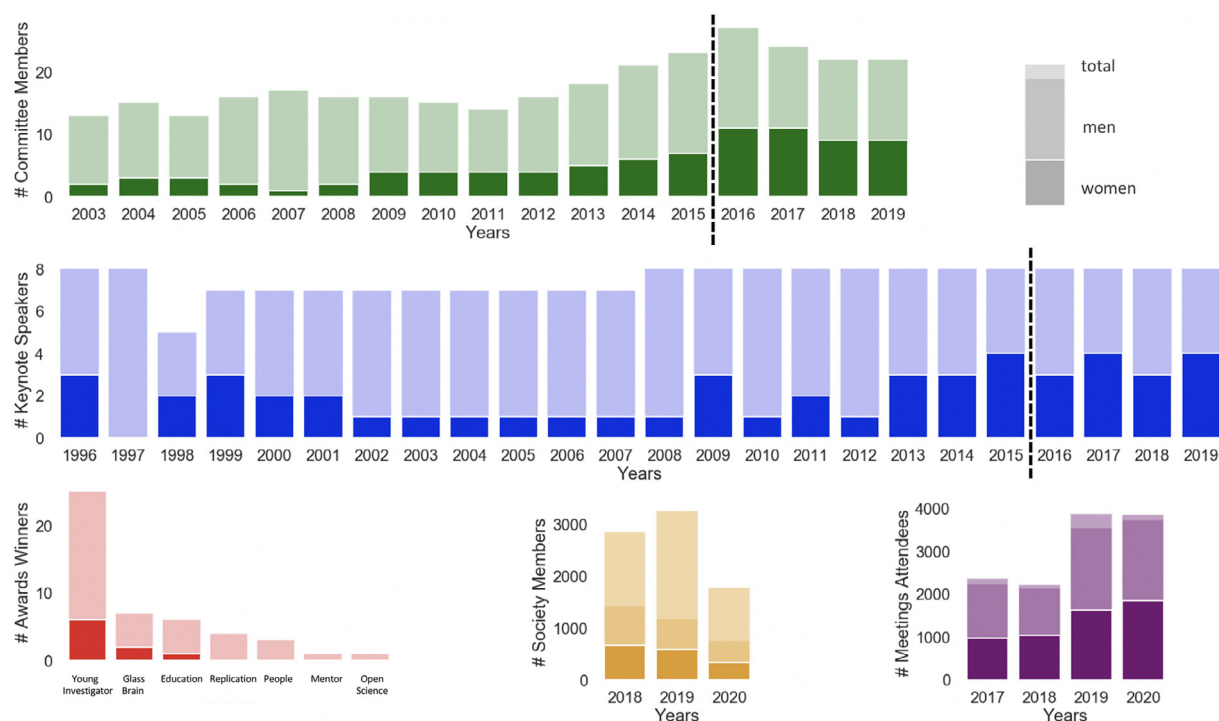
Special Interest Groups, which operate within OHBM. In addition to regular members, the committee also includes current, future and past chairs, whose term consists of 1 year. When their terms end, members of the committee are rotated off on a rolling basis so that new and past members overlap at any given moment, to ensure a smooth transition. Calls for new members are made to the general OHBM membership to replace members rotating off the DIC.

#### 3.1. Interactions with the OHBM council

The OHBM DIC has been supported by OHBM Council since its inception. Council is committed to supporting the evolution and development of the committee and its activities in several ways.

*Administrative and financial support:* Council has devoted administrative resources for the committee in the form of personnel who provide assistance by organizing committee meetings, taking notes at meetings, distributing relevant documents to committee members, conducting polls and surveys, and helping out with the election of new committee members and chair. Council also supports the DIC financially for its ongoing and evolving initiatives (e.g. Diversity Round Table described below, Child Care Grants discussed in Section 4.3).

*DIC-organized symposium at Annual Meeting:* The DIC has been encouraged to have a strong presence within the programming of the Annual Meeting. At the 2019 meeting in Rome, the first ever Diversity Round Table was presented in the form of a symposium, on the topic of gender bias, while at the 2020 virtual meeting, the diversity symposium focused on the topic of neuroscience and the LGBTQ com-



**Fig. 2.** Sex distribution for committee members, Tailarach lecture and keynote speakers, awards winners, society members, and meetings attendees. Dark colors highlight the number of women; light colors indicate the total number of individuals. Please note that lighter colors in Society members and meeting attendees panel refer to unknown/prefer-not-to-say responses. No data on committee members prior to 2003 were available. Several prizes have been established over the last 2 years and thus only a cumulative representation of those data is given. Data on sex distribution in society membership and meeting attendees are available only for recent years. Dotted lines mark year 2016 when the DIC was established.

munity<sup>5</sup>. The Diversity Round Table is now an annual event, with a mandate of focusing on different issues surrounding diversity and inclusivity every year. The planned 2021 Round Table discussion will focus on racial bias in neuroscience. In order to encourage privileged groups to attend the symposium, there have been coordinated efforts to advertise these symposia on social media. To encourage maximal participation and minimal overlap with other scientific programming, the symposium takes place during prime-time slots of the main conference. In addition, these symposia are promoted by conducting interviews and blog posts both leading up to the annual meeting, and throughout the year.

*Seat at the OHBM Nominating Committee:* The Nominating Committee now includes a representative from the DIC (DIC Chair). Moreover, in the last four years, the procedure of how candidates for open OHBM Council positions are identified and listed on the voting ballot has been improved to ensure gender, geographic, and career-stage diversity. The call for nominations of open Council seats were modified to facilitate self nominations, so that members from underrepresented groups or regions might be attracted to serve on Council. As per the Affirmative Attention approach, since 2017 the Nominating Committee has taken great care to ensure that the short list for the open Council positions will enable voters to increase the proportion of underrepresented groups on Council. An effective strategy here was that at least for half of the short list only persons from underrepresented groups were selected. This was relatively easy to achieve as the total number of nominations strongly increased after self-nominations were allowed. Overall, the ‘balanced ballot’ strategy enabled OHBM to significantly increase the proportion of female members and members from Asia on Council from 2017 onwards.

