AMERICAN SOCIETY FOR MICROBIOLOGY

December 18, 2020

Dear ASM Members and All Stakeholders,

An essential part of ASM's mission is to embrace diversity in the STEM community. Being inclusive enhances innovation, broadens the health research agenda and furthers scientific advancement. ASM is committed to fighting social injustice and racial disparities, as well as addressing systemic inequities in the microbial sciences and across the globe. We know that complex scientific problems can better be solved by harnessing diversity, tapping different perspectives, training, cultural backgrounds and experiences.

ASM vows to drive change in the microbial sciences, and we have been actively building on past efforts around inclusivity in 2020:

- ASM continues to advocate for policies that demand equality and inclusion in science and allow Black, Indigenous and People Of Color (BIPOC) in STEM to reach their full potential.

- ASM's Journals committee is taking steps to improve the representation of Black microbiologists in our family of journals and working toward gender equality in scientific publications after analysis showed that women are underrepresented and receive more negative outcomes.

- ASM published a collection of papers on inclusive science in the *Journal of Microbiology and Biology Education (JMBE)*. The issue covers 3 key areas: an understanding that inclusion is the foundation for the future of colleges and universities, the need for radical changes in faculty support and the removal of barriers to understand social issues and the university experience. Strategies for LatinX inclusion in microbiology programs are also highlighted in these papers.

- ASM joined #ShutDownSTEM to assist in eliminating racism and embracing diversity, equity and inclusion in our staff, volunteer leadership and membership.

- ASM was a gold sponsor of #BlackinMicrobiology week, a grassroots organization that highlights accomplishments of Black microbiologists from around the world and fosters a supportive community for their work.

- The Public and Scientific Affairs Committee (PSAC) Subcommittee on Microbiological Issues Impacting Minorities held a Capitol Hill briefing, "Strengthening Career Pathways in Science for Underrepresented Groups." The discussion encouraged Congressional staff and federal policymakers to build on advancements made by the House Science, Space and Technology Committee.

- Articles about diversity and inclusion are posted on asm.org, and will continue to be a core focus of ASM's content strategy.

- To help us better understand and meet the needs of our members and other stakeholders, ASM staff began refining and expanding how demographic information related to gender and race/ethnicity is collected.

Building on these actions and our commitment, ASM's Board is proud to share the findings of the ASM Diversity, Equity and Inclusion (DEI) Taskforce, which was formed at the request of ASM CEO Stefano Bertuzzi in June 2018 to assess the current landscape and make recommendations to build a culture of inclusion. The Taskforce presented its findings at ASM's December 2020 board meeting, and we thank them for the important work.

Addressing issues of equity, inclusion and diversity requires immediate action and will be an ongoing work in progress. While we look to the future, we will also continue taking actions that reflect and advance our vision of a more diverse scientific association. To this end, the Board voted for the following:

1. Form a Rapid Working Group to reform the nomination process for ASM's elected positions. This will ensure inclusiveness and diversity in our leadership ranks. Past President Robin Patel, Chair of the Governance Committee, will lead this group. The goal is to pilot a new process for the 2021 ASM elections.

2. Collect enhanced demographic data. Starting in 2021, ASM will capture race, gender and other demographics more effectively, so that we can measure our progress and adjust our efforts as needed.

3. Revise current position descriptions to ensure that our staff will be focused on, and held accountable for, always fostering a culture of diversity, equity and inclusion.

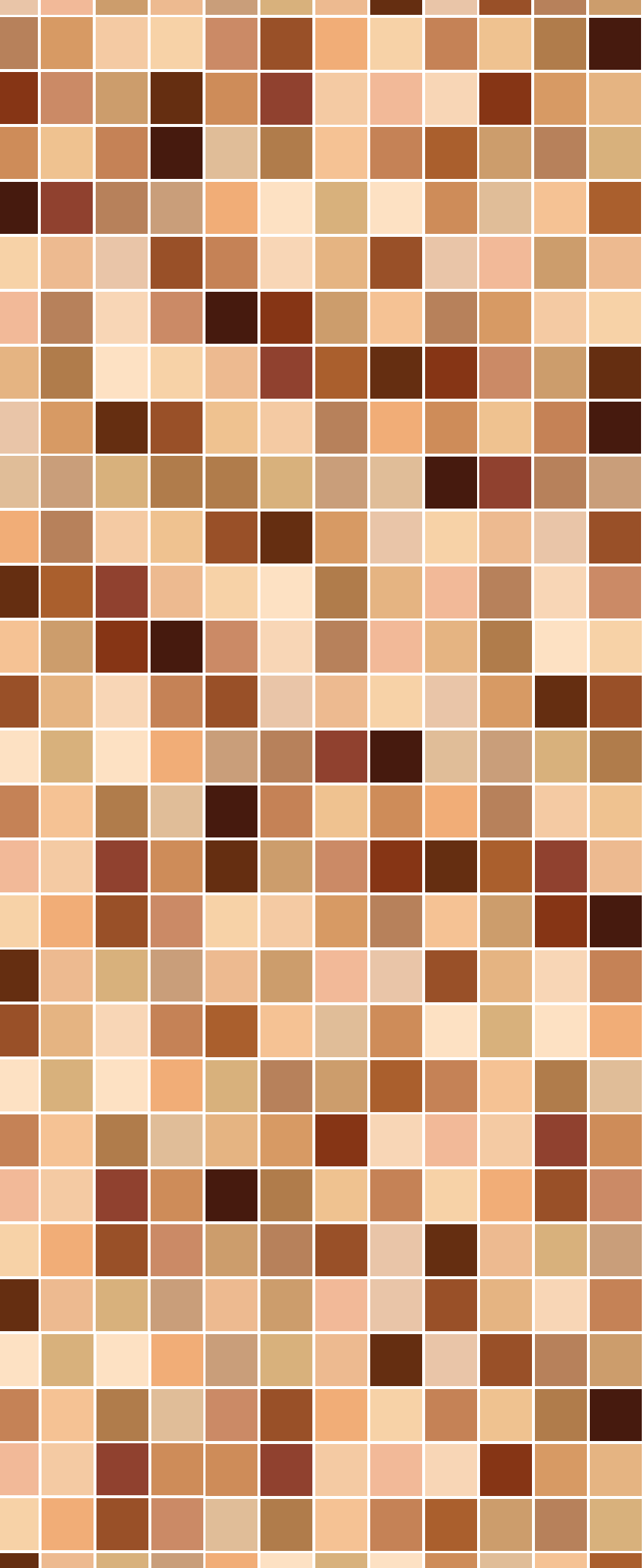
These actions are a rapid and clear response to some of the main recommendations in the task force report. However, we see them only as a start for Society-wide action in this area. The ASM Board of Directors will begin developing an action plan for taking further actions in 2021 and beyond.

Culture change is hard and requires continuous work. The ASM Board of Directors is committed to working hard to support and expand our scientific community as we advance the microbial sciences. We embrace a culture of diversity, equity and inclusion, and invite you to join us.

To gather broad input as we determine how best to act on the Task Force recommendations, we invite you to email us with your comments and thoughts on the report findings.

Sincerely,

Victor DiRita
Chair of the Board of Directors
ASM President (in representation of the whole ASM Board of Directors)



AMERICAN SOCIETY FOR MICROBIOLOGY

DIVERSITY, EQUITY AND INCLUSION TASK FORCE REPORT

Written by the ASM Diversity, Equity & Inclusion (DEI) Task Force.

www.asm.org

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EXECUTIVE SUMMARY

For over 100 years, ASM has been a leader for improving the health and environmental and economic well-being of all people. ASM achieves this work by publishing excellent journals and books, convening high-quality meetings and conferences, recognizing achievement and distinction, supporting education and public outreach, and setting standards of ethical and professional behavior. In June 2018, ASM Chief Executive Officer Stefano Bertuzzi urged ASM to elevate diversity and inclusion in the microbial sciences as key to maintaining this leadership in Science, Technology, Engineering and Mathematics (STEM) as the 21st century progresses. He recognized that it was time to examine ASM system-wide policies and unfavorable activities that perpetuate the lack of diversity in the microbial sciences, ultimately leading to the formation of the Diversity, Equity and Inclusion (DEI) Task Force and this report. The ASM Board of Directors (BoD) charged the Task Force to advise the ASM on elevating diversity and inclusion in the microbial sciences.

There is extensive literature explaining that inclusive diversity is essential for every organization's success. For example, the McKinsey Report Series "Diversity Wins" builds a strong case for diversity as a means of greater productivity. The McKinsey Report shows that the likelihood of outperforming peers on service, quality and success correlates with diversity, while the penalties are becoming steeper for workplaces lacking diversity. STEM lags behind in inclusive diversity. According to the 2019 U.S. Census, Whites made up 61% of the population, Hispanics 19%, Blacks 13%, and Asians 6%. Comparing these demographics with the make-up of STEM occupations, we recognize some disparities. According to studies about STEM occupations by the PEW Research Center, Whites make up 69% of the workforce, Hispanics 9% Blacks 7%, and Asians 13%. The demographics of respondents to the 2020 ASM Member Perception Survey suggests that the ASM membership is similar to STEM occupations. Of the U.S. member respondents, Whites make up 65%, Hispanics 12%, Blacks 5% and Asians 11% of the respondents. The ASM can only maintain its leadership standing among STEM societies if it welcomes all microbiologists and provides pathways for everyone to have equitable impact on the organization.

The Task Force first developed guiding principles and a diversity statement. Following this work, they undertook a comprehensive review of ASM policies and practices guided by the principles and informed by scholarship about inclusive diversity in STEM and beyond. They identified a professional equity, inclusion and diversity group to conduct a member climate survey.

The Task Force identified that a century of traditional practices in scientific training led to policies and behaviors that prevent broadening participation to all people. These practices perpetuated the overrepresentation of historically privileged groups in science and underrepresentation of historically excluded groups outside science, resulting in challenges across all ASM programs. The Task Force urges ASM to acknowledge the forces at play and affirm the extent they are prepared to embrace new, more inclusive practices, starting with the Board of Directors, Council on Microbial Sciences, program leaders for meetings and publications, and nominating and selection committees for Academy fellowships and awards. The ASM must balance broadening access to and participation of all people while maintaining ASM's unique standing and position of leadership.

To achieve the many lasting benefits of inclusive diversity at ASM will require a transformation. The Task Force envisions a period during which the full community, including early career members, members who are Black, Indigenous or People of Color (BIPOC), and global members, will be heard from and have influence on ASM decisions. Ultimately, science is better served when people with diverse backgrounds, experiences and perspectives are contributing.

This transitional period will give birth to and raise a new ASM – a home that honors microbial scientists with various perspectives, enabling all to share findings, engage in discourse, set policies and develop programs, and adjust current programs to promote and advance the microbial sciences. The intention of this report is to initiate the transformation and provide guidance for sustainable change.

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GUIDING PRINCIPLES, DIVERSITY AND VISION STATEMENTS

GUIDING PRINCIPLES

The Guiding Principles provide unwavering guidance for equity and inclusion efforts and serve to communicate core values:

- A diverse ASM enhances the microbial sciences, increases innovation, strengthens the community and sustains the profession.
- ASM empowers individuals with diverse perspectives in decision-making processes.
- ASM ensures equitable access and accountability through transparent procedures and communication.
- ASM attracts, supports and develops the community, ensuring that all are empowered and engaged in the work of the organization.

DIVERSITY STATEMENTS

The ASM Diversity Statements provide unwavering guidance for equity and inclusion efforts and mandate leaders' and members' behavior and practice:

- ASM exemplifies inclusive diversity with equity, access and accountability in the microbial sciences.
- In practice, ASM works to create a diverse community and a culture of inclusion where all staff, volunteers, members and the community are respected, treated fairly, and provided opportunities to develop professionally and excel in their chosen career pathway.

VISION STATEMENTS

The ASM Vision Statements are aspirational and provide unwavering benchmarks for success:

- ASM reflects the demographics of the U.S. population and the entire spectrum of professionals advancing and promoting the microbial sciences.
- ASM embodies a culture where all participants in the community flourish in their chosen career to promote and advance the microbial sciences.
- The community recognizes ASM for exemplary leadership in creating a respectful, equitable, engaging and empowering culture for all in the microbial sciences.
- ASM's mission is to promote and advance the microbial sciences with equity, inclusion and diversity.

RECOMMENDATIONS

GUIDING PRINCIPLE A:

A diverse ASM enhances the microbial sciences, increases innovation, strengthens the community and sustains the profession

1. ASM must increase the proportion of members from diverse populations to reflect the demographic diversity of the U.S. population and the entire spectrum of professionals advancing and promoting the microbial sciences.
2. ASM Board of Directors (BoD), Council on Microbial Sciences (COMS), program leaders for meetings and publications, and nominating and selection committees for science awards and Academy fellowships must ensure representation from historically excluded and underrepresented scientists in the microbial sciences.

GUIDING PRINCIPLE B:

ASM empowers individuals with diverse perspectives in decision-making processes

3. ASM members must be heard by ASM decision makers in an ongoing manner.
4. ASM members must be aware of and have opportunities to participate in decisions about ASM governance, meetings, publications, and honorific fellowship and science awards.
5. ASM must build new opportunities in governance, meetings and publications to welcome, support and empower diverse individuals.

GUIDING PRINCIPLE C:

ASM ensures equitable access and accountability through transparent procedures and communications

6. ASM must monitor and hold accountable elected and appointed leaders to implement and embody inclusive diversity policies and practices.
7. ASM must provide tailored, accessible, continuous and inclusive communications from leaders to members and the scientific community, and vice versa.
8. ASM must put forth the structure, staffing and resources to succeed in sustaining inclusive diversity for staff, the BoD and COMS, program committees, members and the community.

GUIDING PRINCIPLE D:

ASM attracts, supports and develops the community, ensuring all are empowered and engaged in the work of the organization

9. ASM must ensure equal opportunity for all members and staff, regardless of their background, culture, experiences and perspectives, to participate in ASM.
10. ASM must reach for and encourage historically excluded and underrepresented scientists to participate in journals, meetings, Branches lectures, fellowships and awards.

AMERICAN SOCIETY FOR MICROBIOLOGY

GLOSSARY OF TERMS

The following terms are used throughout this Report:

BLACK, INDIGENOUS AND PEOPLE OF COLOR (BIPOC)

This term describes any person who is Black, Indigenous or non-White. This term evolved from the former term, People of Color. The term People of Color dates back centuries. Black and indigenous were added more recently.

COMMUNITY

The community is inclusive of current, lapsed and future ASM members; non-ASM members interested in the microbial sciences; and the scientific public at large.

HISTORICALLY EXCLUDED AND UNDERREPRESENTED

These terms, used interchangeably throughout the document, describe individuals or groups that have been subjected to bias, discrimination and unequal treatment. Such groups include, but are not limited to women, Blacks/African Americans, Asians, Native Americans, Native Alaskans, Latinx/Hispanic Americans, Native Pacific Islanders, persons with disabilities, lesbian, gay, bisexual, transgender, queer, intersex, and asexual (LGBTQIA) people, people at all career stages, and first-generation undergraduates. [1]

INCLUSIVE DIVERSITY WITH EQUITY

The Task Force enhances the term "diversity"[2] by using the phrase "inclusive diversity with equity" and "inclusive diversity." This enhancement means (i) everyone is welcomed and feels comfortable in the community, (ii) everyone has a voice in decision-making, (iii) everyone is aware of and has access to opportunities to advance throughout the profession, and (iv) everyone monitors progress and agrees to established measures of success. Ultimately, the goal of inclusive diversity with equity[3] is justice, meaning conditions under which everyone has, as a matter of course, access to everything they need to participate fully. The phrases "inclusive diversity" and "inclusive diversity with equity" are used interchangeably throughout the document.

NON-BINARY

The term describes a spectrum of identities where people who do not identify exclusively as a man or a woman. Non-binary people may identify as being both a man and a woman, somewhere in between, or as falling completely outside these categories.

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FORMATION OF THE TASK FORCE

For over 100 years, ASM has been a leader for improving the health and environmental and economic well-being of all people. ASM achieves this work by publishing excellent journals and books, convening high-quality meetings and conferences, recognizing achievement and distinction, supporting education and public outreach, and setting standards of ethical and professional behavior. In June 2018 ASM Chief Executive Officer Stefano Bertuzzi urged ASM to elevate diversity and inclusion in the microbial sciences as key for maintaining this leadership in Science, Technology, Engineering and Mathematics (STEM) as the 21st century progresses. He recognized it was time to examine ASM system-wide policies and unfavorable activities that perpetuate the lack of diversity in the microbial sciences, ultimately leading to the formation of the Diversity, Equity, and Inclusion (DEI) Task Force and this report. The ASM Board of Directors (BoD) charged the Task Force to advise the ASM on elevating diversity and inclusion in the microbial sciences.

The Task Force represents a cross-section of microbiologists by including members who are from historically excluded groups, microbiologists at different career stages and different professions. The Task Force brings together decades of expertise about inclusive diversity in STEM as well as the kind of expertise that can only come from having experienced unfair exclusion by virtue of characteristics such as race, ethnicity, disability, sexuality, accent, institutional affiliation and/or gender identity. The biographies of the Task Force can be found in Appendix 1.

Ultimately, the Task Force found that 1) ASM has had some past success investing in diversity and has good intentions now, but 2) its diversity-related efforts have not ultimately led to inclusive diversity throughout the entire organization. The Task Force thus recommends substantial revision of all programs to expand inclusive diversity throughout the organization and ensure that ASM is positioned to remain a leading scientific society.

TASK FORCE ACTIVITIES

The Task Force met nine times since November 2019 either in person or virtually. The Task Force first developed guiding principles and a diversity statement (Appendix 2) that were approved by the BoD in winter 2019. The Task Force then used these principles in a 5-step discovery process (Appendix 3). Following this process, the Task Force developed recommendations for ASM to elevate inclusive diversity in the organization and in the microbial sciences more broadly.

The Task Force's first undertaking was to define the scope of its work. For example, it discussed issues pertaining to access for people with disabilities and people who are LGBTQIA and the issue of intersectionality.[4] All causes of unequal access to participation and power are important, and after rigorous discussion, the consensus was to focus the bulk of this report on issues related to race and ethnicity in the United States. Why race and ethnicity? Because the changing demographics of the U.S. population and the history of racism elevate the urgent nature of addressing racism in STEM. Because issues related to race and ethnicity are frequently mentioned by ASM members. The Task Force is cognizant that ASM has had existing programs intended to address racial and ethnic inequalities. Thus, the work could include reviewing the extent to which these activities have been effective at increasing inclusive diversity within ASM.

Global members comprise approximately 40% of the 2020 ASM membership and make invaluable contributions to the ASM. However, the report focuses on domestic scientists because of the historically intractable nature of racism and the urgent need to address it now as the U.S. population continues to become ever more diverse in its racial and ethnic composition. The Task Force acknowledges that legacies of colonialism put many international scholars at a significant disadvantage. The relationship between inclusion for international scholars and for all U.S. scholars is complex because there are examples in which many U.S. institutions have been more successful at attracting and retaining global members than they have been for historically excluded U.S. populations.[5] One ASM Member Survey respondent wrote, "Older, white researchers have the most exposure and leadership roles. Occasionally, international (non-American) researchers have a platform. I rarely see Black American or Hispanic American leaders at ASM." The Task Force agrees that ASM has had greater success expanding its global presence for individuals from Latin America, Europe, China, India, and Africa than it has expanding its presence in U.S. Hispanic and Black communities. Addressing this divisive legacy is crucial work that ASM should do, but it is also beyond the scope of what this Task Force could accomplish in the 12-month time period.

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TASK FORCE FINDINGS

FINDING 1: SUCCESSFUL ORGANIZATIONS EXHIBIT INCLUSIVE DIVERSITY

There is extensive literature concluding that inclusive diversity is essential for every organization's success. For example, the McKinsey Report Series "Diversity Wins" builds a strong case for diversity as a means of greater productivity. The McKinsey Report indicates that the likelihood of outperforming peers on service, quality and success correlates with diversity, while the penalties are becoming steeper for workplaces lacking diversity. Moreover, the relationship between diversity on executive teams and the likelihood of outperformance strengthens over time. Ultimately, investigation after investigation demonstrates that a more diverse organization promotes discovery and innovation.

> *"My background has made me aware of looking at interactions between biological entities, as opposed to just studying things in isolation. I believe this has been a direct result of choosing to put myself in multi-racial environments and observing the dynamics, both positive and negative. I also believe that it is impossible to understand the microbiome or co-evolution without understanding the survival advantages and strength that can come from well-managed diversity."*

Source: This and all following quotes are from the ASM Member Survey, 2020

FINDING 2: SCIENCE, TECHNOLOGY, ENGINEERING AND MATH LACK INCLUSIVE DIVERSITY

It is no secret that there are many underrepresented scientists that have historically been excluded from STEM in the United States. Federal agencies such as the NIH and NSF, private funding agencies such as HHMI, and professional societies, including the Society for Neuroscience (SfN) and ASM, have long sought to address these problems. Yet, so far, a lack of inclusive diversity has persisted. For example, individuals that are BIPOC are still not represented proportionally among scientists. As one example, although African Americans comprise about 13% of the U.S. population, they comprise only 7% of the STEM workforce **(Figure 1).** Moving into the future, the U.S. population is going to become more diverse, and there is serious concern that these changes will result in a STEM workforce that is even less representative than it already is. According to projections by the Pew Research Center, the majority of the U.S. population will be non-White by the year 2050. Whites will make up 47% of the population, Hispanics 29%, Blacks 13% and Asians 9%.

Just like the STEM workforce, ASM membership has lagged behind in reflecting demographic diversity in the microbial sciences **(Figure 2)**. Although a comprehensive data set on every member's demographic characteristics does not exist, data from the 3,400 members (representing 10% of the ASM membership) who participated in the spring 2020 Member DEI Perception Survey (herein referred to as Member Survey) indicate the following. About 65% of the respondents reside in the U.S. and 35% reside outside the U.S. Among U.S. respondents, 65% were White, 12% Latinx, 11% Asians, 5% Blacks, 1% Native American and 6% from more than one race. When compared to the makeup of the population of the U.S. Census, Hispanic and Black people are currently underrepresented in ASM membership.

Microbial scientists at Annual Biomedical Research Conference for Minority Students (ABRCMS) and Robert D. Watkins Fellows have greater racial and ethnic diversity than ASM membership. Notably, the Fellowship program was 35 years old in 2015.