*Seat at the OHBM Awards Committee:* Additionally, to improve on issues of bias during attribution of awards (Fig. 2), a member of the DIC is set to act as a liaison with the awards committee. To encourage more women to apply for awards, like for the Early Career Investigator Award, OHBM has decided to remove age requirements, which previously might have made women ineligible due to parental leaves.

### 3.2. Involving other committees and special interest groups

Direct interactions and effective collaborations between the DIC and other Committees and SIGs at OHBM, facilitated by liaisons, have allowed us to take a robust multi-pronged approach to diversity and inclusivity.

At the 2019 Annual Meeting in Rome, the Student and Postdoc Special Interest Group (SIG) hosted four #MeToo themed workshops, aimed to provide training and support on handling situations of conflict and inappropriate behaviour. These workshops were conducted by a sexuality and trauma educator<sup>6</sup>, and provided training for conflict resolution, handling microaggressions or sexualized situations in the workplace, educating researchers on setting boundaries and on topics of consent. In addition to the four workshops, one-on-one office hours with the conflict mediator and trauma educator were provided for further questions and personal discussions. This first series of workshops focused on alleviating trauma and empowering victims of harassment. This does not imply by any means that it is the responsibility of the victim to avoid or reduce harm. Future attempts will need to target specifically the source of harassment, and educate perpetrators not to harass.

Another example of efforts towards common goals was the Neuro-Diversity themed Brain-Art Exhibit and Competition organized by the

<sup>5</sup> <https://www.ohmbrainmappingblog.com/blog/ohbm-2020-diversity-round-table-intersection-between-neuroscience-and-the-lgbtq-community>.

<sup>6</sup> <https://emmakaywin.com/>.

Brain-Art SIG for the 2020 Annual Meeting. The goal was to promote and highlight diversity and inclusivity within the OHBM community.

#### 4. DIC activities and accomplishments to date

##### 4.1. Educational role: blog posts, interviews, symposia

Since its inception, a main goal of OHBM's DIC has been to raise awareness on issues surrounding diversity. In the period between 2016 and 2020, the DIC has published six blog posts and organized two symposia, with planning for a third in progress (Table 2). Key topics addressed by the DIC via blog posts include: (a) gender and diversity imbalance among Council members <sup>7</sup>, (b) issues of implicit and explicit biases in academia <sup>8</sup>, (c) announcing activities of the DIC, such as topics covered at the annual Diversity symposium <sup>9</sup> or family friendly activities <sup>10</sup> and (d) communicating future plans of action to address racism and support Black, Indigenous, and People of Color <sup>11</sup>. Symposia on similar topics as the ones organized by the DIC, addressing issues of bias and gender inequalities, are also taking place at other major neuroscientific conferences, such as the Federation of European Neuroscience Societies (FENS) <sup>12</sup>, and the Society for Neuroscience <sup>13</sup>.

##### 4.2. Code of conduct

Codes of Conduct provide a set of rules and values which a given organization and its members are expected to follow. Codes of Conduct have been popularized by open source projects, where they have seen broad adoption (Tourani et al., 2017). Codes of Conduct are particularly important for any public events or projects, where they have been introduced to combat persistent discrimination against women and minority contributors (Finley, 2017). A Code of Conduct can be created to address both general (e.g. power dynamics, and negative consequences for victims who speak up) as well as organization-specific problems, and is recommended for any organization/society to have.

Such a document can set explicit guidelines for what constitutes inappropriate behavior within a society, and set rules for how to address this behavior. At OHBM, the DIC has put in place a **Code of Conduct** since 2019 (Table 2). The OHBM Code of Conduct applies to all event venues and online activities managed by the organization, including the annual meeting, afternoon and evening social events, educational courses, year-round OHBM Chapter activities, and online content posted under OHBM hash tags. Adopting a Code of Conduct follows the approach of other neuroscience-focused scientific societies such as the **Society for Neuroscience**, **Social and Affective Neuroscience Society**, and the **Cognitive Neuroscience Society** in providing concrete guidelines to support membership.

In its Code of Conduct, OHBM has also laid out specific consequences for discrimination in all forms and at every organizational level. Acts of discrimination or harassment of conference participants and organizers are considered a serious breach of the OHBM's spirit of diversity. As written in the Code of Conduct "harassment reduces the value of our community for everyone", and thus OHBM has committed to put in place procedures that allow for safe reporting of harassment, as well

<sup>7</sup> <https://www.ohbmbrianmappingblog.com/blog/you-spoke-we-listened-steering-a-new-course-with-respect-to-gender-equity>.

<sup>8</sup> <https://www.ohbmbrianmappingblog.com/blog/qa-with-uta-frith>.

<sup>9</sup> <https://www.ohbmbrianmappingblog.com/blog/ohbm-2020-diversity-round-table-intersection-between-neuroscience-and-the-lgbtq-community>.

<sup>10</sup> <https://www.ohbmbrianmappingblog.com/blog/family-friendly-activities-during-the-ohbm-2020-virtual-annual-meeting>.

<sup>11</sup> <https://www.ohbmbrianmappingblog.com/blog/ohbm-statement-george-floyd-and-black-lives-matter>.

<sup>12</sup> <https://fenskavlinetwork.org/dealing-with-gender-bias/>.

<sup>13</sup> <https://www.sfn.org/initiatives/women-and-neuroscience>.

as enforcement to keep the event a welcoming environment for all participants. Reporting can be either in person, by contacting one of the members of the OHBM executive office, or anonymously, by filling in a web form. The Code of Conduct is a living document, and the DIC expects to continue to update its guidelines and enforcement procedures in order to better meet the needs of OHBM community members as our activities broaden their scientific scope.

##### 4.3. Family-friendly activities

Researchers who are also parents often struggle to attend conferences, while fulfilling childcare duties (Calisi and a Working Group of Mothers in Science, 2018; Pinho-Gomes et al., 2020). The DIC recognized that OHBM traditionally provided scant resources for those traveling to the Annual Meeting with young children. Thus, starting in 2019, the DIC has been implementing ways to promote inclusivity for meeting attendees with young children (Table 2).

**Child care grants:** Leaving children behind while one or both parents attend the Annual Meeting is not always a viable option. Some parents choose to bring their children along with them when they travel to the conference. Finding a trustworthy local childcare arrangement in an unfamiliar city is a difficult and daunting task. As early as 2017, OHBM began providing onsite childcare during the annual conference. However, many children, especially young ones, are uncomfortable being cared for by a stranger, which makes "on-site" day care options at the conference venue less desirable for both children and parents. Parents often end up paying out of pocket for an alternative caretaker (e.g. another family member) to travel to the conference with them. This puts a financial strain on working parents who are likely paying for their regular childcare "back home" while away at the conference. In 2019, OHBM began offering childcare stipends (up to \$750 US) to help offset the costs of childcare described above. Preference was given to trainees and early career researchers who are hit hardest by this extra conference-associated expense.

**Onsite child-friendly activities at the Annual Meeting:** Another way that the DIC has promoted inclusion of researchers who attend the Annual Meeting with their children is by providing child-friendly activities at the conference venue. In 2019, children were encouraged to use art materials and use a play space located next to the Brain-Art exhibits. These activities helped keep the children entertained during conference venue visits. These child-friendly art activities were well-received by the conference attendees (see Future directions). Continuing the successful collaboration with the Brain-Art SIG, there will be brain science-related arts and craft activities for children of all ages at future Annual Meetings <sup>14</sup> (see Future directions).

**Communicating science to children:** In the 2020 meeting, we further expanded activities available to families. We organized for the first time a *Frontiers for Young Minds Live Review* event which aimed to use the conference as an opportunity to encourage communicating science and developing critical thinking and science literacy in children aged 8-15 years old. Scientists submitted a short article to *Frontiers for Young Minds*<sup>15</sup>, written for a young audience, and presented it at the event. Children acted as reviewers, questioning the scientists with the guidance of mentors (often their parents). The children decided whether to accept or reject the article as a means of experiencing the peer review process and learning to critically evaluate scientific material. The live review for 2020 was hosted virtually and is available for viewing for OHBM members from the OHBM website's OnDemand feature. Moreover, the council has approved an open broadcast of the live review, in order to make it accessible to all children. Lastly, the articles that were presented during the live review have been published in *Frontiers for Young Minds*,

<sup>14</sup> <https://www.ohbmbrianmappingblog.com/blog/family-friendly-activities-during-the-ohbm-2020-virtual-annual-meeting>.

<sup>15</sup> <https://kids.frontiersin.org/>.



in an open access format (Blok and White, 2020; Girgis 2020; Korn and Rosenblau 2020; Loudjani et al., 2020; Mills and Mcgrath 2020), and they will also appear in the form of an e-book.

#### 4.4. Diversity award

Improving diversity is crucial, but often falls in the category of ‘invisible’ and labor-intensive work. To recognize scientists who are contributing to enhancing diversity within OHBM and more generally in academia, the DIC has introduced a new award to honor champions of diversity. This award will be aimed at individuals or groups who have exemplified deliberate efforts to mentor members from underrepresented groups within the brain mapping community, or have demonstrated activities that advocated for and advanced diversity and inclusivity within OHBM and beyond. This award was approved in 2020, and the Inaugural Award will be presented at the 2021 Annual Meeting.

#### 4.5. Diversity and inclusivity while transitioning to an online meeting

Due to the COVID-19 global pandemic, the 2020 annual meeting planning transitioned from in-person to virtual as the evolving situation made clear that a large gathering would not be possible. One positive outcome of this pivot from in-person to virtual was that the meeting became in many ways more accessible to those who would otherwise not have been able to attend in person due to cost, travel restrictions, or care-taking responsibilities. For the first time, in addition to individual registrations, the option for lab registrations was made available. This entailed paying a flat fee that permits attendance of multiple lab members from the same research group. This option was enthusiastically embraced by the OHBM community: 185 labs registered, with a total of 2,021 lab members participating. Going forward, if virtual and hybrid in-person/virtual meetings become the norm, there has been discussion of continuing this group registration option for future annual meetings to further improve accessibility and further the goals of inclusivity for researchers around the globe at various career stages.

## 5. Discussion

### 5.1. Limitations and challenges faced by the DIC

Despite the positivity that the DIC has encountered within OHBM leadership and membership, its work has come with many challenges. First, work in the area of increasing diversity is often invisible and underappreciated, despite its huge potential to bring positive change in academia. Work performed by the OHBM DIC members is voluntary and for most members it is very different from their formal scientific training and research background. The DIC frequently needs to deal with challenges that intersect with the fields of sex and gender studies, social psychology, sociology, ethics, and even law enforcement. Drafting the Code of Conduct for OHBM was one such challenge, since it needed to be as inclusive and accommodating as possible, while at the same time allowing for freedom of expression. Moreover, effectively enforcing the Code of Conduct remains an open problem not only for OHBM, but also for other communities (Havergal, 2019). Given that diversity/inclusivity initiatives such as OHBM’s often task its Committee members to address challenges in uncharted territories, it not only requires Committee members to invest substantial formal and informal training time, but can also severely tax their emotional resources.

Second, diversity work is challenging due to its very nature. Inclusivity may have different nuanced meanings for different individuals, and considering them all, in a community as large and international as OHBM, can be a demanding task. In particular, one challenge that the DIC has faced has been to ensure that its various activities are not affected by possible implicit biases of its members. Indeed, the DIC needs to ensure that it does not neglect needs of the wider OHBM community, while prioritizing actions deemed important by DIC members.