The inclusive diversity challenges within the ASM extend beyond race and ethnicity and include gender. Based on the Member Survey, women represent 55% of respondents and, by extension, 55% of ASM membership. The good news is women in the microbial sciences may be overrepresented when compared to the U.S. Census. However, analysis of their representation among ASM positions of power and/or prestige suggest more work is required to reach parity with the U.S. population **(Figure 3).**

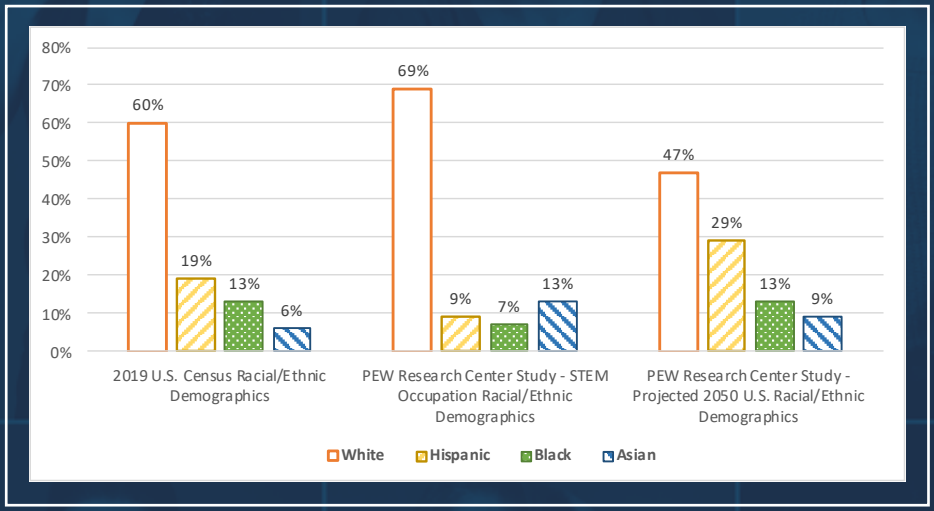


Figure 1. Demographic composition of the U.S. compared with the U.S. STEM workforce.

Figure 1 Legend. Categories are based on those used in the Federal census. The PEW Research Studies only included White, Hispanic, Black and Asian for the racial/ethnic groups.

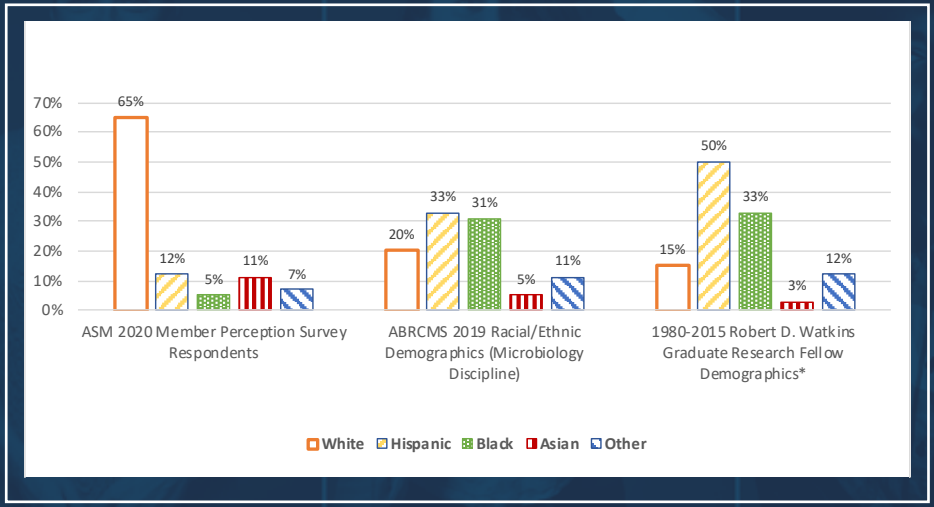


Figure 2. Race and ethnicity among ASM members, ABRCMS microbial scientists, and Robert D. Watkins Minority Graduate Fellow recipients.

Figure 2 Legend. "Other" is an indicator for the following racial/ethnic categories: Two or More Races, Pacific Islander and Native American. The * denotes that the data total may exceed 100% as some respondents indicated more than one category.

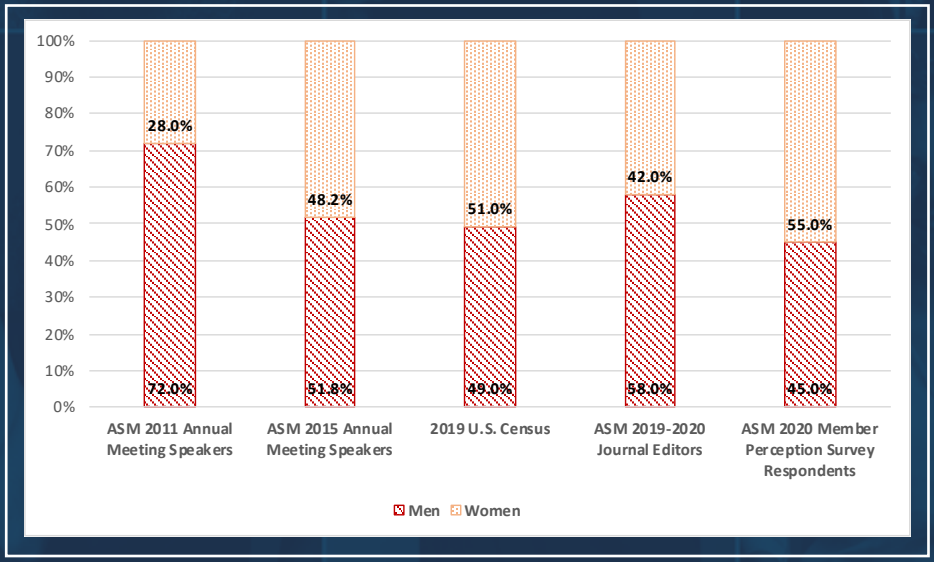


Figure 3. Gender in the US and ASM.

Figure 3. Legend. The U.S. Census does not collect data on non-binary people, so here we have focused on people identifying as men or women.

FINDING 3: ASM HAS SHOWN COMMITMENT TO INCLUSIVE DIVERSITY

The Task Force applauds ASM's acknowledgment of the need to accelerate its inclusivity goals. Its commitment to becoming more inclusively diverse was demonstrated by its recognition of the paucity of women speakers at the ASM General Meeting and its taking action to correct the problem **(Figure 2)**. Between 2011 and 2015, the proportion of women speakers went from 28% in 2011 to nearly 50% in 2015 (Casadevall 2015). The ASM General Meeting Program Committee achieved this goal by deliberately sharing gender statistics with each other and with the convening teams, increasing female representation among those teams and directly instructing conveners to avoid all-male sessions.

Similarly, ASM has made significant investments in the racial and ethnic diversity of ABRCMS[6] participants and awards to Watkins Fellows **(Figure 3)**. While the Task Force found some aspects of this investment problematic (see next section), the existence of these programs and the pride ASM takes in them are positive signs for ASM's capacity to move forward on its inclusive diversity goals.

More recently, after the ASM BoD approved the Guiding Principles, members and staff began to take action. First, ASM published the Guiding Principles and Diversity statement, coupled with resources to enhance its diversity programs on the ASM website before the release of ASM Microbe 2019. Second, ASM implemented a centralized ethics portal for members presenting at a meeting or publishing in an ASM journal to read and acknowledge the codes of ethics and conduct. Third, the ASM Journals Committee published a Black Lives Matter editorial in July 2020, committing to promoting the work of Black microbiologists and issues that impact the Black community. Fourth, in August 2020 the American Academy of Microbiology (AAM) established new criteria for broadening participation of scientists from non-traditional groups. Fifth, the Public and Scientific Affairs Committee (PSAC) in October 2020 hosted a Congressional briefing on strengthening diversity in the microbial sciences. Sixth, ASM sponsored several outreach activities, including a dedicated issue on inclusive science for the Journal of Microbiology & Biology Education in spring 2020 as well as two social campaign events: #ShutDownSTEM and #BlackinMicrobiology. The ASM was a Gold Sponsor for the latter event. And finally, all ASM staff regularly engage in anti-discrimination, anti-bias, and anti-harassment training. All of these early actions attest to commitment among ASM members and staff towards inclusive diversity.

FINDING 4: ASM HAS NOT YET ACHIEVED INCLUSIVE DIVERSITY

Without wishing to minimize the many positive steps explained above, the Task Force found that people from historically excluded groups are not well-represented in positions of authority and leadership throughout the entire organization. Current practices appear to have perpetuated an overrepresentation of historically privileged groups and a corresponding underrepresentation of historically excluded groups. A good example of this practice is the underrepresentation of ASM journal editors who are women yet the overrepresentation of members who are women when compared to the U.S. Census.

"Honestly, I have not seen huge efforts made by ASM to highlight or exemplify diversity. Perhaps I just missed it, but that also speaks in its own way if it is the case. As far as I can recall, the leadership has mostly been white and male, and I struggle to name minority leadership figures or investigators who have been highlighted by the organization's publications."

The ASM Watkins Minority Graduate Fellowship serves as an example of the paucity of inclusive diversity within the society. In 2000, President Clinton awarded ASM the Presidential Award for Excellence in Mentoring Underrepresented Minorities in STEM, recognizing specifically the ASM Watkins Minority Graduate Fellowships. The goal of the program, in which ASM has invested $5M over 35 years, is to improve inclusive diversity in the microbial sciences and within the society. Between 1980 and 2015, this program supported 111 fellows to conduct graduate research and present at ASM's annual meeting. Despite national pride in this program, the program failed in broadening participation of talented underrepresented scientists in ASM itself. In a recent review of the 2005-2015 Watkins fellows, only 17% are ASM members. A lack of Watkins Fellows in ASM signals a broken system, as does the paucity of Fellows among ASM meeting speakers, journal editors, the BoD, COMS and other leadership positions.

The Task Force urges ASM to acknowledge the unqualified historical exclusion of scientists from underrepresented groups and affirm the extent to which the society is prepared to embrace new, more inclusive practices in order to maintain ASM's unique position of leadership in STEM. The Watkins Fellowship is just one example of a program that must

evolve to achieve the broader goal of inclusive diversity in the microbial sciences. In this case, more sustained attention to longer-term mentoring, leadership opportunities, and professional development are likely necessary. This need is amplified by the data from the Member Surveyaccording to the survey, 56% of Black respondents, 55% of Asian respondents, and 51% of Latinx respondents agreed with the statement "I want access to a mentor and sponsor at ASM who can help me navigate through my career." Sixty-seven percent of early career scientists (defined as 25-35 years old) agreed with this statement as well. Additionally, a closer examination of programs to welcome members and provide opportunities to share expertise around science, health and education are needed. The ASM must address why diverse scientists 1) leave either ASM or the microbial sciences and 2) do not hold volunteer or leadership positions in ASM.

"Very few Latinx/Black trainees can identify leaders in the microbial sciences from the same ethnicity/race group. Only one Black ASM president has been selected and came out of Education, an area of ASM that holds the diversity of ASM. No Latino has ever been considered to lead ASM."

Although certain flagship programs at ASM such as ABRCMS are models for inclusive diversity, the Task Force determined that inclusive diversity is not found throughout ASM, including in leadership positions. ASM must build on ABRCMS's success to ensure greater inclusive diversity throughout the organization so that its most valuable assets, functions, and points of influence can continue to be effective. An absence of inclusive diversity distributed throughout ASM may compromise its strong brand. These include ASM's longstanding position of supporting, representing and advocating on behalf of the best microbial science, as well as its reputation of attracting, developing and retaining the "best" scientists. Because inclusive diversity is the foundation of innovation and discovery, ASM will severely impede its goal of advancing the microbial science because it will not be in the position to benefit from the growing segment of the U.S population of diverse students, educators, researchers and professionals. Failure to act decisively now risks a vicious cycle in which a lack of inclusive diversity makes it even more difficult to attract, grow, and continue attracting the dynamic membership necessary for scientific leadership in the 21st century.

FINDING 5: ASM MUST OVERCOME CHALLENGES TO ACHIEVE INCLUSIVE DIVERSITY

The Task Force identified four key practices that have contributed to exclusion. Some are from the STEM community at large, while others are specific to ASM itself. These are:

1. The apprentice-based model for scientific training;
2. The continuation of less effective strategies that at one time was believed to improve diversity in the microbial sciences and among ASM leaders;
3. The lack of understanding among members and their allies about the role of the Council on Microbial Sciences; and
4. Ineffective and perceived exclusionary and opaque communication pathways.

Challenge 1. STEM includes traditions that work against inclusive diversity

Throughout the survey responses, ASM members cited the lack of diversity in the ASM leadership as duplicating a lack of diversity within the greater ASM, which in turn reflects the same tradition throughout STEM. Survey data show that members want ASM to catalyze inclusive diversity in the microbial sciences and beyond.

The traditional apprentice-based model of scientific training necessitates that a young scientist moves from undergraduate, graduate and post-doctoral apprenticeships into other career opportunities that lead to greater responsibility and stature. Because of this model, scientists in leadership positions typically employ an informal set of criteria for decisions such as publications, presentation opportunities, hiring and promotion. Although long-standing, the model must change to broaden participation for parity to be achieved. The use of informal criteria to prepare scientists for success prioritizes existing networks over transparency and equitable access which tend to reproduce existing networks rather than diversifying them. Informal criteria are especially susceptible to both overt and unconscious bias. This tradition of handoff during one's training and throughout one's career has a snowballing effect that prevents many historically excluded and underrepresented scientists from entering, persisting and advancing in the microbial sciences. Differential access to useful networks has powerful effects that preferentially exclude underrepresented scientists while also preferentially reproducing the existing composition of those networks and the power associated with them. Because most ASM members have become professional microbiologists

through the apprenticeship model, it is hard for some to realize that advancement through those networks did not always arise through scientific merit.

ASM can work against some of these trends by diversifying networks of microbiologists and informing the membership about how networks can be used more equitably. The work of diversifying the networks within ASM requires setting new goals for participation, finding new leaders to advance the new goals and new people to implement new programs, building capacity and addressing power issues and potential conflicts. ASM must also implement fair, inclusive, transparent criteria for qualifying for leadership positions in ASM itself. Importantly, ASM must hold itself accountable for these changes. For example, the new actions implemented following the Task Force's recommendations should be monitored and iteratively evaluated to achieve the goal of broadening the participation of historically excluded and underrepresented scientists in ASM.

Challenge 2. To remain viable, ASM must evolve to embrace inclusion more quickly

Much work remains to "get ASM's house in order" and lay the groundwork for inclusive diversity. First, ASM must acknowledge that Black and Latinx are not sufficiently included across and integrated into the organization[7] writ large. White members are not as aware of this disparity as other members, as illustrated by the Member Survey. Less than half (43%) of White respondents agreed to "ASM leadership has diverse representation, with individuals from different backgrounds, cultures and perspectives", whereas only 23% of Black respondents and 39% of Latinx respondents agreed to the same statement. Moreover, the enduring nature of low diversity in leadership positions indicates that ASM perpetuates inequitable distribution of power despite best intentions. The data indicate that existing policies and practices are wholly ineffective at addressing the disparities, and they must be improved.

"I've noticed that it's mainly white women or men from privileged background who are employed at the top universities (i.e. Harvard, Stanford, Ohio State, etc) [who] are able to receive [most of the] prestigious awards … from ASM. There are numerous wonderful professors/researchers that aren't employed at the top universities in the United States who are able to greatly contribute to the microbial sciences."

As illustrated in the above members' insights, a focus on certain kinds of achievement to the exclusion of others loses sight of the fact that publications and institutional affiliation are not solely the function of ability. ASM must find ways to reward the breadth of laudable contributions different people make to the microbial sciences and the organization. The existing types of awards and pathways to leadership do not acknowledge that the burdens of belonging to excluded groups include having to demonstrate one's professional value over and over again. This burden is a constant drain on scientists from historically excluded groups. In fact, the members who have experienced unfair exclusion have unique insights and skills that ASM needs. Moreover, ASM needs leaders who come from a variety of professions. This issue relates to race and ethnicity because microbiologists from historically excluded groups may be better represented among professions where successful scientists have goals in addition to, or in lieu of, publication. For example, non-tenure track faculty are a more diverse group in terms of gender, race, and ethnicity than tenure-track faculty, and many microbiologists have non-tenure track positions in academia.[8] Career advancement in many of these positions relies on excellence in teaching, mentoring, communicating, and networking and not necessarily on research in the microbial sciences. To achieve inclusive diversity, ASM must create pathways for microbial scientists in a wider variety of careers to enter into leadership positions.

"I teach at a small liberal arts college, and ASM has lovely educational resources, but seems in general more interested in big research and big institutions. I truly value the ASM summer research grants that have supported my students, but would appreciate a more deliberate attempt to include my cohort at the table. Our numbers (few) dictate that we are quite unlikely to win elections - but we have a lot to add to the discussions surrounding undergraduate education and undergraduate research."

Another sign of the power differential within any organization is the over-representation of historically excluded groups within certain silos. ABRCMS is especially diverse with respect to racial and ethnic demographics, which is a sign of the success of this flagship program. Yet its comparatively high degree of diversity relative to that of other ASM sectors suggests that ABRCMS may be disproportionately bearing the organization's responsibility for diversifying ASM **(Figure 3)**. Additionally, the Watkins Fellowship program, discussed earlier, is another

example of an important, yet stand-alone, transient program not well integrated into ASM meetings, publications and awards; the success of individual Fellows has not resulted in equitable representation nor robust participation across the organization.

"I find that much of the actual power at ASM in the meetings, leadership, and journals is held by white males. And it very much promotes that through the Old Boy's Club."

"I get really tired of elitism inherent in academic research. There's also a complete lack of training and understanding towards individuals with "disabilities." Very little focus or respect for people of varied backgrounds. A lot of white saviors."

Challenge 3. Members do not understand the Council on Microbial Sciences (COMS)

The role of COMS that includes leaders from ASM program committees must be effectively clarified and communicated to the ASM membership. The Member Survey found that only 51% of respondents agreed to "I have the opportunity to volunteer and serve on ASM committees." There was slightly less agreement among Latinx respondents (42%), Black respondents (45%) and Asian respondents (48%).

Strategies to effectuate transparent, two-way communication between ASM leaders and members must be developed, implemented and disseminated. Several findings from the Member Survey indicate that a significant proportion of members say that they do not have a voice at ASM. Just 38% of survey respondents agreed to "When I speak up, my opinion is valued by ASM." Even lower percentages of non-White respondents to the survey agree with this statement: 24% of Black respondents, 29% of two or more race respondents and 34% of Latinx respondents. Because ASM still relies on informal networks that can unintentionally but preferentially exclude people from underrepresented groups, the Task Force recommends specific inclusive messaging so microbiologists from diverse backgrounds learn how to give voice to their experiences, priorities and opinions and influence ASM. Equally important, the Task Force recommends identifying and reporting measurable outcomes to actions that work towards inclusive diversity.

"My experience with ASM has been that it is a very valuable scientific platform, but opportunities to bring your perspectives forward have not always been obvious or easy to find."

Challenge 4. Members have different understandings about the value of inclusive diversity

The Task Force found that the value of inclusive diversity is not fully embraced by all ASM members. For example, when asked about how one's personal identity has shaped perspectives about the microbial sciences, one woman respondent cautioned, "It doesn't. Because personal identity should not affect science. This is so ridiculous I can hardly stand it. Facts don't care about feelings. I shouldn't have to say this to a scientific organization." Furthermore, the Member Survey shows that many members (42% Latinx, 51% Black and 44% Asian) are either uncertain if ASM values different perspectives - or they do not believe the organization does. The BoD and COMS must demonstrate their commitment to an embodiment of the principles of inclusive diversity in everything that they do. To achieve equitable representation in these leadership bodies, ASM needs to define a strategy, update practices, and create accountability systems to ensure leaders have the understanding and ability to leverage the talent of all people (Center for Creative Leadership). This goal is as achievable as equity for women speakers at the Microbe meeting – the practices that led to success in this venue can be expanded and adapted for other ASM programs. Furthermore, the BoD and COMS must prioritize educating the community about the value of an equitable and inclusive organization and promote extensive dialoguing about the topic. One survey respondent urged ASM to provide "[m]ore clear communication of direct efforts to identify and correct historical failings in including diverse groups within the ASM purview."

"I think [being an African American woman] allow[s] me to look at health data and studies carried out in third world countries with a bit of a different point of view. Not to say that a white man working in Africa for 20 years does not have a better understanding than I do about the continent, but that my life experiences (and that of other people of color) might allow me to see things that they might miss (and vice versa)."

The Task Force also found that members have been satisfied with programs dedicated to supporting historically excluded and underrepresented groups in education such as ABRCMS and certain fellowships as sufficiently meeting ASM's diversity goals. Because of this attitude, the ASM staff in education bears most of the organizational responsibility for inclusive diversity. We celebrate their tremendous service to the organization while also finding that inclusive diversity in education-related programs has not led to inclusive diversity throughout ASM. Their success should be held up as one model for success but not as a substitute for inclusive diversity throughout ASM. As one member pointed out in the Member Survey, the burden of doing this work cannot fall predominantly on members who are BIPOC:

"I'm tired of diversity initiatives asking minorities to fix the problem when I'm the one in the minority and nothing is done to address the majority."

White people must work for inclusion of BIPOC; men must work for inclusion of women.[9]

The Task Force calls on ASM to transform the center of the organization through broadening participation by historically excluded and underrepresented scientists. That this transformation will be uncomfortable for some is inevitable, but it is also inevitable that ASM must change to maintain leadership in STEM. Efforts to create and subsequently maintain inclusive diversity must be priorities for the foreseeable future. It will require creativity, collaboration and dedication for ASM members and staff to take the lead among STEM societies to dismantle the counterproductive aspects of business-as-usual in STEM. Every decision-maker, member and staff member must be united around equity and inclusion across the entire organization. The fact that the BoD engaged the Task Force is a critical step in the right direction. ASM has the will and capacity to lead in inclusive diversity.

This period will give birth to and raise a new ASM – a home that honors microbial scientists with various perspectives, enabling all to share findings, engage in discourse, set policies and develop programs, and adjust current programs to promote and advance the microbial sciences with equity, inclusion and diversity.

TASK FORCE RECOMMENDATIONS

The Task Force proposes 10 recommendations aligned to the Guiding Principles:

GUIDING PRINCIPLE A

A diverse ASM enhances the microbial sciences, increases innovation, strengthens the community and sustains the profession.