Third, there are several directions that our committee has not had the time, resources or expertise to pursue. Class, and intersection of race, class, and gender is one such example. Another example is disabilities, where with the exception of some first steps for hearing loss, the DIC still has a long way to go. To achieve this, a considerable amount of effort is put into making sure that the committee’s agenda is taking into account the very diverse voices of OHBM. The GAFF meetings that are held every year, as well as in-person feedback have proven valuable points of self-reflection. We would encourage other organizations to hold such assemblies, in order to gather diverse feedback from their membership and identify open problems.

Fourth, engaging privileged groups remains a challenge. The DIC has, since its inception, received strong support from the council and several OHBM members that are part of privileged groups. However, we still have a long way to go to effectively reach and educate all privileged individuals about diversity and implicit bias. Diversity training has been shown to be efficient in improving attitudes towards individuals who are at a disadvantage, due to increased awareness of privilege (Ehrke et al., 2020). Our future goal is therefore to increase engagement with the privileged groups, by (a) providing education materials in the form of blog posts, or future symposia, aiming at increasing awareness of implicit bias; (b) organizing our future annual symposia at time-slots that have minimal overlap with other scientific sessions; (c) focusing future anti-harassment or bias training on perpetrators, instead of victims; (d) contributing to diversity training for all OHBM committees, which will be extended to both new incoming members as well as currently serving ones. Although these initiatives are not forced upon OHBM members, our goal is to use them for reducing bias by increasing awareness and engagement with the privileged groups. Moreover, these activities are meant to increase solidarity among OHBM members, by exposing them to the challenges faced by different underprivileged groups. In all workshops and training sessions, special emphasis needs to be given to not propagate existing stereotypes, but instead to promote values of acceptance and inclusivity. As an example, training needs to avoid pushing the minority group to change towards acquiring qualities generally associated with the majority group (e.g. traditionally accepted leadership qualities), but instead, to attempt to challenge stereotypes and harmful attitudes within the majority group itself.

Last, but not least, one challenge the committee is currently facing is keeping the momentum of the positive reception that it has encountered. Despite having increased the gender ratio and geographic representation among leadership and speakers, this remarkable progress may very easily halt unless the committee keeps actively pursuing its goals. One constant reminder that needs to be given to the academic community is that bias and lack of inclusivity are multi-faceted problems that manifest in complex ways at a societal level, and cannot be solved by one single committee. Moving forward, there is a clear need to reinforce and extend the committee’s efforts to include additional voices of the OHBM community, and potentially interact with other organizations and institutes to coordinate activities that promote diversity and inclusivity on a wider scale.

### 5.2. Future directions for DIC and academic conferences

#### 5.2.1. Moving towards international norms and intersectionality

Given that most academic conferences are not limited to a single geographic location, their organization needs to adhere to international norms of diversity. The terms used to describe minority groups, as well as the conventions of what constitutes a minority group might differ from one country to another. In order to be inclusive, registration forms that collect demographic information and calls for open seats should carefully consider the norms that they follow. Conferences could encourage their membership to share their demographic data, in order to formulate new initiatives and address any potential inequities. This, however, cannot be achieved without data, and as scientists it is important to design future plans of action based on objective evidence. In

December of 2020, a Survey of Member Views on Inclusivity at OHBM was launched in order to begin to collect data that will critically inform future activities of the DIC. Considering that diversity manifests over several axes, future diversity initiatives also need to consider which of those they aim at covering. Importantly, these axes, reflecting different identities or minority statuses are not independent, but intersect with one another. As an example, women of color are severely underrepresented in academia, and are present at a much lower ratio than their white female colleagues (Armstrong and Jovanovic, 2017). Moving forward, academic societies, including OHBM, should cater to the needs of their diverse membership, acknowledging intersecting identities and highlighting more representative role models.

Furthermore, we need to consider individuals working in underserved countries who can greatly benefit from the work being shared at scientific organizations like OHBM, but are economically disadvantaged relative to those working in wealthier countries. More efforts need to be put in place to encourage global participation, by adjusting for example, registration fees with the level of income in each country. It is the tweaking of existing initiatives, together with the formulation of new initiatives, that will allow all organizations to ensure that neuroimaging science has a broader impact globally, and better serves the scientific needs in underrepresented nations. As OHBM focuses on bringing together researchers in neuroimaging, this often concentrates the meetings and activities of the organization in richer countries due to the expensive equipment required to conduct such research. Although several conferences, including OHBM have taken steps to provide travel awards to students from less wealthy nations, there is still much work to be done in this area <sup>16</sup>.

### 5.2.2. Increasing support for historically underrepresented racial and ethnic groups

As science knows no borders, scientific organizations need to acknowledge the struggles faced by historically underrepresented racial and ethnic groups. Although OHBM and the DIC are promoting values of inclusivity, tolerance and respect, our actions have not sufficiently addressed all groups. Following the murders of African-Americans George Floyd, Breonna Taylor, and Ahmaud Arbery, and protests around the world supporting the Black Lives Matter movement in 2020, along with the stories of Black academics shared under the #BlackintheIvory hashtag, the DIC began to confront issues related to anti-Black racism and the dominance of Western White norms in academia.

The DIC made the decision to issue a *Statement of Action*, describing its plans to combat systemic racism that unfortunately is present in academia<sup>17</sup>, both within our sub-discipline of brain mapping and beyond. It is near impossible to find statistics regarding the racial and ethnic makeup of neuroscientists across the globe. The Society for Neuroscience issued a report<sup>18</sup> of a survey of neuroscience departments, both in the US and internationally in an attempt to obtain a demographic breakdown of students, postdocs and faculty. While data were not obtained from programs outside of the US, 1% of neuroscience faculty were Black or African American, 3% Hispanic or Latino, and 0% Indigenous within the US. These numbers cover the whole field of neuroscience, and we expect the numbers in the sub-field of brain mapping to be even smaller.

To address the racial/ethnic diversity problem within OHBM, we drafted a plan of action to start gathering demographic data on the composition of the OHBM membership. This plan of action was approved, and allows the DIC to explicitly assess the level of participation from historically underrepresented racial and ethnic groups. Data gathering

is currently being followed up by an anonymous survey to assess to what degree OHBM members feel welcome and have access to all necessary facilities during OHBM activities (with the previously mentioned Survey of Member Views on Inclusivity at OHBM). Our goal is to identify concerns and flag problems for planning and implementing corrective action, to better support Black, Indigenous, and People of Color (BIPOC) individuals, as well as other groups to whom we have not provided sufficient support to date. In addition, future efforts will further focus on increasing diversity and ensure that our speakers and awardees are diverse in terms of race/ethnicity as well as gender and geographical region. We also acknowledge that our action plan is only a first step in the overall goal of increasing support for racial and ethnic minorities in the field of brain mapping. We encourage other organizations to follow similar approaches in gathering data and receiving feedback from their membership regarding the level of support that they need.

### 5.2.3. Introducing non-binary gender definitions and support for LGBTQ+ members

Some of the efforts that our committee has pursued so far have focused on improving the representation of women scientists within OHBM. In the future, our committee will continue to ensure that women are represented within OHBM leadership, talks and awards. One of our goals moving forward is to work towards non-binary gender definitions, and increase accessibility and visibility of non-binary scientists.

An important consideration in formulating research questions and demographic questionnaires is the definition of sex and gender. The assumption that sex and gender can be equated and that both are binary concepts inherently limits the extent to which research can represent a given population, and limits the participant pool. The fact that trans and intersex individuals are faced with selecting only one of two options when asked to state gender and/or sex (or when a researcher collects this information without consulting the participant) compromises the accuracy of these data, as individuals may misrepresent themselves to fit into the assumed parameters. To avoid this issue, forms collecting demographic information about biological sex should either offer “male”, “female”, and “intersex” as response options, or leave response fields blank for participants to fill out as they wish. As a first, in 2020, OHBM approved the use of pronoun stickers on participants’ badges, before the meeting transitioned to a virtual event. This important step, that we encourage all academic societies to take, recognises that all individuals should have the freedom to state their preferred gender pronouns. Explicit stating of preferred pronouns (e.g. she/her, they/them) is encouraged on social media and at some institutions and conferences (e.g. Mozilla Festival <sup>19</sup>). While the expectation of explicit sharing of gender pronouns is not always viewed as positive by LGBTQ+ scholars, there is an agreement that being addressed in a way that fundamentally misrepresents one’s identity is a painful and invalidating experience (see personal essays <sup>20 21</sup>). Therefore, allowing all conference attendees to display pronouns if they so wish will encourage inclusivity (Siegel, 2019). All academic meetings should recommend that gender neutral language is used, such as “Dear attendees/colleagues/all” or “they”, whenever addressing their membership. Moreover, participants who may change their name during transition should be given the option to update their name on name tags, submitted abstracts and correspondence.

Another first in 2020 was that OHBM approved bathrooms for individuals who identify themselves as neither male nor female. Future attempts should ensure that non-gendered bathrooms are made available at all in-person scientific meetings. Other directions aimed at improving inclusivity for LGBTQ+ members include hosting social LGBTQ+ events,

<sup>16</sup> <https://www.youtube.com/watch?v=RRwuOs0BA4I&t=8s>.

<sup>17</sup> <https://www.ohbmbraintmappingblog.com/blog/ohbm-statement-george-floyd-and-black-lives-matter>.

<sup>18</sup> [https://www.sfn.org/-/media/SfN/Documents/Survey-Reports/Final-SfN\\_2016-NDP-Survey-Executive-Summary.pdf?la=en&hash=1C38873C17898286CE9D14488EA390E4F1CC1227](https://www.sfn.org/-/media/SfN/Documents/Survey-Reports/Final-SfN_2016-NDP-Survey-Executive-Summary.pdf?la=en&hash=1C38873C17898286CE9D14488EA390E4F1CC1227).

<sup>19</sup> <https://github.com/MozillaFoundation/mozfest-design-2019/issues/38>.

<sup>20</sup> <https://publicseminar.org/essays/the-performance-of-transgender-inclusion/>.

<sup>21</sup> <https://www.deanspade.net/2018/12/01/we-still-need-pronoun-go-rounds/>.

such as for example at the Society for Neuroscience, and explicitly stating a zero-tolerance policy towards homophobic language and behavior.

#### 5.2.4. Expanding family-friendly activities

Childcare grants are an essential part of parental support, and are now available at a number of conferences. For example, OHBM and other conferences such as FENS are providing childcare grants, with a preference to junior scientists or presenters<sup>22</sup>. While childcare provisions have increased there is still some way to go to ensure inclusion of parents at all stages of their academic career, and with children of all ages and needs.

Apart from financial support in the form of childcare grants, simple resources can be made available to parents attending a conference. A list of local child friendly venues, playgrounds and on-site activities can help parents plan their days and keep their children entertained. Knowledge of the location of nursing rooms and facilities will aid new parents who are breastfeeding or pumping milk.

Moreover, there is an ongoing effort to provide more onsite facilities for parents attending the conference without an additional caregiver. Keynote lectures have been live-streamed. A future aim is to provide viewing rooms on-site where sessions can be live-streamed and activities for children can be simultaneously provided. This serves to make parents feel less self-conscious if their children cause a disturbance during a session, whilst allowing them to make the most of the scientific content. To a certain extent this is constrained by the availability of facilities in the conference venue. An alternative to on-site viewing rooms is the provision of private on-line screening channels that allow parents to view sessions from their local accommodation. This option is particularly useful for nursing mothers or times in the day when children need naps or feeding.