1. ASM must increase the proportion of members from diverse populations to reflect the demographic diversity of the U.S. population and the entire spectrum of professionals advancing and promoting the microbial sciences.
2. ASM Board of Directors (BoD), Council on Microbial Sciences (COMS), program leaders for meetings and publications, and nominating and selection committees for science awards and Academy fellowships must ensure representation from historically excluded and underrepresented scientists in the microbial sciences

GUIDING PRINCIPLE B

ASM empowers individuals with diverse perspectives in decision-making processes.

3. ASM members with diverse perspectives must be heard by ASM decision makers in an ongoing manner.
4. ASM members must be aware of and have opportunities to participate in decisions about ASM governance, meetings, publications, and honorific fellowship and science awards.
5. ASM must build new opportunities in governance, meetings and publications to welcome, support and empower diverse individuals.

GUIDING PRINCIPLE C

ASM ensures equitable access and accountability through transparent procedures and communications.

6. ASM must monitor and hold accountable elected and appointed leaders to implement and embody inclusive diversity policies and practices.
7. ASM must provide tailored, accessible, continuous and inclusive communications from leaders to members and the scientific community, and vice versa.
8. ASM must put forth the structure, staffing and resources to succeed in sustaining inclusive diversity for staff, the BoD and COMS, program committees, members and the community.

GUIDING PRINCIPLE D

ASM attracts, supports and develops the community, ensuring all are empowered and engaged in the work of the organization.

9. ASM must ensure equal opportunity for all members and staff, regardless of their background, culture, experiences and perspectives, to participate in ASM.
10. ASM must reach for and encourage historically excluded and underrepresented scientists to participate in journals, meetings, Branch lectures, fellowships and awards.

STRATEGIES TO IMPLEMENT THE RECOMMENDATIONS

The Task Force proposes a plan to begin the journey of implementing the recommendations.

SUSTAINED DIVERSE REPRESENTATION

Specific strategies to ensure sustained diverse representation on the Board of Directors (BoD), Council on Microbial Sciences (COMS), and ASM committees and subcommittees:

1. Collect from members information about gender, race and ethnicity; education and employment history; science expertise and interest; and achievements, distinctions, and volunteerism. Utilize the information to measure progress towards achieving demographic diversity.
2. Ensure that representation[10] of early career members who are BIPOC and global members in leadership is on a par with the demographic distribution of the membership. Adjust seats on the BoD, COMS, and program committees to respond immediately to the need to increase the presence of underrepresented scientists.
3. Require evidence of candidates' commitment to inclusive diversity and hold decision-makers accountable for broadening participation in ASM. Require equity and inclusion statements from candidates for the BoD, COMS, journal editors, meeting organizers, and nominating and selection committees for science awards and Academy fellowship.
4. Elevate criteria for access, equity and consistency across all elected and appointed positions. Encourage opportunities to self-nominate or nominate more junior members who help ASM achieve inclusive diversity goals into in-training positions. Publish annual nominating and appointment calendar.

5. Develop targets[11] to ensure that the pool of candidates for elected and appointed positions is representative of the demographic diversity of the U.S. population and that candidates have equal opportunity to succeed.

DIVERSE MEMBERSHIP

Implement specific strategies to ensure sustained diverse membership.

1. Review, assess and adjust investments in partnerships with organizations that support diversity in science. For example, engineering societies have established strong partnerships with the National Society of Black Engineers (NSBE), Society of Hispanic Professional Engineers (SHPE), and Women in Engineering ProActive Network (WEPAN). ASM can reevaluate its relationship with Out in Science, Technology, Engineering and Mathematics (oSTEM), the Society for Chicanos and Native Americans in Science (SACNAS) and the Association for Women in Science (AWIS). ASM's initial sponsorship of the nascent group, BlackInMicrobiology is a step in the right direction.
2. Review, assess and adjust investments in programs for people whose entry into the microbial sciences comes from outside leading programs and institutions in the microbial sciences. Establish new programs and partnerships with Historically Black Colleges and Universities (HBCUs), Hispanic Serving Institutions (HSIs), tribal colleges, community colleges and professional masters programs in bioscience, linking them to existing ASM outreach programs - ASM Branches, Student Chapters, Young Ambassadors, journal clubs, practitioner communities (e.g. Microedu and Div C listservs), advocacy groups and other means of online professional development.

EVERY VOICE

Develop specific strategies to ensure every voice is heard.

1. Clarify and communicate COMS's role, responsibilities and relationship to the BoD, members and the community.
2. Clarify and communicate the process to be heard and serve on COMS and ASM committees and subcommittees.
3. Invest in regular multi-cultural, anti-racist and ethical training for members and staff as a condition for serving ASM. Hold members and staff accountable for negative behavior.

ACCOUNTABILITY

Build strategies to ensure accountability.

1. Establish an ASM-wide committee to develop a strategy and implementation plan[12] to execute the Task Force recommendations. The committee should have representation from members and staff, community members and equity and inclusion experts.
2. Publish an annual accountability report[13] demonstrating progress towards achieving inclusive diversity goals. Provide an annual listing of elected and appointed leaders, including their background, interest, experiences and perspectives.
3. Conduct an annual survey of members' perspectives around progress toward current concerns (e.g., lack of diversity in leadership, confusion around COMS and pathways to being heard and volunteering).
4. Prepare the groundwork[14] and implement executive-level structure, staff and resources to lead ASM's efforts in inclusive diversity. The BoD and executives must provide opportunities for historically excluded and underrepresented members and staff to contribute to the discipline and advance professionally.
5. Engage in the work of consultants specializing in equity and inclusion to develop a plan, monitor progress and hold ASM accountable to inclusive diversity.
6. Monitor and communicate the placement of in-training participants into positions with increasing responsibility and decision-making power.

EMPOWERMENT

Initiate strategies to ensure empowerment of all people.

1. Provide clear pathways and invest in professional development and mentoring for members to serve ASM. Establish annual training for meeting organizers and speakers, journal reviewers and editors, ASM Ambassadors and Branch Lecturers, and COMS representatives, for example.
2. Review, assess and adjust resources for retaining lapsed members and non-member meeting attendees, journal authors, and community members
3. Empower members to reach out and support historically excluded or underrepresented scientists.

ENDNOTES

1 The Task Force considered the information presented by SEA Change, NSF, Human Rights Campaign and University of Washington School of Public Health to develop these definitions. Historical exclusion is one cause of underrepresentation, but the term does not mean that exclusion is no longer part of the social landscape. The fact that underrepresentation is both historical and ongoing makes it all the more necessary to try new strategies to overcome exclusion.

2 The words "diversity" and "inclusion" on their own can be used disingenuously to side-step the specific goal of broadening the participation of historically excluded and underrepresented people.

3 Equity explicitly contrasts with equality. Equality can mean giving everyone the same resources even though not everyone has the same needs. For example, the Microbe Travel Grant Program provides financial support for students to travel and present their work but students need more than travel funds to be successful.

4 Crenshaw, K (1989) "Demarginalizing the intersection of race and sex: a Black feminist critique of antidiscrimination doctrine, feminist theory and antiracist politics." University of Chicago Legal Forum, University of Chicago Law School. 1989: 139-168.

5 After 2010, universities encountered enrollment challenges that threatened the STEM pipeline. Rather than doubling down on efforts to include domestic students from underrepresented groups, many instead reached to the global market to fill the gap (NSF Report on Science and Engineering Indicators). International graduate students in U.S. academic institutions increased while inclusive diversity for U.S. students did not improve.

6 Annual Biomedical Research Conference for Minority Students

7 Greater representation is needed specifically on the BoD, COMS, journal editorial boards, meeting program committees, and nominating and selection committees for science awards, Academy fellowship, and ASM Division and Branch positions.

8 https://www.tiaainstitute.org/publication/taking-measure-faculty-diversity

9 While the Task Force has often focused on race, ethnicity, and gender in this Report, other kinds of inequalities must also be addressed to achieve inclusive diversity. Gradients of power and privilege related to disability, Veteran or immigration status, state or territory of origin, sexuality, and access to family wealth also lead to the inclusion of some people at the expense of others. Success at one type of inclusion cannot substitute for any other type of inclusion any more than ABRCMS can serve as the only venue for inclusive diversity in ASM.

10 One model for inclusive guidelines comes from SfN in Resources for Chapters, "We know that letters of recommendations on behalf of women and URM candidates tend to be shorter, raise more doubts, bring up personal issues and are perceived as less supportive for a candidate than letters on behalf of white male candidates. A discussion of the data that demonstrates this bias should be engaged in prior to the review of candidates. Occasionally it is necessary to remind reviewers of this during the review process..... Clear guidelines and targets that are based on big-picture views of real data should be in place to crystalize such a commitment to diversity, represent the consensus and make it difficult for the committee to deviate away from a critical path to diversity initiative. Prior to reviewing any applications, general discussions about bias and how it affects everyone can help align the committee. It is essential for individuals on search [nominating] committees to reach out to and invite qualified female and URM candidates to apply for positions early in the search process. If there are no women or URM candidates on the short list after these committee efforts, a discussion of why there are no such applicants is appropriate."

11 One example of setting targets comes from the American Institute of Physics Report (p21), "doubling the number of physics and astronomy bachelor's degrees awarded annually to African Americans by 2030." For more examples of professional society diversity plans and reports, refer to Appendix 6, Curated List of Resources.

12 Sample plans are from the American Association for Anatomy, Infectious Disease Society of America, American Association for the Advancement of Sciences and others. See Appendix 6. Listing of Curated Resources.

13 Sample reports are from the American Geophysical Union, John Hopkins University (JHU), and the University of Rochester (UR). Additionally, UR publishes two dashboards, Faculty Diversity Dashboard and Student Diversity Dashboard, to monitor progress. JHU publishes a visual resource, Key Dates in the JHU Diversity Roadmap. See Appendix 6. Listing of Curated Resources.

14 Members and the community must understand how differences affect ASM's brand and translate this understanding into coordinated and effective actions that sustain the discipline and profession. Members and the community must see, understand and embrace differences.

APPENDICES

AMERICAN SOCIETY FOR MICROBIOLOGY

APPENDIX 1. COMPOSITION OF THE TASK FORCE

Appendix 1 provides a list of biographical summaries and headshots for the ASM DEI Task Force members:

CHAIR: TUAJUANDA JORDAN, PHD

President (since 2014) of St. Mary's College of Maryland, a public liberal arts college (25% minority; 20% first gen, 20% Pell, 25% non-Pell loans; 72% graduation rate). Prior to arriving at St Mary's, Jordan served as Dean of the College and later also served as, Chief Diversity Officer at Lewis and Clark College. She is well known in higher education in STEM as the former director of the Science Education Alliance at HHMI, including leading one of the most inclusive projects (SEA-PHAGES) in the history of HHMI.[1,2,3] Jordan published the model in mBio in 2014, opening the gate for all 1st year students to have an opportunity to participate in the process of science. She started her career at Xavier University of Louisiana – a university known for its training of African-American scientists – as a professor in chemistry. Through her experience at Xavier University, Jordan acquired firsthand knowledge of historically black colleges and universities (HBCU).

CO-CHAIR: MARIA F. LIMA, PHD

Associate Dean for Research and Chief Research Officer at The City University of New York, and formally the Dean of the School of Graduate Studies and Research at Meharry Medical College, an HBCU in Nashville, TN, and Sr. Vice President for Research and Innovation at Meharry Medical College. Dr. Lima is a tenured Professor of Microbiology and Immunology with research interests in infectious diseases, specifically in the area of microbial pathogenesis and immunology. As Dean of the School of Graduate Studies and Research, she has obtained funding from the NIH and NSF, which has enhanced graduate training at Meharry Medical College. According to Diverse Issues in Higher Education, over the past 10 years in the United States, the highest number of African-Americans students who earned Ph.D. degrees in Biomedical Sciences graduated from Meharry. She was the Chief Research Officer at Meharry responsible for all research initiatives as well as research compliance. Meharry's research expenditures are at $33 million. Between 1994 and 1998, she served on the ASM Committee for the ASM/CDC Postdoctoral Training Program in Infectious Diseases and Public Health Microbiology. She is the 2014 recipient of the ASM William Hinton Award for Advancement of a Diverse Community of Microbiologists.

BRUCE BIRREN, PHD

Director, Genomic Center for Infectious Diseases of The Broad Institute of Harvard and MIT in Cambridge, MA. Birren is the Director of the Broad's Genomic Center for Infectious Diseases and advisor to the Broad Research Communications Lab. He directs genomic studies of infectious diseases, including projects centered on bacteria, fungi, viruses, parasites and insect vectors of disease, as well as research on vertebrate evolution. Birren founded the Broad's Diversity Initiative, an institute-wide mentoring program, and is the founding advisor to Women@Broad. He is a Master Facilitator with the National Research Mentoring Network and Center for Improvement of Mentored Experiences in Research, where he leads workshops to develop skills for communicating science and building awareness of how aspects of our identities influence success within the culture of science and perpetuate underrepresentation of specific groups in research careers. Between 2012-2016, he served on the ASM Steering Committee for developing faculty leaders from underserved and/or under-resourced colleges (as known as the ASM LINK Program).

KYLE CARD, PHD

Postdoctoral Research Fellow, Cleveland Clinic Lerner Research Institute. Card is an evolutionary biologist studying how genetic background, mutation rate, and population demographic factors influence the evolution of antibiotic resistance. He also draws on his experience in experimental evolution to address similar questions in cancer, such as whether and how collateral resistance of evolving cancer populations changes across time. Card was born with a rare neurological condition called Moebius syndrome that affects the muscles that control facial expression and eye movement. He is also missing fingers on either hand and a right foot; he wears a below-the-knee prosthetic leg to compensate. Card is therefore a strong advocate for disabled individuals who desire to pursue careers in STEM fields. As an HHMI Gilliam Fellow, he is fortunate to be a member of a diverse group of scientists who are also committed to promoting inclusive diversity in science.

AMY L. CHANG, MS

ASM Education Director at the ASM. Chang is responsible for education, professional and career development at one of the largest life sciences professional societies. Under her leadership, ASM offers an education journal, student and teacher conferences, grants and fellowships, webinars, and career guidance. In 2017, Amy was elected a Fellow of the American Association for the Advancement of Science for contributions to faculty development and diversity. In 2000, she successfully led ASM to be the first society recipient of the US Presidential Award for Excellence in Mentoring Underrepresented Minorities in Science and Engineering. Prior to joining ASM in the 1980s, Amy worked in microbiology as a research assistant, clinical microbiologist and university lecturer, affording her experiences that shaped a life-long commitment to advancing the microbial sciences. She is a graduate of the University of Rhode Island and the University of Vermont. In her spare time, she enjoys gardening, hiking, and time with her spouse, children and grandchildren.

[1] Tuajuanda C. Jordan, Sandra H. Burnett, Susan Carson, Steven M. Caruso, Kari Clase, Randall J. DeJong, John J. Dennehy, Dee R. Denver, David Dunba, Sarah R. Elgin, Ann M. Findley, Chris R. Gissendanner, Urszula P. Golebiewska, Nancy Guild, Grant A. Hartzog, Wendy H. Grillo, Gail P. Hollowell, Lee E. Hughes, Allison Johnson, Rodney A. King, Lynn O. Lewis, Wei Li, Frank Rosenzweig, Michael R. Rubin, Margaret S. Saha, James Sandoz4, Christopher D. Shaffer, Barbara Taylor, Louise Temple, Edwin Vazquez, Vassie C. Ware, Lucia P. Barker, Kevin W. Bradley, Deborah Jacobs-Sera, Welkin H. Pope, Daniel A. Russell, Steven G. Cresawn, David Lopatto, Cheryl P. Bailey, Graham F. Hatfull (2014) A broadly implementable research course for first-year undergraduate students. mBio01051-13R1. Doi 10.1128/mBio.01051-13

[2] Welkin H. Pope, Deborah Jacobs-Sera, Daniel A. Russell, … Tuajuanda C. Jordan, … Roger W. Hendrix, and Graham Hatfull (2011) Expanding the diversity of mycobacteriophages: Insights into genome architecture and evolution. PLoS ONE 6(1): e16329. doi:10.1371/journal.pone.0016329 (Note: there are 192 authors on this publication)

[3] Jordan, Tuajuanda C (2008) The HHMI Science Education Alliance's National Genomics Research Initiative. Focus on Microbiology Education 14 (2), 5.

KARISSA CULBREATH, PHD, D(ABMM)

Associate Professor in the Department of Pathology and Director of Infectious Disease Diagnostics, at TriCore Reference Laboratories, University of New Mexico Medical School. Culbreath is an alumna of Fisk University, an HBCU, in Nashville, TN. In 2010 she became a Diplomate of the American Board of Medical Microbiology (ABMM). Since 2014, she has served on the Exam Development Committee of the American Board of Medical Microbiology. In addition to her clinical microbiology responsibilities at the university and in the profession at ASM, she is Associate Vice Chancellor for Diversity, Equity and Inclusion at the University of New Mexico Health Science Center as Director for the BOSS (Building Outstanding STEM Students) Program. The BOSS Program provides legislatively funded K-12 science, technology, engineering, math and health (STEM-H) programming primarily for underserved students in New Mexico.

STEVEN E. FINKEL, PHD [4]

Dean of Graduate & Professional Education, University of Southern California, Dornsife College of Letters, Arts & Sciences since 2017. Research in Finkel's laboratory focuses on the long-term survival and evolution of bacteria, including understanding natural systems and applications to electricity production. He was elected as a fellow in the American Academy of Microbiology in 2016. In 2017, his dedication to advance inclusive practices at USC was recognized by the ASM William A. Hinton Award for Advancement of a Diverse Community of Microbiologists. His efforts at USC work to disrupt the stereotype of whiteness and privilege at an institution located in one of the most diverse cities in the U.S. In both his research projects and advocacy on behalf of diverse students, he has earned an admirable reputation for breaking down stereotypes and uncovering new perspectives.

LEAH GUTHRIE, PHD

Postdoctoral Fellow, Stanford University. Guthrie is an alumna of the Virginia Tech PREP, which launched her into a successful graduate experience at Albert Einstein College of Medicine at Yeshiva University. There, her systems biology research focused on establishing predictive models of microbiome-influenced patient outcomes and engineering microbial community composition to promote human health. Guthrie uses a combination of biochemical and computational approaches to assess the influence of human gut microbiota metabolic activity on drug metabolism at multiple levels of biological complexity. While at Einstein, she organized a group of graduate students who learned about entrepreneurial opportunities for STEM majors. She was instrumental in the founding of a program at her undergraduate institution that supports STEM majors who are first-generation, URM, from low-income families or under-resourced high schools.

OLIVIA HARRIOTT, PHD

Associate professor and former chair, Biology Department at Fairfield University, Fairfield, CT. This Jesuit institution is home to the highly ranked Marion Peckham Egan School of Nursing and Health Studies. Of the nearly 4,000 undergraduate students, 90% receive financial aid. Dr. Harriott's research focuses on interactions between microbes and hosts, including Vector-Host Interactions of the Asian Tiger Mosquito Aedes albopictus as well as the complexity of microbial symbionts in tropical sponge communities. She served as a professional development facilitator in the AAAS Emerging Researchers National Conference in STEM in 2015 and 2018. Between 2004 and 2011, she participated in ASM professional development programs (e.g., Kadner Institute for Graduate Students and Postdoctoral Scientists; Presentation Institute, ASM Research Capstone Fellowship) coaching undergraduates in presentations and manuscripts. She's served as an ABRCMS reviewer, judge, and mentor.

SHAUNDRA N. HOLMES

ASM Education Program Coordinator at the ASM. Holmes is responsible for creating, sponsoring and coordinating resources and programs dedicated to diversity, equity and inclusion (DEI) at the ASM. Holmes works directly with Amy Chang, ASM Education Director, to advocate and champion for DEI at the Society. In addition to her work at ASM, Holmes studies Clinical Mental Health Counseling with an emphasis on social justice and multiculturalism at George Mason University. In her spare time, she enjoys reading, yoga, cycling, paddle boarding, cooking and spending time with family.

PHOEBE LOSTROH, PHD

Associate Professor of Molecular Biology at Colorado College, Colorado Springs, CO. Lostroh also served as Director of Feminist and Gender Studies from 2013-2016 at the College. With their unique academic schedule of eight 3.5-week block terms, Lostroh has inspired legions of students in her courses and maintained a research program focusing on competence Acinetobacter with publications that have numerous undergraduate co-authors. She has authored a new, comprehensive textbook Molecular and Cellular Biology of Viruses (CRC Press, 2019). Since 2007, she has authored papers and presented on gender studies in sciences. She is a fierce advocate for LGBTQIA+ in STEM. Currently, she is on leave from Colorado College, serving as a Program Director in the Division of Cellular and Molecular Sciences, Directorate for Biological Sciences at the National Science Foundation (NSF) in their Visiting Scientist, Engineer, Educator Program. She has organized programs (e.g., ASM Conference for Undergraduate Educators, ASM Kadner Institute) for ASM on research and teaching at small colleges, and gender equity in science. She helped plan ASM's Inaugural Networking Session for LGBTQIA+ members at the 2019 ASM Microbe.

AMY CHENG VOLLMER, PHD

The Isaac H. Clothier, Jr. Professor of Biology at Swarthmore College and is the only microbiologist on campus. In addition to teaching courses in microbiology and biotechnology, her research laboratory has hosted nearly 100 undergraduate students, many of whom have presented their work at ASM meetings. She has also hosted 7 non-science Swarthmore faculty members and 3 members of the Swarthmore staff in her laboratory. Among other efforts to promote science literacy, include founding the Second Tuesday Science Café at Swarthmore and speaking about bridging the Two Cultures at Swarthmore's Tedx event on 'What Makes a Great Society?'. For 10 years, she coordinated a network of regional microbiology educators that grew from 14 campuses to over 60. Given her commitment to increasing both access to and success in STEM majors at Swarthmore, in 2015 she was a founding faculty member of the Swarthmore Summer Scholars Program (S3P). She became its director in 2017. As President of the Waksman Foundation for Microbiology, she led efforts to recognize educational outreach activities, superb mentoring as well as excellence in science communication. An active member of the ASM, she was the first editor-in-chief of what is now the Journal of Microbiology and Biology Education. She was elected to serve as an at-large member of the ASM's first Council for Microbial Science and was a member of ASM's first Board of Directors.