Of note, the fact that the 2020 annual meeting of OHBM was necessarily a virtual event provided an unprecedented opportunity for parents who would not normally travel to participate. OHBM and other organizations are evaluating options for virtual and hybrid virtual/in-person conferences for the future, which can further the goals of inclusivity and accessibility, with the added positive effect of reducing carbon emissions resulting from conference travel.

#### 5.2.5. Accessibility for scientists with visible and invisible disabilities

**Accessibility for scientists with hearing loss:** Thanks to advances in early diagnosis of hearing loss followed by developments in auditory prostheses and hearing aids, more people with hearing loss aspire to careers in STEM. Yet attending conferences such as OHBM can be challenging for people with hearing loss. Fortunately, the emergence of smartphones, tablets, and the expansion of computational power via the cloud now make it possible to leverage automatic speech recognition (ASR) technology. ASR transcribes speech to text in real time in a variety of situations including conferences. Current ASR technology has a 15% word error rate (WER), though WER in trained models can drop to 5%, thereby making them comparable to transcription provided by humans. This has tremendous potential for making scientific communication more accessible not only for those with hearing loss (disclosed or undisclosed), but also for people for whom English is not their native tongue, or for people with learning disabilities. Since this is a rapidly evolving technology that has yet to mature, it is recommended to follow the latest recommendations<sup>23 24</sup>. The three factors that provide the best possible outcomes are clear speech, audibility (via synchronised high fidelity microphones) and optimal WIFI signal. Rather than wait for the time when 5% WER is consistently attained, it will be proactive for all academic conferences to embrace and adapt this technology now.

**Accessibility for scientists with non-visible disabilities:** As exemplified by the case of scientists with undisclosed hearing loss (reviewed above),

not all conditions that hamper participation in our community's activities are immediately apparent. Other examples include chronic health conditions which may result in pain, reduced mobility or sensory limitations. Non-visible disabilities are often overlooked and/or misunderstood, leading to discrimination, exclusion and stigma. Hence, conference organizers and attendees should, at a minimum, respect everyone's limitations by paying attention to each other's needs and directly asking (when appropriate) how they can help. Over the past years, OHBM has implemented good practices to increase participation and engagement. All conferences are encouraged to consider online portals, like the OHBM On Demand<sup>25</sup> service, to offer access to educational courses, symposia, and lectures recorded during their annual meetings. In addition, the audience can be encouraged to ask questions online. Moving forward, conferences should employ technological resources to widen their impact to a broad membership, and not just those who can physically attend.

Accessibility for other disabilities: Future attempts will focus on increasing accessibility for scientists who have other forms of disabilities, such as using wheelchairs, or scientists with vision loss. In order to account for onsite adjustments/modifications at the Annual Meetings that will increase accessibility for scientists with disabilities, all conferences should consider asking how they can help on the registration form. For example, participants should be able to indicate conditions that would restrict their participation (e.g. "I cannot present my poster for 1h if I have to be standing the whole time").

#### 5.3. Discussion of steps that other organizations could take to increase the visibility of underrepresented scientists

Several organizations have implemented solutions to certain existing problems of diversity and inclusion. For example, the UNESCO International Bureau of Education (IBE) has proposed the issue of gender equality in STEM education as a global imperative. Similarly, the Center for Women in Science, Engineering and Technology (WISET)<sup>26</sup> in South Korea has been working on the development of a special policy to increase participation of women scientists in STEM. Recently, they gathered together for a special seminar entitled "The Global Gender Equality Imperative in STEM Education" at the International Bureau of Brain IBRO 2019, World Congress of Neuroscience in Daegu, South Korea<sup>27</sup>.

With the present article we would like to encourage all organizations to highlight the work that they have been doing to increase diversity and inclusivity among their members. Only by learning from each other and by sharing our successes as well as failures can we make substantial progress in increasing inclusivity in scientific societies and academia more broadly. Below we summarize the ongoing activities of the OHBM DIC as one example for improving diversity and inclusivity in our neuroimaging community.

- Educate membership about implicit bias, harassment and inclusivity through workshops, lectures and round table discussions. Organizations should use their pivotal role in training scientists to provide additional training in issues of diversity.
- Adopt a code of conduct. This document can render in-person and online events inclusive for all members.
- Collect demographic data about membership, leadership and speakers. Concrete demographic data enable an organization to become more aware of their composition, and allow for biases and imbalances to be more easily identified and corrected.
- Have clearly assigned representatives or committees responsible for designing and maintaining an inclusive culture and policy.

<sup>25</sup> <https://www.pathlms.com/ohbm>.

<sup>26</sup> <https://www.wiset.or.kr/eng/main.jsp>.

<sup>27</sup> [http://www.ibro2019.org/index.php?gt=pro/pro03&handler=view\\_lun&key=188](http://www.ibro2019.org/index.php?gt=pro/pro03&handler=view_lun&key=188).

<sup>22</sup> <https://forum2018.fens.org/young-investigators/childcare-grants.html>.

<sup>23</sup> [www.deafearsScientists.org/accessibility](http://www.deafearsScientists.org/accessibility).

<sup>24</sup> [www.connect-hear.com](http://www.connect-hear.com).

- Have a diverse leadership. This sends a strong message to all members that diversity and inclusivity is valued by the organization.
- Promote diverse role models through keynote lectures, symposia and awards. Apart from doing justice to the work of a diverse group of scientists, early career researchers from underrepresented groups can also relate to these role models.
- Draft a policy for facilitating attendance at events for members with childcare duties. Childcare grants, breastfeeding rooms, outreach sessions for kids, and remote attendance are a few of the many steps that organizations can take to accommodate families.
- Be transparent about possible biases and solutions taken to address them. This can send a strong message to all members that inclusivity is not being taken lightly.

In the 21st century scientific organizations should make efforts to move beyond existing power structures by integrating principles of equity and inclusivity in their core values. These actions will benefit not only the science being conducted, but also the society it serves.