[4] Steve E. Finkel, PhD served on the ASM DEI Task Force until March 2020. Finkel resigned from the Task Force in March in order to accept an appointment as President-Elect for the ASM Board of Directors.

AMERICAN SOCIETY FOR MICROBIOLOGY

APPENDIX 2. GUIDING PRINCIPLES AND STATEMENTS

Appendix 2 provides the Guiding Principles, Diversity Statements and Vision Statements developed by the Task Force.

The GUIDING PRINCIPLES provide unwavering guidance for equity and inclusion efforts and serve to communicate core values:

- A diverse ASM enhances the microbial sciences, increases innovation, strengthens the community and sustains the profession
- ASM empowers individuals with diverse perspectives in decision-making processes
- ASM ensures equitable access and accountability through transparent procedures and communication
- ASM attracts, supports and develops the community, ensuring all are empowered and engaged in the work of the organization

The ASM DIVERSITY STATEMENTS provide unwavering guidance for diversity efforts and mandates leaders' and members' behavior and practice:

- ASM exemplifies inclusive diversity with equity, access and accountability (IDEAA) in the microbial sciences.
- In practice, ASM works to create a diverse community and a culture of inclusion where all staff, volunteers, members and the community are respected, treated fairly, provided opportunities to develop professionally and excel in their chosen career pathway.

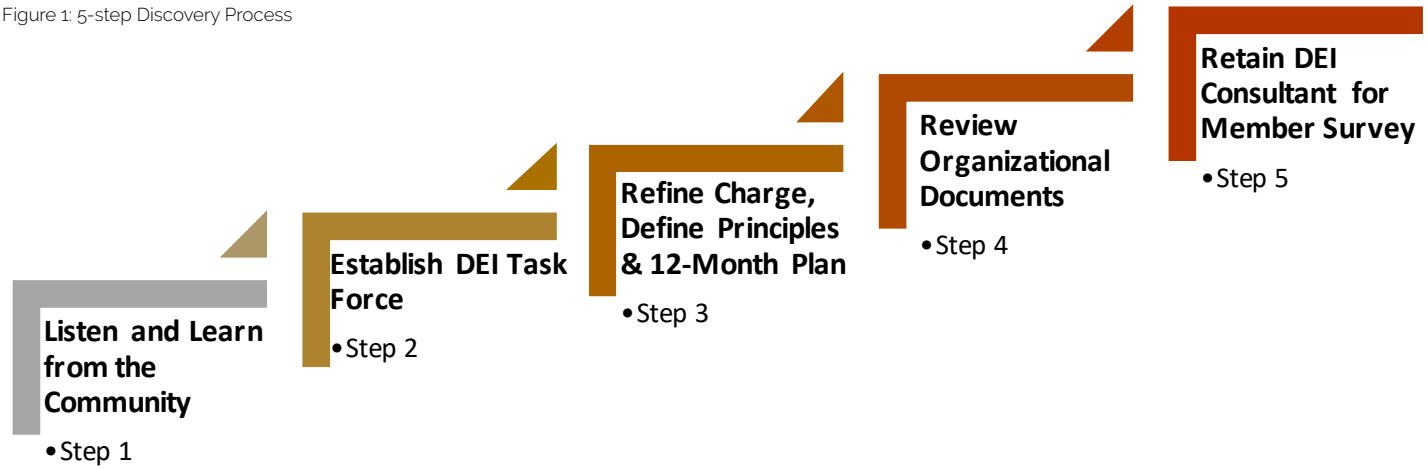
The ASM VISION STATEMENTS are aspirational and provide an unwavering benchmark for success:

- ASM reflects the demographics of the US population and the entire spectrum of professionals advancing and promoting the microbial sciences.
- ASM embodies a culture where all participants in the community flourish in their chosen career to promote and advance the microbial sciences.
- The community recognizes ASM for exemplary leadership in creating a respectful, equitable, engaging and empowering culture for all in the microbial sciences.
- ASM's mission is to promote and advance the microbial sciences with equity, inclusion and diversity.

APPENDIX 3. THE FIVE-STEP DISCOVERY PROCESS

- Appendix 3 describes five steps (Figure 1) that led to 10 recommendations – bold steps toward a vision, stating:
- ASM reflects the demographics of the U.S. population and the entire spectrum of professionals advancing and promoting the microbial sciences.
- ASM embodies a culture where all participants in the community flourish in their chosen career to promote and advance the microbial sciences.
- The STEM community recognizes ASM for exemplary leadership in creating a respectful, equitable, engaging and empowering culture for all in the microbial sciences.
- ASM's mission is to promote and advance the microbial sciences with equity, inclusion and diversity.

Figure 1: 5-step Discovery Process



The goals of Step 1 were to learn about (i) members' personal experiences with ASM and their advice on becoming a more diverse organization, and (ii) businesses recognized for diversity and their advice on aligning people and systems. This work was achieved through (i) a national listening tour to gather member and non-member feedback, (ii) participation in two national initiatives to improve the culture and climate among STEM employers, especially higher education, and (iii) a review of current equity and inclusion literature. The goal of Step 2 was to establish an independent group of microbial scientists representing all career stages and recognized for achievements addressing inclusion and equity. This work resulted in a 12-member Task Force chaired by Dr. Tuajuanda Jordan, president of St. Mary's College of Maryland. Jordan invited Maria F. Lima, Associate Dean for Research at the City University of New York (at time of appointment Lima was Vice President of Research and Innovation and Dean of the Graduate School at a historically black college, Meharry Medical College) to serve as co-chair. In alignment with conducting a comprehensive yet feasible study in the 1-year period, the goal of Step 3 was to refine the charge, reaffirm and plan, and identify Guiding Principles to direct the Task Force's work. The goal of Step 4 was to ensure that ASM practices are in alignment with the Guiding Principles and Diversity Statement. This work was achieved by reviewing approximately 80 ASM organizational documents available between two periods, 2012-2014 (prior to ASM CEO Stefano Bertuzzi's arrival) and 2017-2019 (after ASM CEO Stefano Bertuzzi's arrival). The documents included ASM's strategic plan, codes, statements and policies; member and non-member communications; and governance and volunteer service documents.

STEP 1: LISTEN AND LEARN FROM THE COMMUNITY

The goals of Step 1 were to learn about (i) members' personal experiences with ASM and their advice on becoming a more diverse organization, and (ii) businesses recognized for diversity and their advice on aligning people and systems. Towards these goals, Amy Chang and Amy Vollmer engaged in:

- ASM Listening Tour
- STEM Inclusion Study
- STEM Equity Achievement (SEA) Change Study
- Review of Reports from Diversity Leaders, Organizations and Companies

ASM LISTENING TOUR

Beginning in fall 2018 and ending in fall 2019, Chang conducted in-depth conversations and group discussions with over 200 members knowledgeable about public policy, research and education affecting historically excluded scientists in the microbial sciences, including:

- 15 members from three 2018-2019 diversity committees:
  1. ASM Education Subcommittee on Minority Education
  2. ASM Public and Scientific Affairs Committee (PSAC) Subcommittee on the Status of Women Microbiologists
  3. Public and Scientific Affairs Committee (PSAC) Subcommittee on Microbiological Issues Impacting Minorities
- 70 members of 2018-2019 Council on Microbial Sciences (COMS)
- 70 attendees at the minority-focused receptions at 2018 ASM Microbe
- 20 microbiology judges from the 2018 Annual Biomedical Research Conference for Minority Students (ABRCMS)
- 40 attendees from the 2019 ABRCMS

These participants unanimously agreed that ASM must:

- Collect, analyze and report demographic data about its members
- Review and revise recruiting, nominating and selection practices for committees and boards
- Align and clarify communications around diversity, equity, inclusion and accountability
- Establish mentoring opportunities for mid-career women and underrepresented scientists to validate their science and develop the next generation of science leaders committed to inclusive diversity
- Raise awareness among all scientists about unchecked discrimination, harassment, and unfairness; implicit biases and inequities

The Listening Tours uncovered tensions around ASM's strategic priorities and competition for resources among diverse communities in the "Big Tent," a metaphor from former ASM President Enquist to communicate rich diversity among microbial scientists and assurances about ASM's commitment to all microbial scientists residing in and outside the United States (U.S.). The microbial sciences would benefit from this richness. However, for a small number of historically excluded and underrepresented scientists in the U.S., the Big Tent threatened their tenuous position and exacerbated competition among different groups for ASM resources. These members cited concern about ASM's expanding footprint in Africa, China, India and the rest of the world without consideration to diverse representation within the U.S. Between 2006 and 2016, programs (e.g., Laboratory Capacity Building, Bioresource Centers, Global Outreach, Ambassadors) serving current and prospective members residing outside the U.S. were the fastest growing ASM programs. However, in 2016 ASM membership and meeting attendance plateaued, heightening concerns over limited resources and sparking new questions:

- Has ASM defined its goals around DEI?
- Does ASM have the optimal construct to advance a culture of inclusion for all people?
- What is ASM's role and responsibility to elevate racial and ethnic diversity in the U.S. versus geographical and cultural diversity in the world?
- What has been ASM's impact in diversifying the microbial sciences?

STEM INCLUSION STUDY

The annual conference for the American Association for the Advancement of Science (AAAS) is one of the largest scientific meetings convening researchers, educators, communicators, and policymakers to address challenging issues in science. During the 2019 AAAS Meeting in Washington, DC, University of Michigan social scientist Erin Cech sought to investigate the experiences of professionals from across STEM disciplines and industries and identify concerns around marginalization, profession valuation, and workplace fairness in universities, for-profit businesses, and non-profit organizations.

What set this study apart from earlier studies was the design. Unlike previous studies, Cech partnered with professional

societies to access STEM professionals in diverse industries. Approximately 27,000 members from 20 STEM societies participated in the national study. The 20 societies included:

- Eight national flagship societies in the natural sciences (e.g., cell biology, biochemistry, physiology), physics and math
- Five national flagship societies in engineering (e.g., civil, mechanical engineering)
- Three teaching organizations in STEM (e.g., science, physics, math)
- Two interdisciplinary STEM organizations
- Two demographically focused organizations in STEM (e.g., Blacks, Hispanic)

Approximately 1,100 ASM members from the U.S. participated, providing both positive and negative aspects of diversity and inclusion as experienced by ASM members in the workplace. Although Cech found that personal experiences of harassment in the workplace are relatively low across employer groups, she reported some concerns and offered advice to remedy the problems (Appendix 5):

- Women and people from underrepresented racial/ethnic groups report persistently more negative work experiences compared to White men. Feelings of marginalization (e.g., do not fit in, harassment, hearing insensitive/offensive comments, and fear that their mistakes are more noticeable) and experiences of exclusion are significantly more common among these respondents. The organization should consider ways it can help foster inclusion for women and people of color, as well as having an open dialog about the ways that the STEM expertise of women and people of color are undermined in members' workplaces.
- LGBTQIA-identifying respondents were also more likely to experience marginalization and exclusion. While an LGBTQIA identity may be less visible, members of ASM identifying as LGBTQIA were significantly more likely than non-LGBTQIA respondents to report a chilly climate. A few STEM professional organizations have begun to consider LGBTQIA inclusion issues alongside other axes of disadvantage; these results indicate that dialog and efforts addressing anti-LGBTQIA bias in this field are much needed.
- Disability status was a significant factor across a number of the marginalization and devaluation measures. Disability status is rarely considered and discussed within the context of inclusion and diversity in STEM-related professional organizations. However, over 18% (about 1 in 6) of the members of this organization (ASM) have some kind of disability, whether physical or mental, and those who do frequently report more negative workplace experiences. The organization should consider initiatives and programming that allow persons with disabilities to articulate ways that this organization (ASM) could better provide support and promote their interests."

Participating in this study afforded ASM an opportunity to examine the experiences of microbial scientists through another lens – their employer. In general, the researchers found universities to be the most exclusive among three employment sectors. Traditionally, universities utilize an apprentice-based training model impenetrable to trainees who do not follow usual entry programs and are invisible to well-established and well-connected scientists. This handoff during one's professional training prevents many historically excluded trainees from entering into the academic and employment pipelines. Approximately 60% of the ASM members identify with universities and academic medical centers. Cech and colleagues recommended new activities.

IMMEDIATE

- Facilitate discussions among member around workplace issues
- Adopt welcoming and inclusionary practices at conferences and meetings

LONG TERM

- Build awareness among Principal Investigators (PI's) around disability etiquette
- Empower people and provide toolkits and resources
- Engage with diversity experts and diversity-centered consulting organizations
- Increase the number of employees and leaders from diverse backgrounds and monitor progress towards a more diverse workforce
- Recommend dual membership with other STEM organizations dedicated to supporting members of historically excluded groups

Finally, the study revealed more probing questions for further investigation:

- How is ASM doing in the area of DEI? (through ASM's own self-assessment)
- What is ASM's role in elevating DEI?
- What and where are the DEI problems within members' work environments?

STEM EQUITY ACHIEVEMENT (SEA) CHANGE

The STEM Equity Achievement (SEA) Change program sponsored by AAAS seeks to move beyond small-scale interventions to large-scale, system-wide, institutional efforts. The program provides a well-proven service, resources and connections to build awareness and foster an inclusive culture among university faculty – a major employer that lags behind businesses and non-profits in equity and inclusion efforts. It seeks to change systems and policies and halt practices that perpetuate exclusion and create barriers to diversity and inclusion in universities and other institutions of higher education. It serves as a leader in promoting and elevating DEI in academia and STEM, and the guiding principles provide exemplary guidance for universities and organizations. The AAAS has adopted and adapted SEA Change in its strategic plan for equity and inclusion. In 2018, the ASM joined SEA Change; ASM serves as a convener for the microbial science community and university leaders to join in the national dialogue, embark on the self-assessment process, identify tools and resources for implementing change, and support a national community of practice.

REVIEW OF DIVERSITY REPORTS AND BOOKS

Chang and Vollmer continually studied and learned from equity and inclusive practices of leading companies, associations and universities by reviewing annual reports, diversity plans, organizational documents and commentary (Appendix 6). The outcome of Step 1 is a better understanding of the challenging issues facing ASM in cultivating diverse science communities that are genuinely equitable, accessible and inclusive. Broadening participation in science has proven difficult, where bias, marginalization, and exclusion on the basis of gender (including identity and expression), race, ethnicity, disability status, socioeconomic status, sexual orientation, age, and familial history of higher education as well as the intersections among all these identities have prevented the full engagement of all individuals. This challenge presents continuing questions for ASM,

"How can ASM untie itself from past practices that made inequities possible and allow them to persist?"

STEP 2: ESTABLISH THE ASM DIVERSITY, EQUITY AND INCLUSION (DEI) TASK FORCE

The goal of the second step was to ensure independent, unaligned, and expert opinion in advising the ASM around DEI issues. The BoD agreed to a Blue-Ribbon Task Force chaired by Tuajuanda Jordan, president of St. Mary's College of Maryland. The Task Force charge was to elevate diversity and inclusion in the microbial sciences and advise the BoD around:

- Promote a culture of inclusion
- Ensure growth and sustainability
- Identify benchmarks of success

Jordan named Maria F. Lima, Associate Dean for Research at the City University of New York (at time of appointment Lima was Vice President of Research and Innovation and Dean of the Graduate School at Meharry Medical College) to serve as co-chair. Efforts were made to identify a pool representing members from different races, ethnicities and genders, different ages and career stages, and different disciplines in the microbial sciences. In the spirit of independence, another set of criteria was used to select members:

- Not currently serving on ASM committees
- Regional or national recognition for equity and inclusion efforts
- Availability for a 12-month term

The members of the Task Force were announced in fall 2019 (Appendix 1):

- Tuajuanda Jordan, PhD (chair)
- Maria F. Lima, PhD (co-chair)
- Bruce Birren, PhD
- Kyle Card, PhD
- Amy L. Chang, MS (ASM Staff, ex-officio)
- Karissa Culbreath, PhD, D (ABMM)
- Steven E. Finkel, PhD
- Leah Guthrie, PhD
- Olivia Harriott, PhD
- Shaundra Holmes (ASM Staff, ex-officio)
- Phoebe Lostroh, PhD
- Amy Cheng Vollmer, PhD (ASM BoD Liaison, ex-officio)

Chang and Vollmer intentionally assumed ex-officio status and agreed to liaise between the Task Force, BoD (Vollmer) and staff (Chang).

STEP 3: REFINE CHARGE AND DEFINE PRINCIPLES AND STATEMENT

The purpose of the third step was to ensure a feasible plan to complete the 12-month project. To complete the work within a year, the Task Force refined its charge to: elevate and embody inclusive diversity with equity within the ASM community. The defining element of the refined charge was "within the ASM community." As a member-serving organization, ASM has the responsibility to the community it serves. The term community is inclusive of current, lapsed and future ASM members; non-ASM members interested in the microbial sciences; and the scientific public at large, for the purposes of this report. Driven by the community focus, the Task Force proposed a vision for ASM's equity and inclusion efforts: The community recognizes ASM for exemplary leadership in creating a respectful, equitable, engaging and empowering culture for all in the microbial sciences. The Task Force continued more groundwork and identified:

1. Current deficiencies that hinder DEI efforts
2. A common language to describe the commitment to DEI
3. Principles to guide future work and activities.
4. Objectives and actions to complete during the 12-month period

CURRENT DEFICIENCIES

During the December 2019 meeting, the Task Force uncovered major gaps hindering ASM's ability to move forward and be productive:
Lack of information about the community's experiences and perceptions around ASM efforts to welcome and ensure that all are comfortable and have a voice in making decisions.

- Absence of demographic information such as gender, race, ethnicity, disability, age, career stage, and scientific interest from the community to understand differences in the advantages and disadvantages of specific populations.
- Absence of statements articulating ASM's values and commitment to inclusive diversity with equity. The ASM's mission statement, promoting and advancing the microbial sciences, is silent about ASM's commitment to inclusive diversity with equity, access and accountability (IDEAA).
- Absence of bold, clear and transparent principles and policies aligned with ASM's commitment to IDEAA.

COMMON LANGUAGE

Due to the complexity of the inclusion and equity environment coupled with potential confusion and misinterpretation by diverse stakeholders, the Task Force developed a common language to ensure clarity in its messaging.

Inclusive diversity with equity means:

- Everyone is welcomed and feels comfortable in the community (all people at the table).
- Everyone has a voice in decisions and in the decision-making process (all voices are heard).
- Everyone is aware of and has access to opportunities to advance throughout the profession (all people are supported). Equity means that opportunities are tailored to one's needs.
- The more differences ASM embodies and values, the stronger the community will be (the strength of the microbial sciences is driven by diversity).

Access means supporting and monitoring the effectiveness of programs, particularly at entry and transitional points within ones' career trajectory, such that there is equitable, engaged and empowered representation for all groups to succeed. Accountability means establishing benchmarks and monitoring progress and addressing gaps and shortfalls towards achieving the goals.

GUIDING PRINCIPLES AND ASM DIVERSITY STATEMENT

As mentioned in the previous section, the ASM mission statement "to promote and advance the microbial sciences" is lacking in commitments to DEI. To address the gap the Task Force developed Guiding Principles and a Diversity Statement; these statements were adopted by the BoD in February 2020 and published on the ASM website in April 2020.

The Guiding Principles were developed to (1) boldly and outwardly articulate a commitment to inclusive diversity with equity, access and accountability, (2) provide unwavering guidance for diversity efforts, and (3) serve to mandate better leaders' and members' behavior and practice. The Guiding Principles are:

- A diverse ASM enhances the microbial sciences, increases innovation, strengthens the community and sustains the profession.
- ASM empowers individuals with diverse perspectives in decision-making processes.
- ASM ensures equitable access and accountability through transparent procedures and communication.
- ASM attracts, supports and develops the community,

ensuring that all are empowered and engaged in the work of the organization.

The ASM Diversity Statement, describing how ASM achieves its work:

- ASM exemplifies inclusive diversity with equity, access and accountability (IDEAA) in the microbial sciences.
- In practice, ASM works to create a diverse community and a culture of inclusion where all staff, volunteers, members and the community are respected, treated fairly, and provided opportunities to develop professionally and excel in their chosen career pathway.

PLANNING WORK

The Task Force modified and reaffirmed the need for additional data points to lay the groundwork for monitoring progress and holding the BoD accountable to becoming more inclusive, equitable and empowering:

- Member experiences and perspectives toward promoting and advancing the diversity in the microbial sciences
- Policy development and organizational documents and assessments promoting Guiding Principles.

STEP 4: REVIEW ORGANIZATIONAL DOCUMENTS

The goal of the fourth step was to ensure that ASM practices are in alignment with the Guiding Principles and Diversity Statement. In January 2020, the Task Force reviewed the ASM strategic plan; codes, policies, and statements; member and non-member communications; and governance and volunteer service documents. In total, about 80 documents from two periods, 2012-2014 (prior to AM CEO Stefano Bertuzzi's arrival) and 2017-2019 (after ASM CEO Stefano Bertuzzi's arrival), covering core programs were examined:

- Meetings
- Journals
- Academy & Awards
- Education & Membership
- Minority Programs
- General Communications

Questions that the Task Force asked themselves during the review included:

- Do the documents present a sense of inclusive diversity with equity? If so, how?
- Which documents have the most impact on the microbial sciences? In ones' professional advancement?
- What suggestions are there for adding and/or modifying the documents?
- Are there examples or models from like organizations recognized for DEI?

As a result of the review, the Task Force found both positive and negative indicators of inclusive behaviors. The Task Force identified several footholds in the current strategic plan – ASM is inclusive, ASM creates a sense of belonging, and ASM is a leader – to elevate. However, the Task Force called for immediate actions to:

- Revise and outwardly communicate ASM's commitment to diversity by modifying the current mission statement to ASM promotes and advances the microbial sciences with equity, inclusion and diversity.
- Adopt practices driven to advance people from diverse backgrounds, cultures, experiences, and perspectives, and abandon practices driven to advance people from privileged backgrounds in science and driven to sustain the status quo.

Deep and sustained exclusionary practices across ASM programs in three previous decades perpetuated an overrepresentation of historically privileged groups and underrepresentation of historically excluded groups, resulting in a myriad of tensions across all programs and especially those programs placing high value on one's science. To address complex issues and broaden the participation of people from all backgrounds, the Task Force urges balance, rather than simple resolution, to move forward. Figure 2 illustrates the tensions, countered by balancing needs to address longstanding problems, and Table 1 provides short-and-long-term actions to achieve balance by program area.

- ASM ensures equitable access and accountability through transparent procedures and communication.
- ASM attracts, supports and develops the community, ensuring that all are empowered and engaged in the work of the organization.

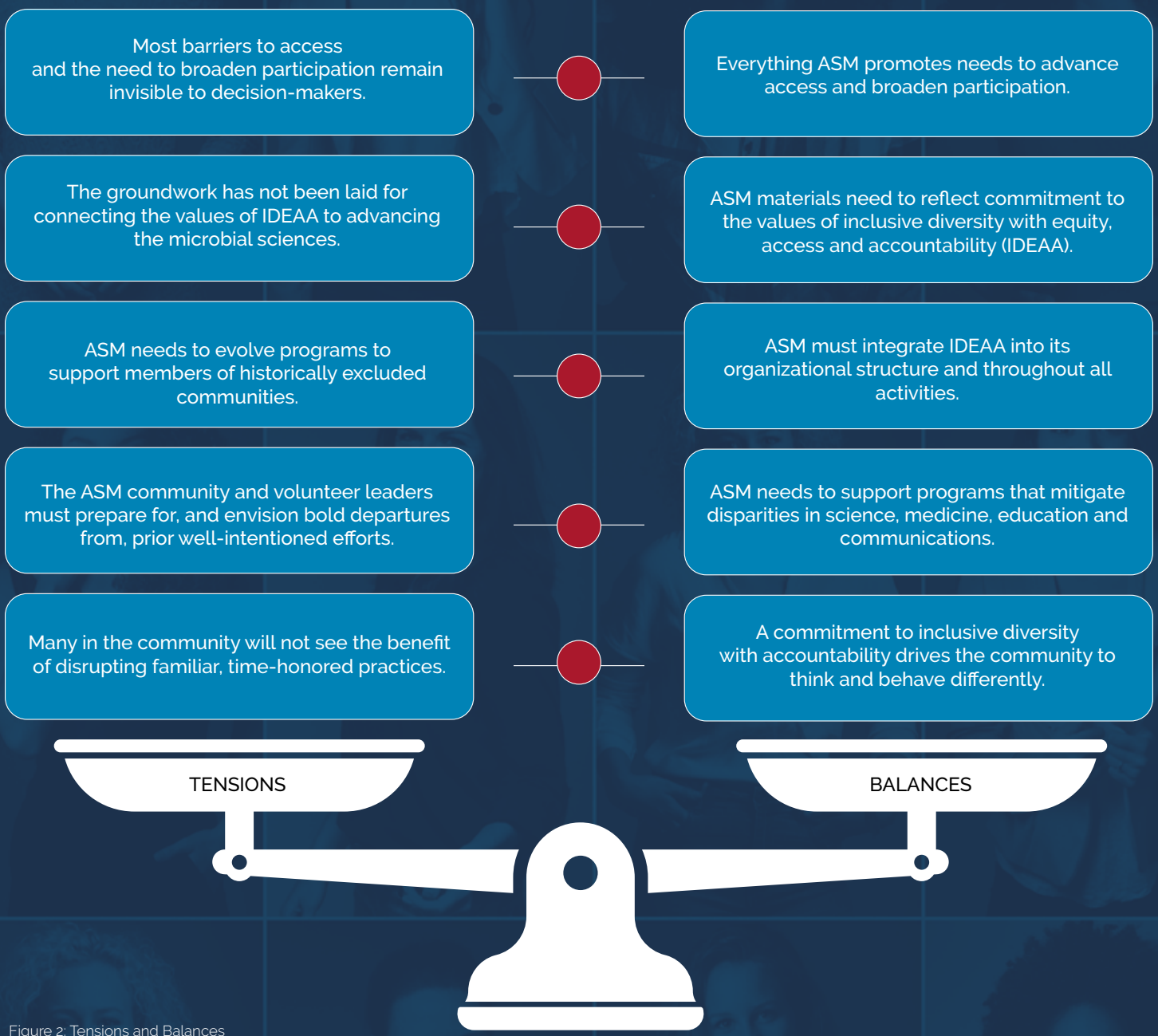


Figure 2: Tensions and Balances

TABLE 1. SHORT-TERM AND LONG-TERM ACTIONS

ASM PROGRAM	ACTIONS
MEETINGS	• Communicate why IDEAA is important for sustaining the scientific enterprise (e.g., science/scientific progress and production of new knowledge) • Broaden recruitment efforts to ensure that the candidate pool is highly diverse (e.g., plenary speakers, oral speakers, posters, abstracts, etc.) • Use evaluation criteria that require applicants to submit evidence of a commitment to, and value of, IDEAA • Collect data on attendee demographics and organizational data about sponsors and strategic partners to evaluate recruitment outcomes • Post pictures of the meeting's organizing committee in marketing promotions
JOURNALS	• Broaden recruitment efforts to ensure candidate pool is highly diverse • Evaluation criteria that requires newly appointed Editorial Board members to submit evidence of a commitment to, and value of, IDEAA • Collect demographic data on Editorial Board members to evaluate recruitment outcomes • Ensure that all leaders and Editors in Training (EiT) receive ongoing and annual implicit bias and inclusivity training
ACADEMY & AWARDS	• Broaden recruitment efforts to ensure candidate pool is highly diverse • Use evaluation criteria that require nominees and candidates to submit evidence of a commitment to, and value of, IDEAA • Collect demographic data on nominees and awardees to evaluate recruitment outcomes • Ensure that the leaders and selection committee receive ongoing and annual implicit bias and inclusivity training • Provide background and history on each award, so that nominees have guidance to the kind of goals the award programs strive toward
EDUCATION & MEMBERSHIP	• Broaden efforts to ensure that ASM meetings incorporate education and mentoring sessions • Collect data on meeting sessions details to evaluate recruitment outcomes • Bridge scientific knowledge with education and mentoring in ASM's programs, and integrate the Profession of Microbiology sub-track across Microbe • Encourage NSF and NIH to consider mentoring and broader impacts at a greater degree in funding decisions
MINORITY PROGRAMS	• Broaden recruitment efforts to ensure candidate pool is highly diverse for all ASM programs • Use evaluation criteria that require candidates to submit evidence of a commitment to, and value of, IDEAA • Collect demographic data from candidates and awardees to evaluate recruitment outcomes • Provide programming to support members of marginalized communities while also conveying that diversity is relevant to, benefits, and is the responsibility of, our entire community • Discontinue use of language that does not acknowledge the origin of the observed disparities in participation (e.g., underrepresented, minority, etc.)
COMMUNICATIONS	• Communicate the commitment to, and value of, IDEAA in all ASM's communication material (e.g., website, newsletter, marketing promotions, photographs, etc.) • Update ASM's mission statement and core values to reflect IDEAA (i.e., mission statement and core values should explicitly articulate the commitment to, and value of, IDEAA)

STEP 5: RETAIN DEI CONSULTANT FOR MEMBER SURVEY

The goal of the fifth step was to ensure an unbiased, independent assessment of member experiences to inform further work and hold ASM accountable. To ensure anonymity among members and reaffirm findings from earlier work, the Task Force sought a well-established consulting company leading global companies, non-profit organizations and governments around diversity. The Kaleidoscope Group, Inc. (KGI), services include (i) organizational assessment, strategy and measurement, and (ii) competence development via education and coaching. To inform the development of a customized survey for ASM, KGI conducted a review of organizational documents and conducted interviews with ASM leaders. The results were consistent with earlier findings:

- Diverse perspectives and experience are needed to solve global problems (DEI is a must)
- Infrastructure and support are needed to ensure that the microbial science is a welcoming field where differences are celebrated and respected, and fair access is ensured (DEI won't happen on its own)
- ASM must fully integrate inclusion and equity into the Society's DNA
    - Adopt effective structures for decision-making processes that foster and support diversity of staff, volunteers and members
    - Amend processes and guidelines to ensure fair access and continued support
    - Communicate and educate about participating in and serving ASM
    - Target resources to enhance DEI success in meetings and among editors in publishing
    - Establish key measures of DEI success and hold ASM accountable

KGI identified specific areas to probe:

- Do members want to be inclusive?
- Does ASM, as an organization, value DEI?
- Are members excited about issues beyond the natural boundaries of the ASM (e.g., science communication)?
- What are some needs among members (e.g., younger members, global members)?
- What is the level of awareness of different ASM programs and opportunities (i.e. journals and publishing)?
- Is ASM currently serving its historically excluded members (Level of support)?
- Do members have a sense of belonging (by different groups) to the community?
- Do members have access to professional development?

The customized survey (Appendix 7) occurred between June 22-July 6, 2020 and was delivered, via email, to 34,000 paid members, current and lapsed, from 2015-2020. The survey received a 10% (3,400 members) response rate, an average response rate for ASM member surveys. The survey, employing a set of statements to which respondents agreed, measured five areas: sense of belonging, program awareness, fair access, equitable treatment, commitment and accountability (Table 2).

TABLE 2. 2020 ASM MEMBER PERCEPTION STUDY: KEY AREAS OF STUDY

KEY AREA	KEY MEASUREMENTS
SENSE OF BELONGING	Measure a sense of inclusion felt by members about belonging, respect, values, having a voice, and valuing differences/seeking different perspectives.
AWARENESS OF ASM PROGRAMS	Measure a sense of inclusion felt by members about belonging, respect, values, having a voice, and valuing differences/seeking different perspectives.
FAIR ACCESS TO ASM PROGRAMS AND OPPORTUNITIES	Measure perceptions of fair and equitable access to these same programs and opportunities.
EQUITABLE TREATMENT, POLICIES AND PRACTICES	Measure how fair and equitable the processes are regarding committees, boards, publications, presentations and rewards/recognition.
DEI COMMITMENT AND ACCOUNTABILITY	Measure ASM's commitment to DEI, their leadership, perceptions of accountability, and general perceptions around the need/value of DEI commitment to further the field.

The survey provided insight into different groups of respondents based on demographic information:

- Region
- Race/ethnicity
- Gender
- Age
- Years as an ASM member
- Scientific track
- Current role
- Highest level of education achieved

MEMBER-PERCEPTION SURVEY RESULTS

Approximately 55% of the respondents were females and 45% were males. Among the U.S. respondents, 35% came from underrepresented groups in science. Of the underrepresented groups, 12% were Latinx, 11% Asian, 5% Black, 6% two or more races and 1% Native American. To further explore their ASM experiences, KGI provided four additional open-ended questions for the underrepresented groups:

- How do you believe your identity shapes your experiences in the field of microbial sciences?
- In what ways, if at all, does ASM value the unique perspectives that you bring to the microbial sciences?
- What characteristics, traits, contributions and behaviors are most valued and rewarded at ASM?
- What would you like ASM to do to better meet your needs (i.e., programs, meetings, publications, committees, etc.)?

About 35% of the survey respondents represented members residing outside the U.S. As expected, their experiences and perspectives with ASM differed from those of members residing inside the U.S. Although KGI sent the survey to international participants, the final analysis around issues of diversity, equity and inclusion did not capture international respondents' perspective because these issues are prevalent among U.S. members only.

The member perception survey revealed key strengths and opportunities:

KEY STRENGTHS

ASM should maximize and leverage key strengths:

- Most members, across all demographic groups, feel a strong sense of pride in being an ASM member. Across all groups, there is agreement that ASM's values align with the values of its members with regard to science and the microbial sciences profession.
- Eighty percent of members agree that ASM shows respect for members of all backgrounds, cultures and perspectives. Eighty percent of members feel that they belong to ASM.
- Having access to information needed to submit a manuscript for publication in an ASM journal scored well across all groups of members.
- Having access to information needed to submit a proposal or abstract to present one's work at ASM Microbe scored well across all groups of members.
- There was strong satisfaction with having opportunities to present work at meetings or in a journal.

KEY OPPORTUNITIES

ASM should focus on the following concerns from members:

- Members feel that they do not have a voice at ASM. "When I speak up, my opinion is valued by ASM" received just 38% agreement at the total level and was even lower among other demographic groups. An additional 58% of members are uncertain whether their opinion is valued or have neutral feelings on the topic. There is also low agreement on available outlets for members to provide opinions (52%) and open and honest communication at ASM (52%).
- U.S.-based members perceive low diversity representation. Diversity among ASM's leadership was one of the lowest scoring questions. There is also room for improvement in ensuring that members accurately reflect the diversity of the broader microbial sciences.
- Members feel that ASM practices are not fair or equitable. At the overall level and across groups, there is low agreement that the nomination requirements for fellowships and awards at the Academy are fair and equitable. There is similarly low agreement in total and across groups that policies and practices to nominate and select ASM committee and board members are fair and equitable.
- Members have low satisfaction with opportunities to volunteer or serve on committees. This is one of the lowest scoring statements among all members, and even lower among some demographic groups. In the additional qualitative analysis of historically underrepresented groups, a lack of awareness of existing committees, how to get involved, and a desire for more opportunities were frequently expressed.
- Broader equity concerns exist across demographic groups. Fair treatment, equal opportunity and merit-based recognition have low agreement among African-Americans, Latinx, Early Career and, to a lesser degree, Women and Asians.

THE KGI REPORT PROVIDED A SET OF RECOMMENDATIONS:

Lift all voices through celebration and recognition

- Celebrate/promote the pride of ASM membership among such a diverse group of individuals.
- Emphasize the shared scientific research and innovation values of all members across communication touchpoints.
- Consider implementing "member spotlights" focusing on thought leadership and new ideas to help increase positive perceptions around valuing different perspectives.
- Intentional, consistent, and proactive strategies to highlight and honor diverse member identities and topics that feature their unique perspective on broad microbial topics AND to elevate their research into issues that impact diverse communities more.

Strengthen trust through transparency

- Review nomination policies and practices for fellowships and awards, revise as needed for equity and consistency, then ensure the requirements are fully transparent and clearly communicated.
- Review policies and practices for nomination and selection of committees and boards, revise as needed for equity and consistency, then ensure the requirements are fully transparent and clearly communicated.
- Share select survey results with the broader ASM member community, positioned to reinforce commitment and accountability around DEI.

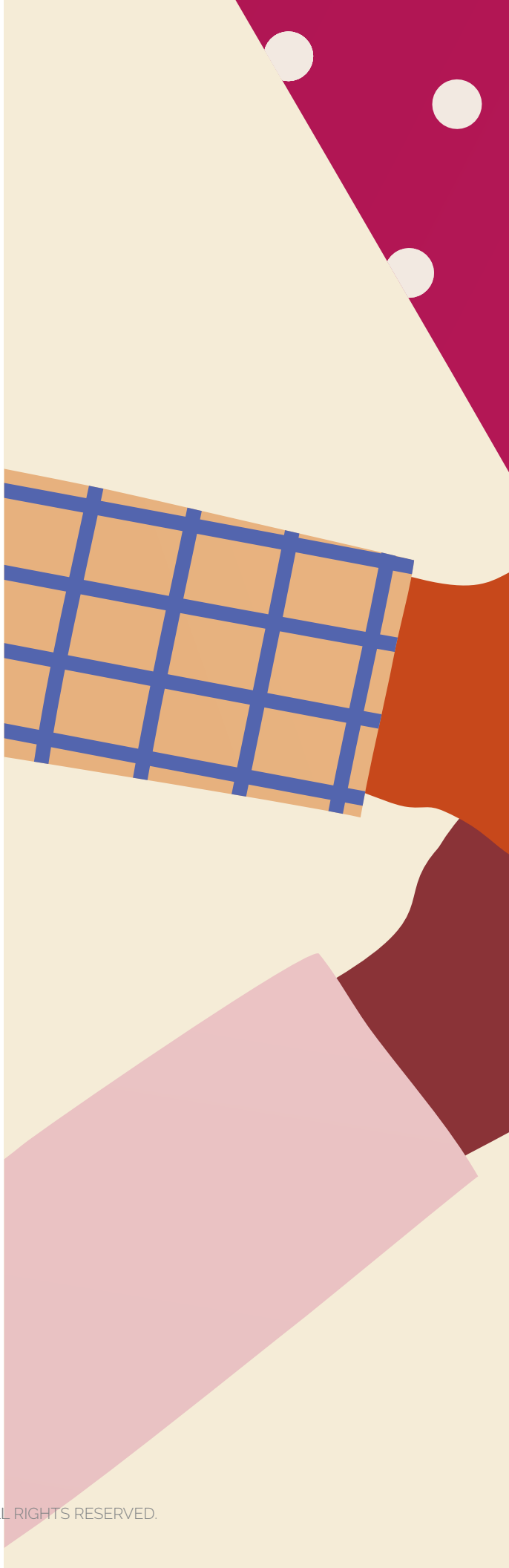
Develop an approach to diversity that demonstrates commitment and accountability

- Develop a strategic plan for recruiting/retaining diverse members.

- Develop a strategic plan for increasing diversity in ASM leadership.
- Review partnerships with diverse organizations that support building member and leadership representation, assess the value those partnerships bring, and adjust investment and resources accordingly.
- Look for ways to increase volunteer opportunities and events where members can serve, learn and grow, and build their professional networks – and develop purposeful practices to support diverse participation.

Ensure that members have a voice and equal opportunity through program development

- Increase outlets and platforms where members can voice their opinions and offer suggestions for the broader ASM organization
- Consider monthly topics where members can share their thoughts and knowledge in a forum among peers. This can help expand the reach across different roles and scientific tracks.
- Increase mentorship for early career respondents, members from underrepresented groups and global members. Begin mapping possible mentors with mentees from the current membership database, aligning scientific track.
- Review all membership practices to further explore low perceptions of equal opportunity and fair treatment.



AMERICAN SOCIETY FOR MICROBIOLOGY

APPENDIX 4. ASM DEI EFFORTS (1980-2015)

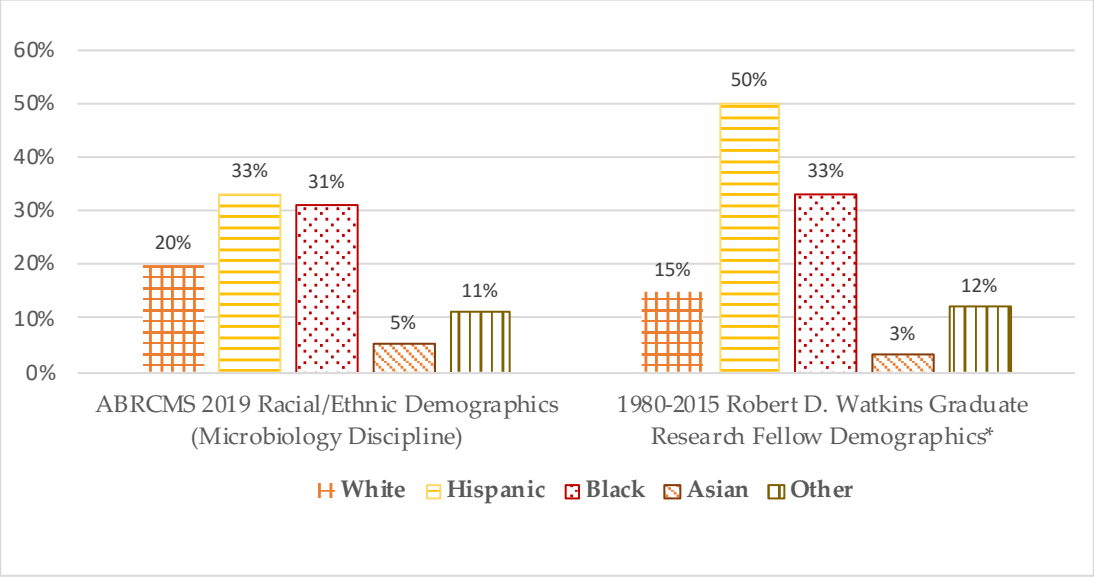
Appendix 4 describes ASM's history of supporting scientists from historically excluded and underrepresented groups.

The most notable programs, managed by the ASM Education Department, are the student research fellowships and the Annual Biomedical Conference for Minority Students (ABRCMS). Other programs across ASM include the former ASM Faculty Enhancement Program (Education/2000-2010), ASM Minority Travel Grants (Meetings), and three minority awards – Alice Evans Women's Award, Hinton Award for Mentoring Underrepresented Minorities, and the Honorary Diversity Award (Academy).

For more than three decades, ASM has offered two highly visible minority student fellowships: (i) ASM Watkins Graduate Fellowship, and (ii) ASM Minority Undergraduate Research Fellowship (MURF). Around 1980, ASM under the former ASM public policy director and African American, Robert Watkins, established the Minority Predoctoral Fellowship Program for rising microbiology graduate students from underrepresented populations to complete doctoral education. The initial program, sponsored by a few pharmaceutical companies, provided research support and travel to present at the ASM annual meeting. The program expanded to undergraduate students and received a boost with 15 years of continuous support from the National Institutes of Health (NIH) Minority Access to Research Careers (MARC) program. In the mid-1990s ASM established a Fund for student research transferring the research and mentoring responsibilities to ASM from private and public sources. The highly sought after ASM fellowships were the pride of ASM and became an exemplary model for STEM professional societies. In 2000, US President Clinton bestowed ASM with the Presidential Award for Excellence in Mentoring Underrepresented Minorities in STEM, recognizing ASM for its contributions in advancing underrepresented scientists through doctoral education. ASM was the first professional society to receive such honor, paving the way for other professional societies to follow.