### Data availability

The data presented in this manuscript can be made available by the corresponding authors upon reasonable request.

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### References

Armstrong, M.A., Jovanovic, J., 2017. The intersectional matrix: rethinking institutional change for URM women in STEM. *J. Divers. High. Educ.* 10, 216–231. doi:10.1037/dhe0000021.

Bielczyk, N.Z., Ando, A., Badhwar, A., Caldinelli, C., Gao, M., Haugg, A., Hernandez, L.M., Ito, K.L., Kessler, D., Lurie, D., Makary, M.M., Nikolaidis, A., Veldsman, M., Allen, C., Bankston, A., Bottenhorn, K.L., Braukmann, R., Calhoun, V., Cheplygina, V., Boffino, C.C., Ercan, E., Finc, K., Foo, H., Khatibi, A., La, C., Mehler, D.M.A., Narayanan, S., Poldrack, R.A., Raamana, P.R., Salo, T., Godard-Sebillotte, C., Uddin, L.Q., Valeriani, D., Valk, S.L., Walton, C.C., Ward, P.G.D., Yanes, J.A., Zhou, X.,

2020. Effective self-management for early career researchers in the natural and life sciences. *Neuron* 106, 212–217. doi:10.1016/j.neuron.2020.03.015.

Blackaby, D., Frank, J., 2000. Ethnic and other minority representation in UK academic economics. *Econ. J.* 110, F293–F311. doi:10.1111/1468-0297.00540.

Blok, E., White, T., 2020. Why are some children more easily frustrated than others? Irritability and the brain. *Front. Young Minds.* 8, 558673. doi:10.3389/frym.2020.558673.

Calisi, R.M., a Working Group of Mothers in Science, 2018. Opinion: how to tackle the childcare–conference conundrum. *Proc. Natl. Acad. Sci.* 115, 2845–2849. doi:10.1073/pnas.1803153115.

Crissman, H.P., Stroumsa, D., Kobernik, E.K., Berger, M.B., 2019. Gender and frequent mental distress: comparing transgender and non-transgender individuals' self-rated mental health. *J. Womens Health* 28, 143–151. doi:10.1089/jwh.2018.7411.

Dunn, K., 2007. Why It's Important for you to Present Your Data at Scientific Conferences.

Ehrke, F., Ashore, A., Steffens, M.C., Louvet, E., 2020. A brief diversity training: Raising awareness of ingroup privilege to improve attitudes towards disadvantaged outgroups. *Inter. J. Psychol.* doi:10.1002/ijop.12665.

English, R., Fenby-Hulse, K., 2019. Documenting diversity: the experiences of LGBTQ+ doctoral researchers in the UK. *Int. J. Dr. Stud.* 14, 403–430. doi:10.28945/4328.

Fagan, J.F., Holland, C.R., 2002. Equal opportunity and racial differences in IQ. *Intelligence* 30, 4. doi:10.1016/S0160-2896(02)00080-6.

Fang, D., 2000. Racial and ethnic disparities in faculty promotion in academic medicine. *JAMA* 284, 1085. doi:10.1001/jama.284.9.1085.

Finley, 2017. Diversity in Open Source is Even Worse Than in Tech Overall.

Fox, C.W., Ritchey, J.P., Paine, C.E.T., 2018. Patterns of authorship in ecology and evolution: first, last, and corresponding authorship vary with gender and geography. *Ecol. Evol.* 8, 11492–11507. doi:10.1002/ece3.4584.

Girgis, F., 2020. Brain surgery to treat seizures. *Front. Young Minds.* 8, 557949. doi:10.3389/frym.2020.557949.

Greathouse, M., BrckaLorenz, A., Hoban, M., Huesman, R., Rankin, S., Stolzenberg, E.B., 2018. Queer-Spectrum and Trans-Spectrum Student Experiences in American Higher Education: The Analyses of National Survey Findings doi:10.7282/T3-44FH-3B16.

Hannam-Swain, S., 2018. The additional labour of a disabled PhD student. *Disabil. Soc.* 33, 138–142. doi:10.1080/09687599.2017.1375698.

Haverlag, 2019. Open Science Advocate Apologises Over 'Inappropriate Behaviours'.

Henrich, J., Heine, S.J., Norenzayan, A., 2010. The weirdest people in the world? *Behav. Brain Sci.* 33, 61–83. doi:10.1017/S0140525X0999152X.

Hofstra, B., Kulkarni, V.V., Munoz-Najar Galvez, S., He, B., Jurafsky, D., McFarland, D.A., 2020. The diversity–innovation paradox in science. *Proc. Natl. Acad. Sci.* 117, 9284–9291. doi:10.1073/pnas.1915378117.

Hong, L., Page, S.E., 2004. Groups of diverse problem solvers can outperform groups of high-ability problem solvers. *Proc. Natl. Acad. Sci.* 101, 16385–16389. doi:10.1073/pnas.0403723101.

Hoppe, T.A., Litovitz, A., Willis, K.A., Meseroll, R.A., Perkins, M.J., Hutchins, B.L., Davis, A.F., Lauer, M.S., Valantine, H.A., Anderson, J.M., Santangelo, G.M., 2019. Topic choice contributes to the lower rate of NIH awards to African-American/black scientists. *Sci. Adv.* 5, eaaw7238. doi:10.1126/sciadv.aaw7238.

Kersey, A.J., Csumitta, K.D., Cantlon, J.F., 2019. Gender similarities in the brain during mathematics development. *npj Sci. Learn.* 4, 19. doi:10.1038/s41539-019-0057-x.

Korn, C., Rosenblau, G., 2020. How do teens and adults learn about other people? *Front. Young Minds.* 8, 563084. doi:10.3389/frym.2020.563084.

Loudjani, S., Narayanan, S., Haqqani, A., Badhwar, A., 2020. How your blood knows your brain is sick. *Front. Young Minds.* 8, 561561. doi:10.3389/frym.2020.561561.