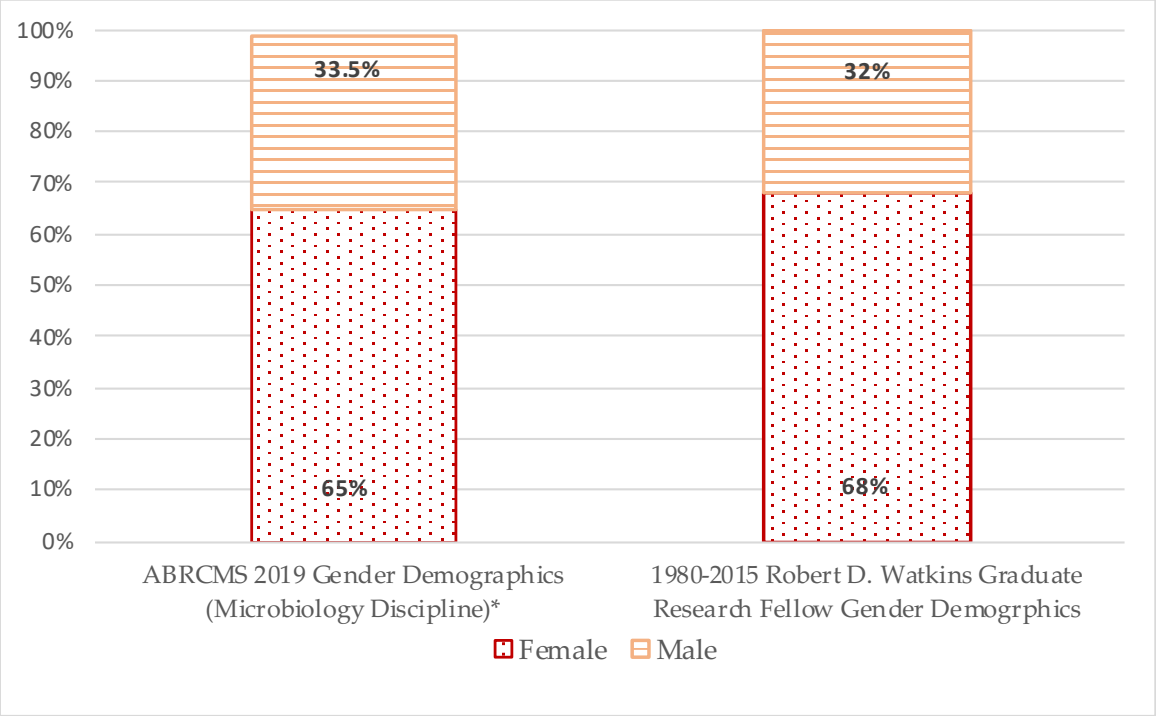
Based upon longstanding, continuous support for student research, the NIH named ASM a sole partner in sponsorship of the largest undergraduate student STEM conference dedicated to underrepresented and historically excluded groups, Annual Biomedical Research Conference for Minority Students (ABRCMS). In nearly two decades, ABRCMS became the premier undergraduate student STEM conference serving 4,000 participants annually. In 20 years, it is estimated that 50,000 STEM undergraduate students, primarily from historically excluded and underrepresented populations, have participated in ABRCMS. Figures 1 and 2 illustrate the gender, racial and ethnic diversity among ASM fellows and ABRCMS participants, providing clear paths to representation and participation of diverse populations of talented scientists.

FIGURE 1. RACIAL/ETHNIC DEMOGRAPHICS OF ASM WATKINS FELLOWSHIP AND ABRCMS



* Totals may exceed 100% as some respondents indicated more than one category.

FIGURE 2. GENDER DEMOGRAPHICS OF ASM WATKINS FELLOWSHIP AND ABRCMS



* Total is below 100% as some respondents did not wish to disclose this information or identify with the the provided gender options (male/female)

In 2015, the ASM hired an evaluator to conduct a retrospective evaluation of three ASM fellowships including the Watkins Graduate Research Fellowship. The study covered the program for 35 years from 1980 to 2015. During that period, 111 Watkins Fellows were supported; in 2015, the contact information was available for 90 Fellows. The vast majority of study respondents have remained in fields related to microbiology (e.g., microbial sciences, immunology, virology, public health, pharmacy, college teaching and administration). The respondents cited professional networking and research presentations as the highlight of their fellowship. Additionally, they cited exposure to other science conferences and connections to other researchers as important. Beyond science-relevant benefits, respondents highlighted several social and cultural benefits from the program. For example, participation in ASM contributed to their sense of themselves as scientists (science identity) and increased their confidence in becoming scientists and succeeding in science. Many cited a strong sense of belonging and attributed this feeling to ASM's programming. This sense of belonging was frequently highlighted in contrast to the isolation felt in their academic programs and in some cases, remained with them for years.

These social factors are critically important for individuals not part of majority populations. Unfortunately, only 37% of the original 111 fellows were ASM members in 2015. Membership participation has declined more since 2015. In a recent assessment of member status among Watkins fellows awarded between 2005 and 2015, only 17% (14 out of 80 fellows) were ASM members in 2020. More probing to assess why talented young scientists leave ASM is necessary.

Both the ASM fellowships dedicated to supporting historically excluded and underrepresented scientists and ABRCMS are positive steps towards increasing diversity in the microbial sciences. Both provide lessons learned and a foothold into increasing the proportion of underrepresented microbial scientists.

APPENDIX 5. STEM INCLUSION STUDY: ASM CLIMATE REPORT

Appendix 5 is the STEM Inclusion Study: ASM Climate Report. The report is separated into five sections, (i) Executive Summary, (ii) Background, (iii) Summary of Findings, (iv) Methodological Appendix and (v) Works Cited.

STEM Inclusion Study

ORGANIZATION REPORT:
AMERICAN SOCIETY FOR MICROBIOLOGY (ASM)

PRINCIPAL INVESTIGATORS:

Dr. Erin A. Cech, *University of Michigan*
Dr. Tom Waidzunas, *Temple University*

FUNDS #1535385, 1535360

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EXECUTIVE SUMMARY

The STEM Inclusion Study, led by Dr. Erin Cech (University of Michigan) and Dr. Tom Waidzunas (Temple University), is the first large-scale, national-level study to simultaneously examine the experiences of women, racial and ethnic minorities (REM), persons with disabilities, and lesbian, gay, bisexual, transgender, and queer (LGBTQ) individuals working in the science, technology, engineering and math (STEM) workforce.[1] The study advances knowledge of the structures and cultures of STEM fields that may undermine equality of opportunities and outcomes on the basis of gender, racial/ethnic category, disability, and LGBTQ status. Overall, the goal of the study is to better understand processes of disadvantage experienced by members of STEM-related professional organizations in order to inform diversity and inclusion efforts in these organizations, as well as other STEM-related entities and institutions.

This organization participated in the survey phase of the STEM Inclusion Study, alongside a number of other STEM-related professional organizations.[2] With permission from the organization, the research team surveyed members of this organization on a variety of topics related to members' day-to-day experiences in their workplaces and their encounters with other STEM professionals. Using data from this survey, this report examines trends regarding (a) *experiences of inclusion and marginalization*, analyzing employees' perceptions of their workplace climate, feelings of personal fit, and harassment on the job; (b) *professional valuation*, the extent to which respondents believe they are respected and taken seriously as STEM professionals, and (c) *reports of workplace fairness,* the frequency with which respondents report instances of hostility and unfair treatment in their workplaces toward members of disadvantaged groups. We compare reports of fairness across employment sector (college or university, for profit sector and other employment sector).

Regarding *experiences of inclusion and marginalization*, persistent patterns emerged by gender, disability status, sexual orientation, and race/ethnicity in this organization. Specifically, controlling for employment sector, education level, and age, women, persons with disabilities, LGBTQ respondents, and some racial/ethnic minority group members are significantly more likely to report experiences of marginalization in their workplaces than their colleagues. A similar pattern emerged regarding *professional valuation*: women, persons with disabilities, LGBTQ respondents and certain racial/ethnic minority group members are significantly more likely to report having their professional expertise devalued, receiving less respect from their supervisors and co-workers, and feeling as though they have to work harder than their colleagues to be seen as competent STEM professionals.

Regarding patterns in *workplace fairness,* organization members across different employment sectors reported witnessing or experiencing instances of negative treatment and harassment with some frequency: for instance, 33% of respondents reported witnessing negative treatment by gender in their workplaces in the last three years, and 21% reported witnessing negative treatment along the lines of race/ethnicity. These instances of negative treatment were similarly prevalent among organization members across different employment sectors.

This report begins with a brief introduction to inequality issues within the STEM workforce, then summarizes the survey results of this organization and offers suggestions for addressing these issues. In particular, we highlight the finding that women report significantly less positive experiences than men on *nearly every measure* of marginalization and professional devaluation that we examine here, and the data show racial/ethnic differences, and differences by disability and LGBTQ status on several measures.

[1] The STEM Inclusion Study (https://www.steminclusion.com/) is funded by the National Science Foundation (#HRD 1539140). Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

[2] In total, the STEM Inclusion Study aims to include approximately 20 professional organizations, seeking to maximize representation from the array of STEM disciplines, sectors, and industries. The names of the professional organizations are kept confidential to protect the confidentiality of individual survey participants.

BACKGROUND

In both public and scholarly discourse, there is growing interest surrounding the retention and representation of certain socio-demographic groups in the STEM workforce. Investigating the processes of disadvantage that underrepresented groups in STEM face helps illuminate the factors that prevent talented and motivated individuals from advancing in STEM. Yet, scholars are only beginning to understand the particular mechanisms that reproduce these disadvantages within STEM workplace interactions, within STEM organizations, and within the contexts of science and engineering professional cultures. There is a pressing need for more research on these issues.

Investigations such as those undertaken by the STEM Inclusion Study are especially timely, as research over the last three decades has documented processes reproducing the underrepresentation of women, racial/ethnic minorities, LGBTQ persons, and persons with disabilities in science and engineering. Historically, women have been underrepresented in STEM in the United States (Iskander et al. 2013), and similar patterns are recorded in countries such as Korea, Switzerland, and Australia (Buccheria, Abt Gurber and Bruhwiler 2011). Women are less likely than men to enter STEM fields and more likely than men to leave them (Frehill 2012). In attempts to explain these gaps, research has not found any evidence of a performance gap between men and women (Koul, Lerdpromkulrat and Chantara 2011). Rather, stereotypes regarding who "fits" STEM are strongly connected to women's under-representation in STEM, help perpetuate "chilly" climates for women, and undermine the perception of women's competence as STEM professionals (Archer et al. 2013, Cech 2013, Cech et al. 2011, Cheryan et al. 2011). For instance, in an experimental study of science faculty hiring a student lab manager, men applicants were rated as more competent and likable than women applicants and offered higher salaries, even though the applicants had otherwise identical applications (Moss-Racusin et al. 2012). Among faculty populations, women tend to receive fewer resources, less mentoring, face greater criticism and isolation from peers, and are shouldered with more administrative and service work than men (McIlwee & Robinson 1991, NSF 2007).

Existing research has also detailed the experiences and challenges of racial/ethnic minorities in STEM fields. Racial/ethnic minorities (particularly African Americans and Hispanics) are highly underrepresented in STEM majors, in STEM faculty positions, and in STEM positions in industry, compared to their representation in US population more broadly (Babco 2003, Huradto et al. 2010). This underrepresentation is attributed to a range of issues, including unequal educational opportunities and mentoring (Moreno et al. 2006), implicit bias (Turner 2002, Moody 2004), and feelings of isolation within academic departments and communities (Zambrana et al. 2015). This underrepresentation of racial/ethnic minority faculty in STEM departments, furthermore, gives minority students the impression that they do not have a place in STEM or academic fields (Nelson and Brammer 2012). Thus, the under-representation of minority faculty and students in STEM are closely tied with one another—without mentors with whom minority students can relate, they are less likely to believe that they can be successful in STEM fields (Nelson and Brammer 2012). Less research has examined the experiences of racial/ethnic minority persons employed in STEM outside of academia, although there is reason to believe that experiences of marginalization and exclusion extend to non-academic sectors as well.

Scholars are only beginning to understand the experiences of LGBTQ individuals in STEM, but limited previous research indicates that LGBTQ persons frequently face marginalization and unfair treatment compared to their non-LGBTQ peers. Cumulatively, prior studies indicate the existence of negative climates for LGBTQ faculty and students in higher education and suggest a link between this climate and academic/career consequences. One campus climate study of students, faculty, and administrators revealed negative experiences for LGBTQ college students and faculty (Rankin et. al 2010). For example, 31 percent of LGBTQ students and faculty reported that they were not comfortable with the climate on their campus climate and 20 percent feared for their physical safety. Faculty and students in STEM departments specifically report similar, if

not more extreme, experiences of marginalization in science and engineering departments (Cech 2013; Cech and Waidzunas 2011; Bilimoria and Stewart 2009; Gunckel 2009). Further, recent research on employees of STEM-related federal agencies found strong and persistent workplace experience inequalities for LGBTQ-identifying persons compared to their non-LGBTQ colleagues (Cech & Pham 2017).

Little is understood about the experiences of persons with disabilities in STEM education and employment as well. Early research suggests that STEM fields may be particularly difficult and marginalizing environments for those with disabilities. Disability is often associated with negative stereotypes about intellectual ability; those with disabilities are often perceived as less intellectually competent than their peers (Slaton 2013). In STEM, this association is further compounded by the fact that STEM culture often silences discussions of bodily ability when evaluating performance (Knorr-Certina 1995, Siebers 2010, Slaton 2013).

Methodological Summary: In the spring of 2019, ASM distributed a link to the STEM Inclusion Study survey to its membership list.[3] Members were sent a pre-notification email in March, followed by an email with the URL survey link. Participation in the survey was voluntary and individual responses are kept strictly confidential. [4] All survey results below are presented in a way that ensures that any given individual's responses are not individually identifiable. For the purposes of this report, we focus only on the workplace experiences of organization members who were employed at the time of the survey (N=1155).

Table 1 below presents the proportion of employed respondents by gender,[5] race/ethnicity (respondents could identify with more than one racial/ethnic minority category), LGBTQ status, disability status, [6] and employment sector (university/college, for-profit, or other—including K-12, nonprofit, and self-employed members).

Table 1: Descriptive Statistics of 1 by Demographic Characteristics (N=1155)

Demographic Characteristics	Percent of the Sample
Women	60.50%
Men	38.91%
Hispanic	7.62%
Asian	10.76%
Black	4.04%
White	79.07%
Other race/ethnicity	3.06%
LGBTQ	5.65%
Disability (physical, mental or emotional)	18.30%
Employed at University or College	59.06%
Employed in for-profit sector	13.53%
Employed in another sector (e.g., government)	25.73%

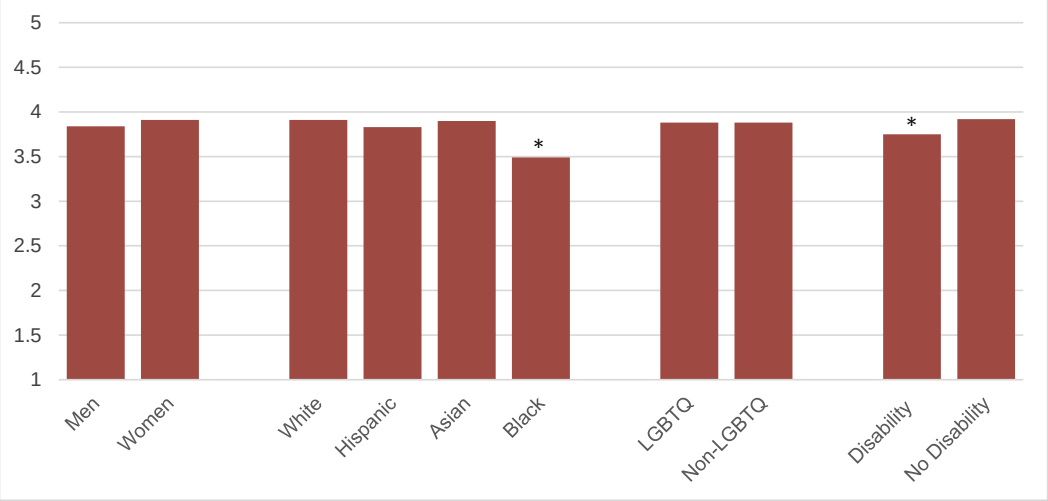
[3] This organization's participation the study was approved by the University of Michigan Institutional Review Board.
[4] Respondents participated in an online survey that took approximately 15-minutes to complete. The survey consisted of active members with a paid membership to this organization. The survey link was distributed via email by the organization to a random selection of its members. Survey sample size: 1,279, response rate: 17.2%. We include in this analysis only those respondents who were employed (N=1155) at the time of the survey. Survey data was analyzed using Stata statistical programming package. The survey results above report univariate statistics (means).
[5] The category "women" includes both cis-gender and transgender women and the category "men" includes both cis-gender and transgender men.
[6] Note: 12.59% of the sample identified as having a physical disability, and 7.11% of the sample identified as having a mental or emotional disability.

1. Inclusion and Marginalization

As noted above, previous research has found that women, racial/ethnic minorities, LGBTQ persons, and persons with disabilities in various arenas in STEM education and employment report more frequent experiences of marginalization and isolation than their colleagues (Frehill 2012, Cech 2013; Cech and Waidzunas 2011; Bilimoria and Stewart 2009; Gunckel 2009). This marginalization has consequences for long-term satisfaction and retention of these groups in STEM education and employment (Eglash 2002, Chang et. al 2008, Zambrana et. al 2015, Laschinger et. al 2004).

We explore patterns of inclusion and marginalization across demographic categories in this organization on four key indicators: (1) whether they feel like they fit in with other people in their workplace, (2) whether they have read or heard insensitive comments in their organization in the last year, (3) whether they worry that their mistakes garner more visibility than those of their colleagues, (4) how frequently colleagues make disparaging comments about disadvantaged group members, and (5) whether they have been harassed verbally or in writing in their workplace. In this work, we consider each axis of marginalization independently. However, we recognize that, from the theory of intersectionality (Crenshaw 1991), forms of marginalization across these dimensions are interlocking and interwoven. Our future research will aggregate data across professional organizations in the STEM Inclusion Study, providing a sample size large enough to explore these intersectional outcomes.

Fig 1: "I feel like I fit in with other people in my workplace."



Predicted Probabilities by gender, race/ethnicity, LGBTQ and disability status, net of differences by sector, age, and education level. *(1=strongly disagree to 5=strongly agree)*

Figure 1 represents whether respondents feel like they "fit in" with the colleagues in their workplace (values range from 1-5, 1=Strongly Disagree through 5=Strongly Agree). The values are predicted probabilities, or the means for each group holding variation by age, sector, and education level constant.

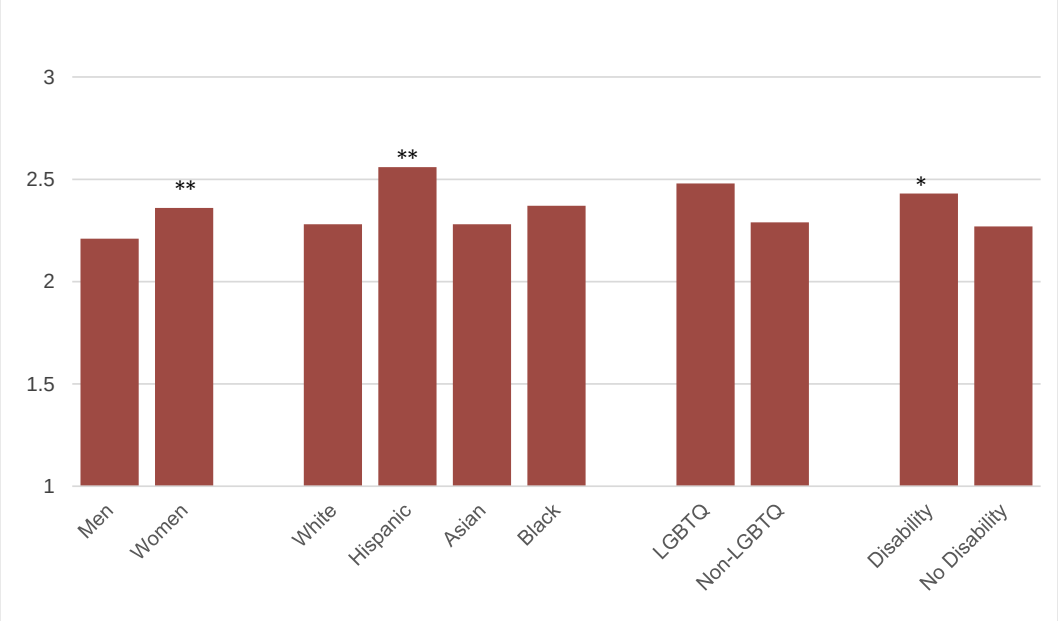
Overall, the averages among all demographic groups are relatively high, with respondents feeling on average between "Neither

Disagree nor Agree" and "Agree" in regards to fitting in with others at their work.

There are two significant differences on this measure of marginalization, as indicated by the asterisks above the bar (***p<.001, **p<.01, *p<.05, †p<.10, two-tailed test).[7]

Black respondents being significantly less likely than their white counterparts to report that they fit in. Further, respondents with disabilities were less likely than those without disabilities to report that they fit in, net of controls.

Fig 2: "I have read or heard insensitive comments in my workplace that I found offensive."



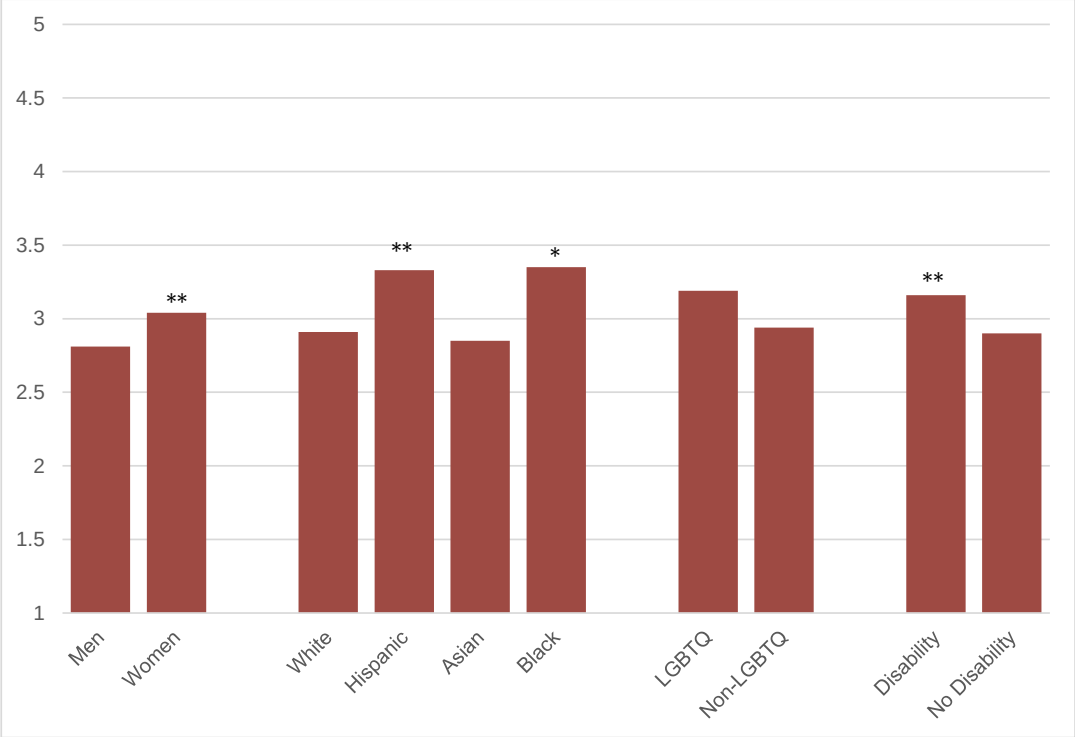
Predicted Probabilities by gender, race/ethnicity, LGBTQ and disability status, net of differences by sector, age, and education level. *(1=Never, 2=At least once in the past year, 3=At least once a month or more)*

This second measure indicates whether some groups are significantly more likely than others to have encountered insensitive or offensive comments in their workplace. Such comments are an important mechanism of marginalization in workplaces. Overall, across all demographic groups, respondents reported encountering an offensive comment at least once in the past year (a mean value of 2 or more).

Women were significantly more likely than men to report hearing insensitive or offensive comments in the workplace. There were also significant differences along racial lines, with Hispanic respondents reporting hearing insensitive or offensive comments in their workplace significantly more frequently than their white counterparts. Respondents with disabilities also reported these comments more frequently than respondents without disabilities reported them. There were no other significant group differences on this measure. Although there is some variation in the means across other demographic categories, these differences are not significant, net of controls.

[7] Significance levels were determined by logistic, OLS, or ordered logistic regressions (depending on the dependent variable in question) that included measures for gender, racial/ethnic category, LGBTQ status, age, disability status, education level and employment status. These models were multiply imputed (20 imputations using the chained command in Stata) so that all figures have an N=1155.

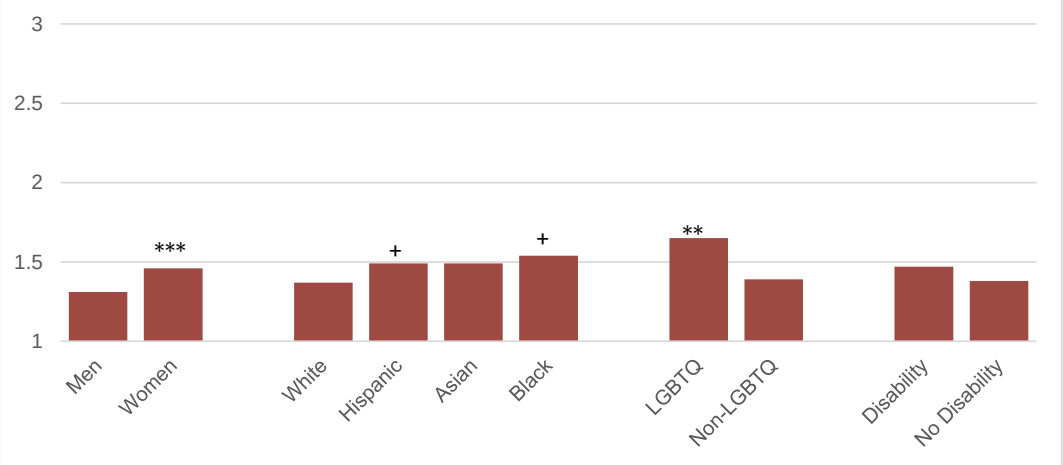
Fig 3: "I worry that my mistakes are more noticeable than the mistakes of others."



Predicted Probabilities by gender, race/ethnicity, LGBTQ and disability status, net of differences by sector, age, and education level. *(1=strongly disagree to 5=strongly agree)*

Another important indicator of marginalization is the extent to which persons fear that their mistakes will be more visible than those of their colleagues. In the figure above, there are several significant group differences: net of variation by sector, education level, and age, women are more likely than men, black and Hispanic respondents more likely than white respondents, and persons with disabilities more likely than those without disabilities to worry that their mistakes garner more negative attention than their colleagues.

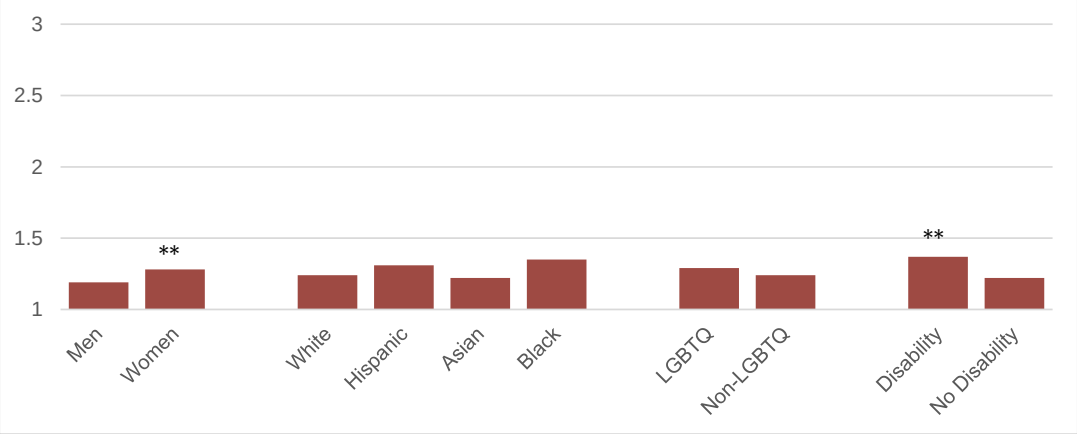
Fig 4: "A co-worker makes a negative comment or joke about women, racial/ethnic minorities, LGBTQ people, or people with disabilities."



Predicted Probabilities by gender, race/ethnicity, LGBTQ and disability status, net of differences by sector, age, and education level. *(1=Never, 2=At least once in the past year, 3=At least once a month or more)*

Figure 4 depicts an aggregated measure that reports the frequency with which respondents reported hearing overtly offensive comments about disadvantaged groups in the workplace (1=Never, 4=Frequently). While the frequency of these overtly biased comments was rare, women and LGBTQ respondents were more likely to report hearing targeted comments about minority groups than men, and non-LGBTQ respondents. Further, black and Hispanic respondents were marginally more likely to report hearing these comments than their white counterparts.

Fig 5: "I was harassed verbally or in writing at my job in the last year."



Predicted Probabilities by gender, race/ethnicity, LGBTQ and disability status, net of differences by sector, age, and education level. *(1=Never, 2=At least once in the past year, 3=At least once a month or more)*

Finally, Figure 5 depicts the frequency with which respondents report experiencing harassment in their workplace. Overall, as indicated in Fig 5, experiences of direct harassment are relatively rare. However, women were significantly more likely than men to report experiencing harassment at work in the last year.

Respondents with disabilities were also significantly more likely than respondents without disabilities to report experiencing harassment in the last year. These differences are significant net of variation by age, sector, and education level.

Summary of Patterns of Marginalization

Several strong demographic patterns emerged on the marginalization measures above. The most persistent pattern was along the lines of gender: even though women were the majority of respondents, women respondents consistently reported more frequent experiences of marginalization in their workplaces than men, net of other demographic and work characteristics. These gender differences emerged all but one of the marginalization measures we include in our analysis. For example, women were more likely than men to report witnessing offensive comments in their workplace, more likely to hear negative comments toward minority groups, more likely than men to report being harassed at work, and more likely to state that they worried their mistakes were more noticeable than others. These results point to a concerning pattern of institutional marginalization of women in their workplaces.

Another consistent pattern that emerged is the marginalization experienced by disability status. Respondents with disabilities were significantly less likely than their peers to feel that they fit in at their workplaces, more likely to report hearing insensitive comments at work, more likely to believe their mistakes are more noticeable than their peers, and more likely to report experiencing harassment at work workplace. These patterns by disability status indicate that this should be an important point of consideration for this organization as it advocates for the interests of its members.

Several other patterns of marginalization emerged. First, Hispanic respondents were significantly more likely than white respondents to report their mistakes are more noticeable than those of their peers. Hispanic respondents were also more likely than white respondents to report hearing negative comments about minority persons. Black respondents were also significantly more likely than white respondents, and black respondents were significantly more likely than white respondents to report that their mistakes were more noticeable than their colleagues, and less likely to report feeling a sense of fit at their workplace. Further, LGBTQ respondents were significantly more likely than non-LGBTQ respondents to report overhearing negative comments in their workplace toward marginalized or under-represented groups.

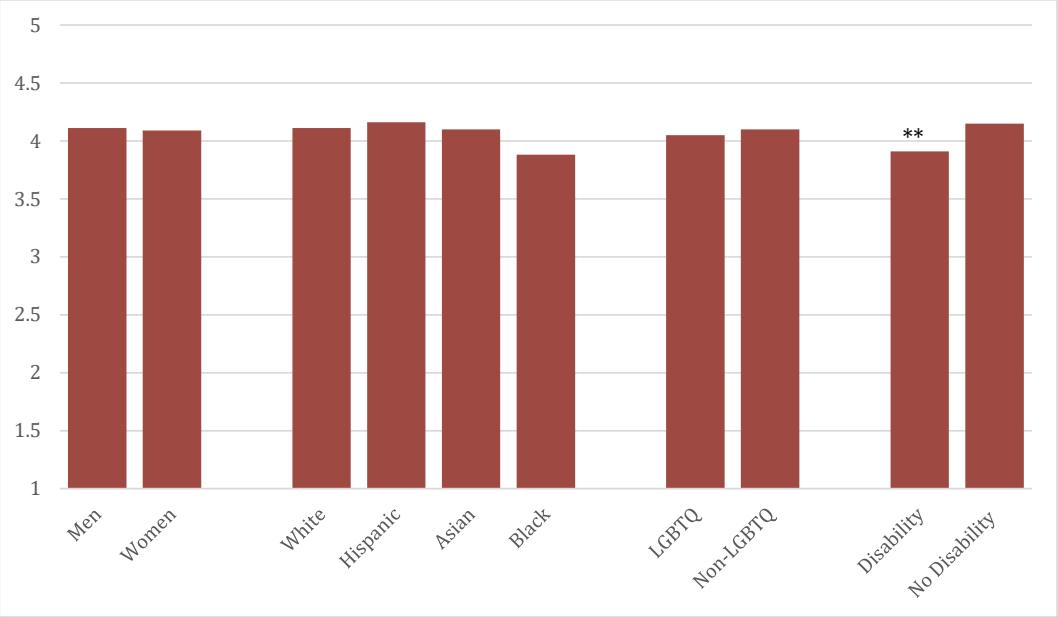
In short, women, LGBTQ persons, persons with disabilities, and black and Hispanic respondents were significantly more likely than their men, non-LGBTQ, non-disabled and white counterparts to report a chilly climates in their workplaces.

2. Professional (De)valuation

Prior research has found that disadvantaged groups within STEM often report that their colleagues question their scientific and engineering competence and performance (Moss-Racusin et. al 2012, Steele 2003, Chang et al. 2008, Williams 2014). Disparities in the recognition of the professional excellence of women, people of color, LGBTQ individuals, and persons with disabilities in STEM exacerbate the disciplinary issues of underrepresentation and attrition in STEM education and careers (Shapin 1995, Collins and Evans 2007, Williams 2014, Steele 2003, Chang et al. 2008, Nelson and Brammer 2012).

In this section, we examine five important indicators of professional devaluation: (1) whether they believe their work is respected in their workplace, (2) whether they believe their supervisor respects them, (3) whether they believe they are held to the same standard as their colleagues, (4) whether their boss gives them less credit than they deserve, and (5) whether they believe they have to work harder than their colleagues to be perceived as legitimate professionals.

Fig 6: "In my workplace, my work is respected."

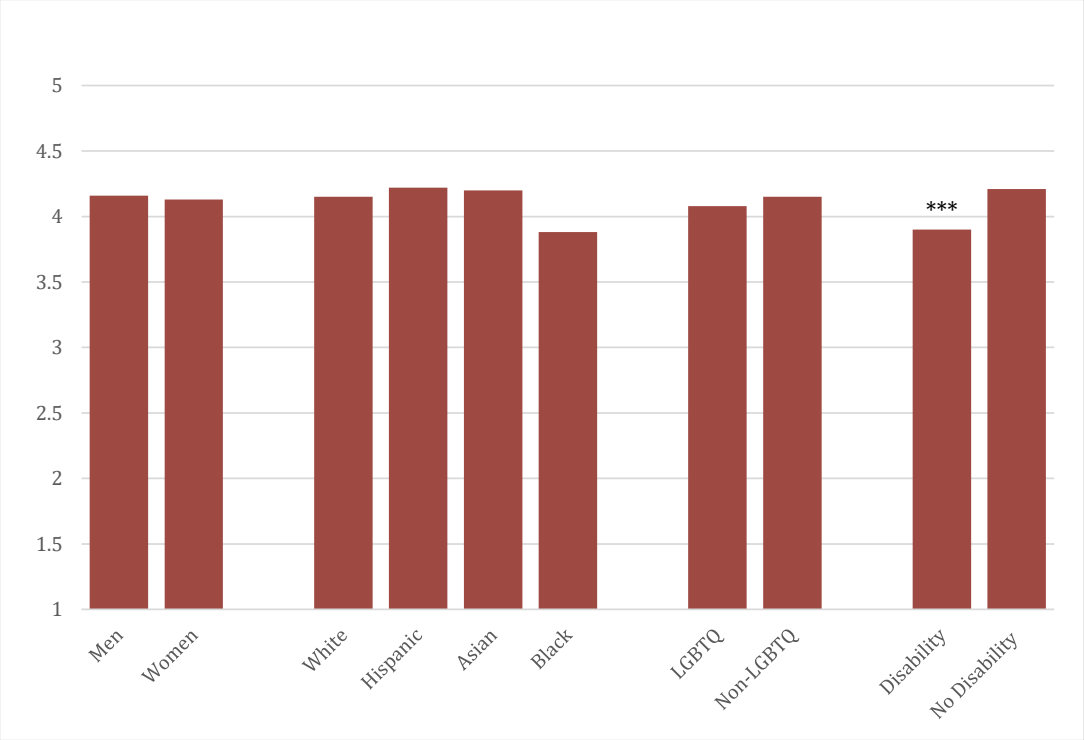


Predicted Probabilities by gender, race/ethnicity, LGBTQ and disability status, net of differences by sector, age, and education level. *(1=strongly disagree to 5=strongly agree)*

As above, the bar charts in this section present the predicted means for each demographic category, net of variation by age, education level, and sector. The asterisks represent significant differences across those categories, as determined by OLS or ologit regression models (***p<.001, **p<.01, *p<.05, †p<.10, two-tailed test).

Figure 6 captures the extent to which respondents feel as though their work is respected within their workplaces (1-5; 1=Strongly Disagree, 5=Strongly Agree). Respondents typically feel that their professional work is respected—means lie on average between somewhat and strongly agree. However, respondents with disabilities are significantly less likely than respondents without disabilities to report that their work is respected by their colleagues.

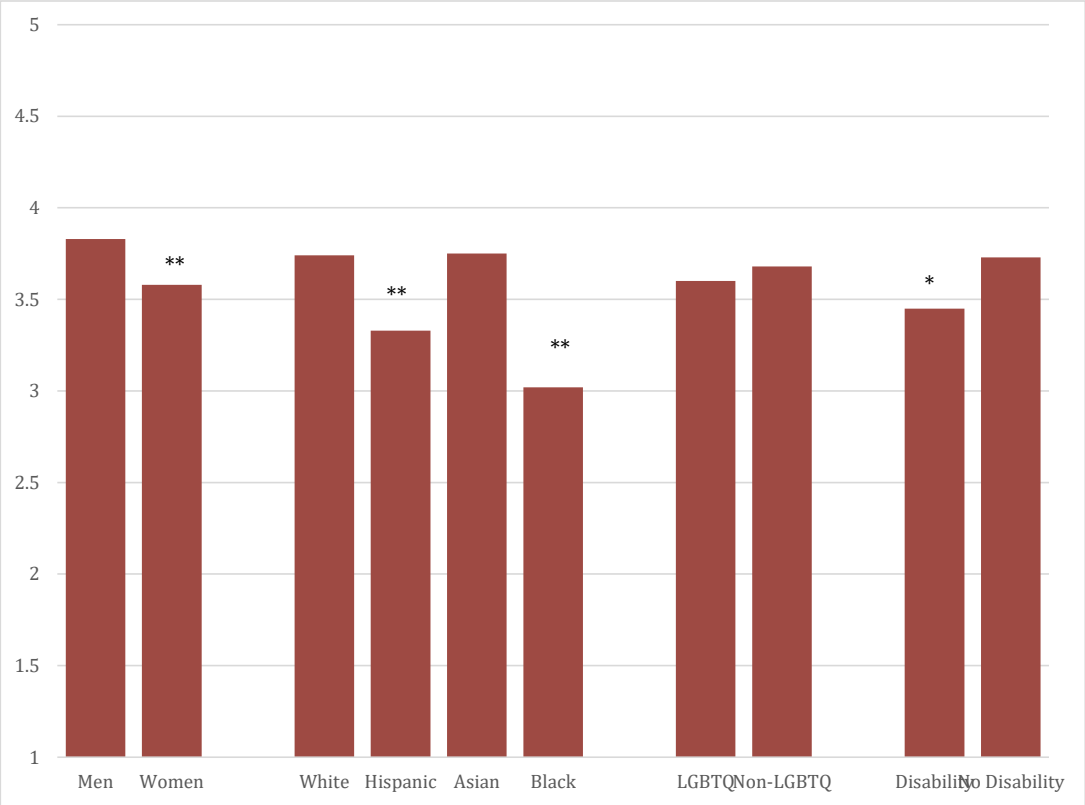
Fig 7: “My supervisor treats me with respect.”



Predicted Probabilities by gender, race/ethnicity, LGBTQ and disability status, net of differences by sector, age, and education level. *(1=strongly disagree to 5=strongly agree)*

The second measure captures whether respondents feel respected by their supervisors (Fig 7). In general, respondents typically report that they experience at least a modest degree of respect from their supervisors. However, respondents with disabilities are less likely than those without disabilities with the same education level, the same age, and in the same sector to report that their supervisors respect their work.

Fig 8: "I am held to the same standard as others for promotion and advancement."

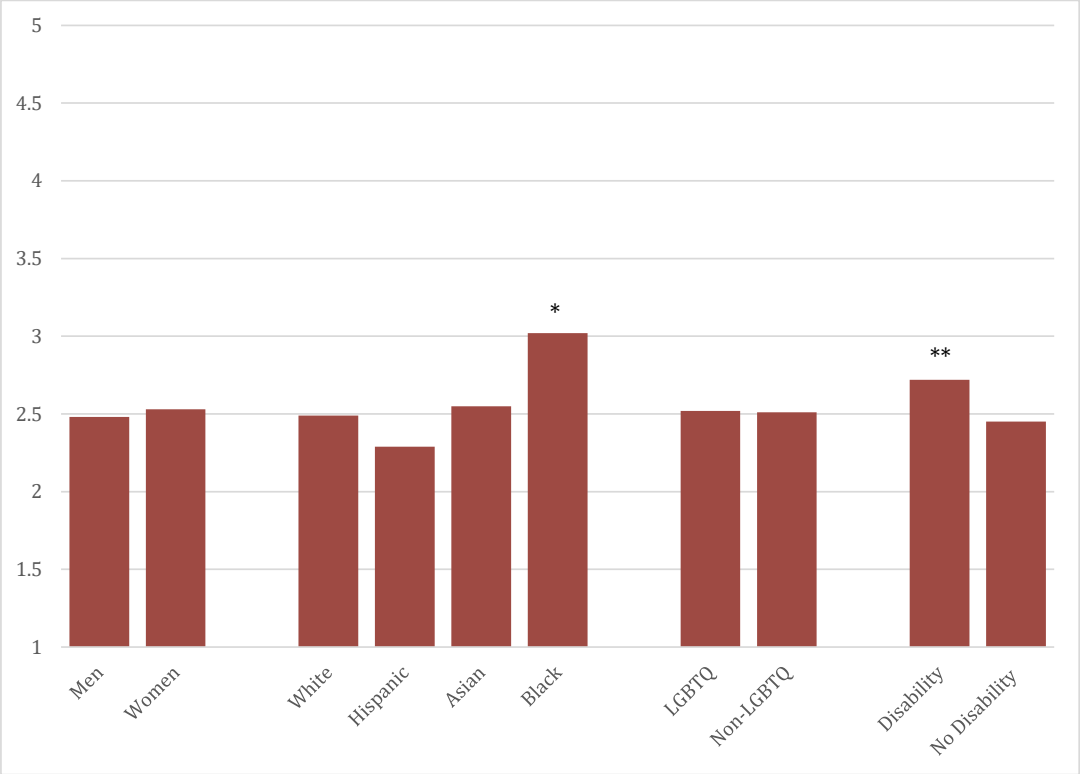


Predicted Probabilities by gender, race/ethnicity, LGBTQ and disability status, net of differences by sector, age, and education level. *(1=strongly disagree to 5=strongly agree)*

Another important indicator of professional respect is the extent to which respondents believe that they are held to the same standard as their colleagues for advancement and promotion (Fig 8). Those who feel that they are held to a higher standard may not advance as quickly, and are not given the same level of respect for the same quality of work.

Here, women are significantly less likely than men, black and Hispanic respondents are significantly less likely than white respondents, and respondents with disabilities are significantly less likely than respondents without disabilities to report that they are held to the same standard as their colleagues in their workplaces.