Master, A., Cheryan, S., Moscatelli, A., Meltzoff, A.N., 2017. Programming experience promotes higher STEM motivation among first-grade girls. *J. Exp. Child Psychol.* 160, 92–106. doi:10.1016/j.jecp.2017.03.013.

Mattheis, A., De Arellano, D.C.-R., Yoder, J.B., 2019. A model of queer STEM identity in the workplace. *J. Homosex.* 1–25. doi:10.1080/00918369.2019.1610632.

Mills, C., Mcgrath, C., 2020. A boring overview. *Front. Young Minds.* 8, 558229. doi:10.3389/frym.2020.558229.

Nielsen, M.W., Alegria, S., Börjeson, L., Etkowitz, H., Falk-Krzesinski, H.J., Joshi, A., Leahey, E., Smith-Doerr, L., Woolley, A.W., Schiebinger, L., 2017. Opinion: gender diversity leads to better science. *Proc. Natl. Acad. Sci.* 114, 1740–1742. doi:10.1073/pnas.1700616114.

Pinho-Gomes, A.-C., Peters, S., Thompson, K., Hockham, C., Ripullone, K., Woodward, M., Carcel, C., 2020. Where are the women? Gender inequalities in COVID-19 research authorship. *BMJ Glob. Health* 5, e002922. doi:10.1136/bmjgh-2020-002922.

Price, M., Salzer, M.S., O'Shea, A., Kerschbaum, S.L., 2017. Disclosure of mental disability by college and university faculty: the negotiation of accommodations, supports, and barriers. *Disabil. Stud. Q.* 37. doi:10.18061/dsq.v37i2.5487.

Prock, K.A., Berlin, S., Harold, R.D., Groden, S.R., 2019. Stories from LGBTQ social work faculty: what is the impact of being "out" in academia? *J. Gay Lesbian Soc. Serv.* 31, 182–201. doi:10.1080/10538720.2019.1584074.

Reicherzer, S., 2008. Evolving language and understanding in the historical development of the gender identity disorder diagnosis. *J. LGBT Issues Couns.* 2, 326–347. doi:10.1080/15538600802502035.

Rogers, L.O., Meltzoff, A.N., 2017. Is gender more important and meaningful than race? An analysis of racial and gender identity among Black, White, and mixed-race children. *Cultur. Divers. Ethnic Minor. Psychol.* 23, 323–334. doi:10.1037/cdp0000125.

Sánchez, J.P., Peters, L., Lee-Rey, E., Strelnick, H., Garrison, G., Zhang, K., Spencer, D., Ortega, G., Yehia, B., Berlin, A., Castillo-Page, L., 2013. Racial and ethnic minority medical students' perceptions of and interest in careers in academic medicine. *Acad. Med.* 88, 1299–1307. doi:10.1097/ACM.0b013e31829f87a7.

Schroeder, J., Dugdale, H.L., Radersma, R., Hirsch, M., Buehler, D.M., Saul, J., Porter, L., Liker, A., De Cauwer, I., Johnson, P.J., Santure, A.W., Griffin, A.S., Bolund, E., Ross, L.,

- Webb, T.J., Feulner, P.G.D., Winney, I., Szulkin, M., Komdeur, J., Versteegh, M.A., Hemelrijk, C.K., Svensson, E.I., Edwards, H., Karlsson, M., West, S.A., Barrett, E.L.B., Richardson, D.S., van den Brink, V., Wimpenny, J.H., Ellwood, S.A., Rees, M., Matson, K.D., Charmantier, A., dos Remedios, N., Schneider, N.A., Teplitsky, C., Laurance, W.F., Butlin, R.K., Horrocks, N.P.C., 2013. Fewer invited talks by women in evolutionary biology symposia. *J. Evol. Biol.* 26, 2063–2069. doi:[10.1111/jeb.12198](https://doi.org/10.1111/jeb.12198).
- Shen, H., 2015. Scientific groups revisit sexual-harassment policies. *Nature* doi:[10.1038/nature.2015.18790](https://doi.org/10.1038/nature.2015.18790), 2015.18790.
- Siegel, D.P., 2019. Transgender experiences and transphobia in higher education. *Sociol. Compass* 13. doi:[10.1111/soc4.12734](https://doi.org/10.1111/soc4.12734).
- Smith, D.H., Andrews, J.F., 2015. Deaf and hard of hearing faculty in higher education: enhancing access, equity, policy, and practice. *Disability Soc.* 30 (10), 1521–1536.
- Sniatecki, J.L., Perry, H.B., Snell, L.H., 2015. Faculty attitudes and knowledge regarding college students with disabilities. *J. Postsecond. Educ. Disabil.* 28, 259–275.
- Tourani, P., Adams, B., Serebrenik, A., 2017. Code of conduct in open source projects. In: 2017 IEEE 24th International Conference on Software Analysis, Evolution and Reengineering (SANER). Presented at the 2017 IEEE 24th International Conference on Software Analysis, Evolution and Reengineering (SANER), IEEE, Klagenfurt, Austria, pp. 24–33. doi:[10.1109/SANER.2017.7884606](https://doi.org/10.1109/SANER.2017.7884606).
- Weisshaar, K., 2017. Publish and perish? An assessment of gender gaps in promotion to tenure in academia. *Soc. Forces* 96, 529–560. doi:[10.1093/sf/sox052](https://doi.org/10.1093/sf/sox052).
- Winter, S., Chalungsooth, P., Teh, Y.K., Rojanalert, N., Maneerat, K., Wong, Y.W., Beaumont, A., Wah Ho, L.M., Gomez, F.“Chuck”, Macapagal, R.A., 2009. Transpeople, transprejudice and pathologization: a seven-country factor analytic study. *Int. J. Sex. Health* 21, 96–118. doi:[10.1080/19317610902922537](https://doi.org/10.1080/19317610902922537).