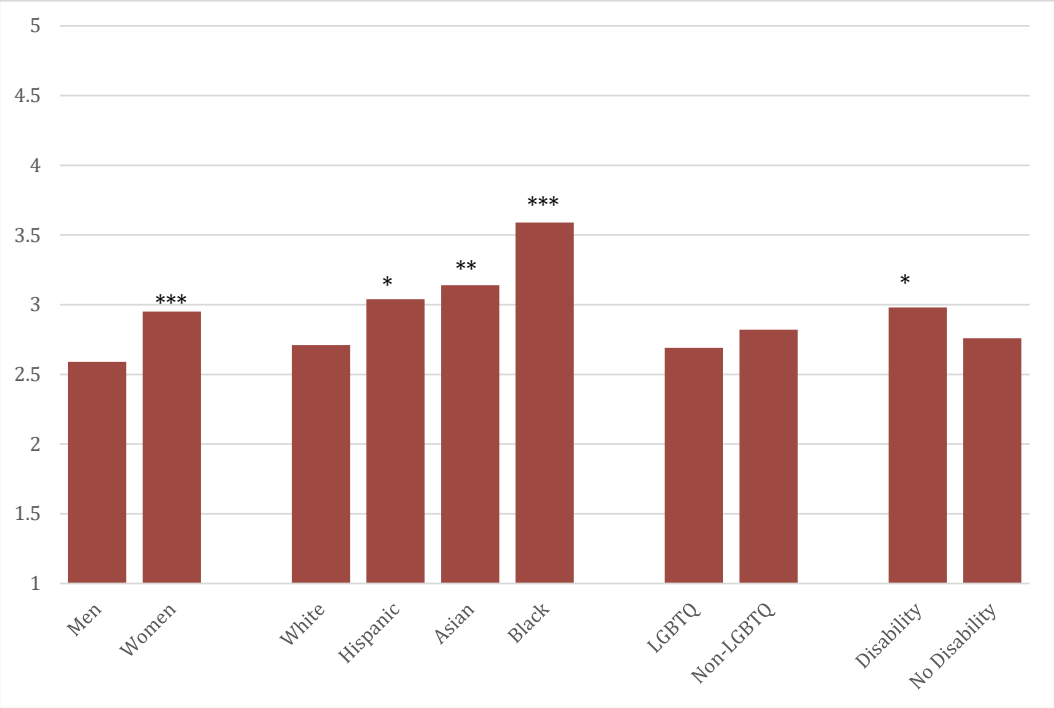
Fig 9: "My boss gives me less credit than I deserve."



Predicted Probabilities by gender, race/ethnicity, LGBTQ and disability status, net of differences by sector, age, and education level. *(1=strongly disagree to 5=strongly agree)*

Similar to the measures above, Figure 9 reports the extent to which respondents agree that their boss gives them less credit than they deserve. In general, respondents typically disagree with this statement: the average for each group sits between "somewhat disagree" and "neutral." Yet, as before, there are important demographic differences: black respondents are more likely than white respondents to report that their boss gives them less credit than they deserve, and those with disabilities are also more likely to agree with this statement than people without disabilities.

Fig 10: "I have to work harder than my colleagues to be perceived as a legitimate professional."



Predicted Probabilities by gender, race/ethnicity, LGBTQ and disability status, net of differences by sector, age, and education level. *(1=strongly disagree to 5=strongly agree)*

As a final measure of professional valuation, Figure 10 above reports the predicted means on a measure that asks respondents the extent to which they agree that they have to work harder than their colleagues to be perceived as a legitimate professional. As a whole, responses average between "disagree" and "neutral."

But, as before, there is important demographic variation. Specifically, women are significantly more likely than men, Hispanic, Asian, and black respondents significantly more likely than white respondents, and respondents with disabilities are significantly more likely than respondents without disabilities to agree that they have to work harder than their colleagues to be perceived as a legitimate professional.

Summary of Patterns of Professional Devaluation

Among the measures in this professional devaluation category, we see similar trends as those reported in the measures relating to marginalization. Gender was once again a pattern in these results—women were less likely to report that they are held to the same standard for promotion as others, and more likely than men to report that they had to work harder than others to be viewed as a professional.

Individuals with disabilities also frequently reported instances of professional devaluation. Respondents with disabilities were significantly less likely than counterparts without disabilities to report that their work is respected, more likely to report that their boss gives them less credit than they deserve, and more likely to

report that they are held to a different standard than their colleagues and get less credit than they deserve for their work. Again, these differences are net of variation in the sample by education level, age, and employment sector.

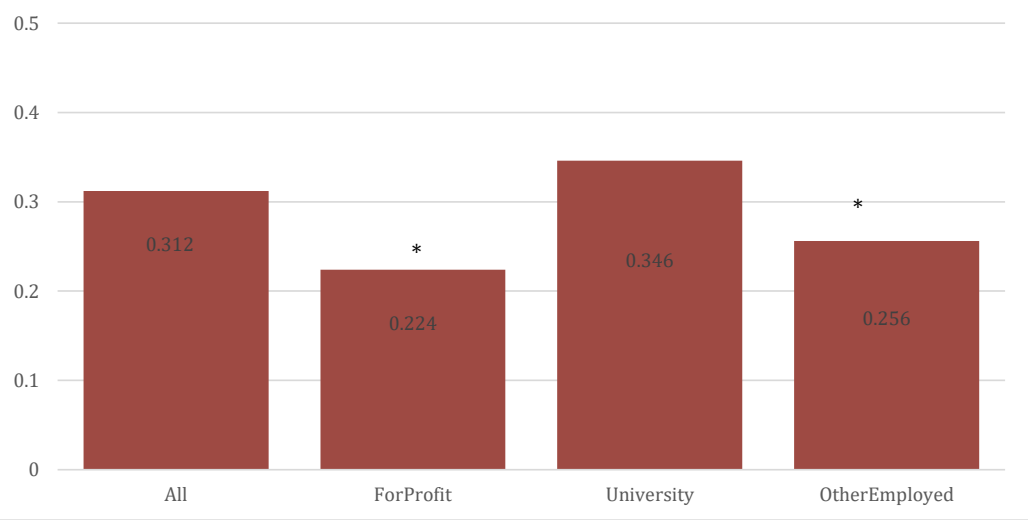
Lastly, a few differentials emerged by race/ethnicity and LGBTQ status. Hispanic respondents, compared to white respondents, were less likely to believe they were held to the same standard as their colleagues, and more likely to report having to work harder than others to be viewed as professional. Black respondents were more likely to report that their boss gives them less credit than they deserve, and more likely to believe they had to work harder than others to be viewed as professional. Furthermore, Asian respondents were more likely than white respondents to report that they have to work harder than their colleagues to be viewed as a legitimate professional.

3. Patterns of workplace fairness across sectors

In the sections above, we compared experiences of marginalization and professional devaluation across demographic categories, controlling for variation by several work factors, including employment sector. However, members of this organization work in a variety of employment sectors (e.g., universities, for-profit companies, the government); the climate for disadvantaged groups may vary considerably across these sectors. As such, this section compares indicators of chilly climates across different employment sectors. It allows us to ask, are certain employment sectors more positive for under-represented groups than others?

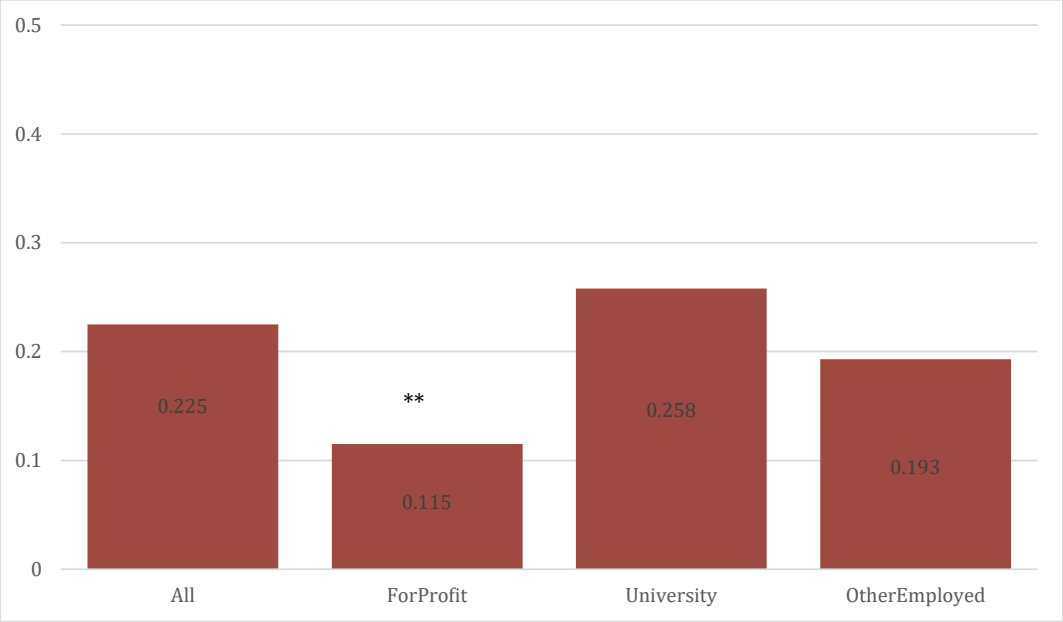
The three figures below present the proportion of respondents in each sector who agree that women, racial/ethnic minorities, and LGBTQ persons must work harder than others to convince their colleagues of their competence.

Fig 11: Proportion of respondents by sector agreeing that "Women in my workplace must work harder than men to convince colleagues of their competence."



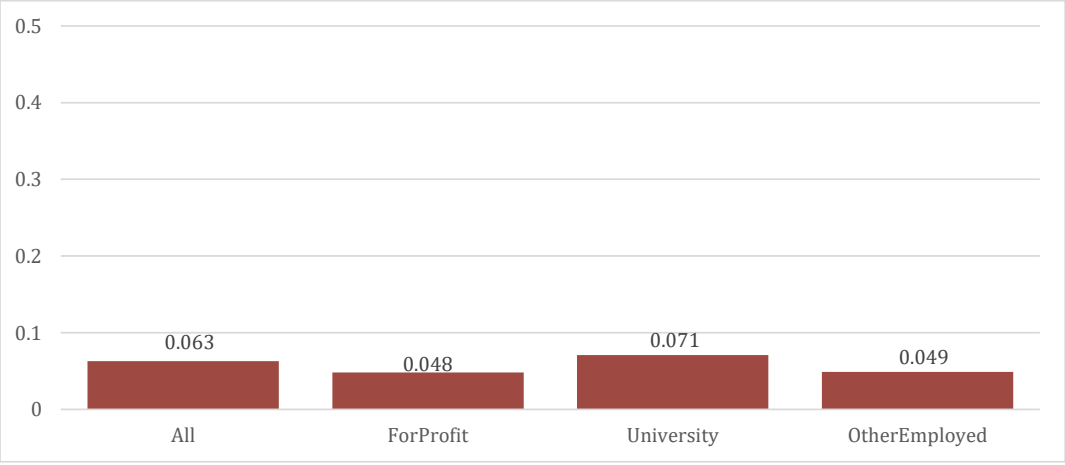
Predicted Probabilities by employment sector. *(proportion who agree between 0 and 1)*

Fig 12: Proportion of respondents by sector agreeing that "Racial/ethnic minorities in my workplace must work harder than whites to convince colleagues of their competence."



Predicted Probabilities by employment sector. *(proportion who agree between 0 and 1)*

Fig 13: Proportion of respondents by sector agreeing that "LGBTQ individuals in my workplace must work harder than non-LGBTQ persons to convince colleagues of their competence."



Predicted Probabilities by employment sector. *(proportion who agree between 0 and 1).*

The figures above represent the proportion of respondents in each sector who agree with each statement, holding constant variation by demographics (gender, race/ethnicity, age, disability status, LGBTQ status, and education level). Asterisks would indicate significant differences between university sector (comprised of 4-year and 2-year institutions), for-profit private sector, and other sectors (a small category that includes non-profit and governmental sectors). Significance levels determined by logistic regression models; see footnote 5 for more details (***p<.001, **p<.01, *p<.05, †p<.10, two-tailed test).

Starting with the first figure in this section, Figure 11, the leftmost column in the graph displays the proportion of respondents overall (31%) who report that women have to work harder than men to convince colleagues of their competence. Those employed in the for-profit and other sectors were significantly less likely than those employed in the university sector to report that women have to work harder to convince colleagues of their competence.

Figure 12 presents results on a question that asks whether respondents believe that people of color in their organization have to work harder than their white colleagues. Across all employment sectors, 23% of respondents agree that racial/ethnic minorities have to work harder than whites in their organization to be seen as competent professionals. As before, those employed in the for-profit sector were significantly less likely than those in the university sector to report that people of color in their organization have to work harder to convince colleagues of their competence.

Although LGBTQ status is not always able to be read off the body, as gender and race/ethnicity often are, workers still may witness differential treatment of LGBTQ colleagues in their workplaces (Cech & Rothwell 2017). Figure 13 indicates that 6% of respondents report that LGBTQ persons in their work environment have to work harder than their non-LGBTQ colleagues to convince others of their competence. The university sector has the highest proportion of respondents (7.1%) who see this disadvantage in their workplace, net of demographic variation, but the variation in these outcomes across sectors were not found to be significant.

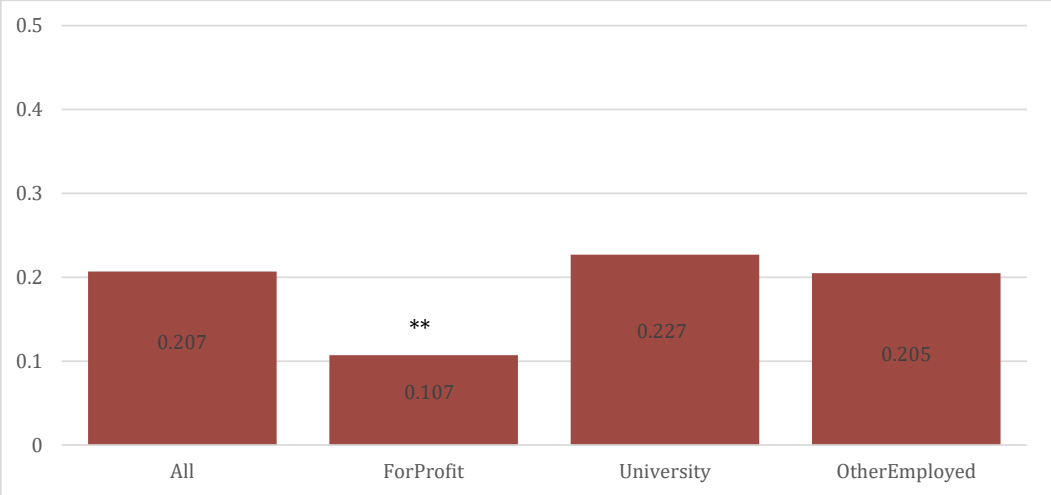
Note that these figures represent all respondents (women and men, whites and people of color, LGBTQ and non-LGBTQ respondents) reporting on the climate of their employing organizations. To see how men and women report on their *own* experiences, see results part 1 and 2 above. Also note that these results are best understood *relationally:* to see which sectors have the strongest or weakest patterns of chilly climates. Estimates of bias in workplaces tend to underestimate levels of bias in organizations overall.

Figures 14-17 below present the proportion of respondents in each employment sector who report having personally witnessed people in their workplace being treated differently based on their demographic category.

Fig 14: Proportion of respondents by sector who reported witnessing person(s) being treated differently due to gender in last three years.

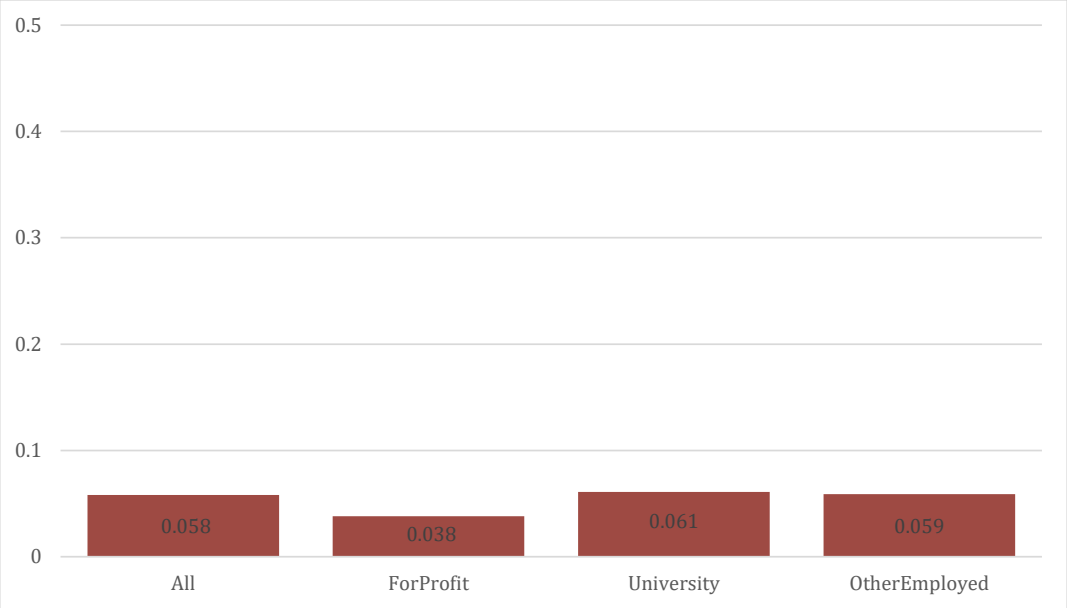
Predicted Probabilities by employment sector. *(proportion who agree, between 0 and 1)*

Fig 15: Proportion of respondents by sector who reported witnessing person(s) being treated differently due to race/ethnicity in last three years.



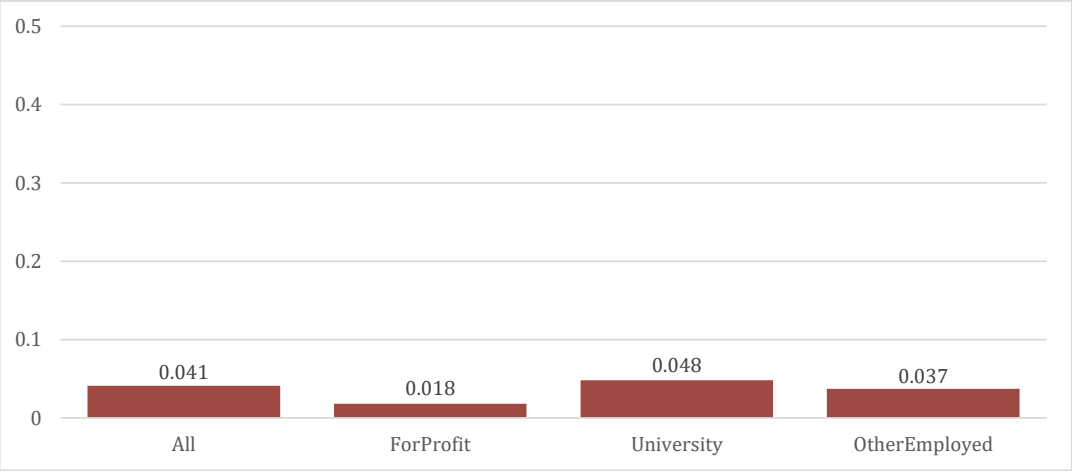
Predicted Probabilities by employment sector. *(proportion who agree, between 0 and 1)*

Fig 16: Proportion of respondents by sector who reported witnessing person(s) being treated differently due to LGBTQ status in last three years.



Predicted Probabilities by employment sector. *(proportion who agree, between 0 and 1).*

Fig 17: Proportion of respondents by sector who reported witnessing person(s) being treated differently due to disability status in last three years.



Predicted Probabilities by employment sector. *(proportion who agree, between 0 and 1)*

As with the previous set, Figures 14-17 present the proportion of respondents in each employment sector who report that they have *observed* women (Fig. 14), racial/ethnic minorities (Fig. 15), LGBTQ persons (Fig. 16) and persons with disabilities (Fig. 17) being treated differently in their workplace on the basis of these statuses. Significance levels indicate statistically significant differences between respondents in the average of all sectors versus individual employment sectors, as determined by logistic regression models; see footnote 5 for more details (***p<.001, **p<.01, *p<.05, †p<.10, two-tailed test).

Figure 14 depicts the frequency with which respondents reported that they observed a person or persons being treated differently in their workplace on the basis of gender in the last three years. Among all employment sectors, 33.1% of all respondents report witnessing instances where someone was treated differently on the basis of gender in their organization in the last three years. The statistic among those employed in higher education is particularly striking. Over a third (37.8%) of respondents working in institutions of higher education reported witnessing differential treatment by gender in the last three years. The results from the for-profit sector are significantly lower: 20.1% of workers in the for-profit sector report gender-based differential treatment. When compared to organization members employed in higher education, those employed in other occupations (including government and non-profit work) report better climates for women, as they are also significantly less likely (at 26.5%) to report observing a person being treated differently on the basis of gender. Note that these employment sector differences are net of variation by demographic categories of respondents (gender, race/ethnicity, etc.).

The next figure (Fig. 15) presents the frequency with which respondents have observed differential treatment on the basis of race/ethnicity in their workplaces. Among respondents in all workplace sectors, 21% reported observing at least one instance of race-based differential treatment in the last three years. Those in the for-profit sector were significantly less likely than those in the university sector to report observing differential treatment on the basis of race/ethnicity in their workplaces.

Figure 16 depicts the proportion of respondents who reported observing differential treatment in their workplace on the basis of LGBTQ status. As before (possibly due to the frequent invisibility of LGBTQ status), a comparatively low proportion of respondents reported observing LGBTQ-based differential treatment. However, 5.8% overall reported observing an instance of this form of bias in the last three years.

Finally, Figure 17 presents the proportion of respondents who reported that they observed differential treatment on the basis of disability status. Among respondents across all employment sectors, 4% reported viewing an instance of disability-based differential treatment in the last 3 years. Rates across sectors were fairly consistent, with no significant differences across the sectors.

As before, these results are best understood relationally—to test for patterns of chilly climates across employment sectors. People typically under-report harassment and differential treatment in their organizations, so these should be taken as conservative estimates of the actual bias occurring in these sectors. To see how different demographic groups report on their own experience of bias, see Parts 1 and 2 above.

Summary of patterns

Part 3 of this report described patterns of workplace chilly climate by employment sector (university, for-profit, and other sectors). Overall, respondents reported negative climates for women and racial/ethnic minorities, compared to male and white employees. For example, 31% of respondents agree that women must work harder than men to convince colleagues of their competence, and 23% feel that racial/ethnic minorities should do the same. 33% of respondents saw differential treatment due to gender, and 21% of respondents saw differential treatment due to race. Such findings are generally consistent across employment sectors.

SUMMARY OF FINDINGS

The results from this survey point to both positive and negative aspects of diversity and inclusion experienced by members of this professional organization. First, personal experiences of harassment in general are relatively low, and respondents across demographic groups generally felt their work is respected by their colleagues and that their supervisors treated them with respect. Respondents on average generally did not believe their boss gives them less credit than they deserve, nor that they have to work harder than others to be given the same professional recognition. Most respondents in this organization did not report high levels of LGBTQ bias in their organizations (although it is not clear whether this is due to the lack of visibility of LGBTQ status vis a vis other demographic characteristics like gender and race/ethnicity). Lastly, the majority of respondents did not observe instances of chilly climates toward persons with disabilities. While these general trends suggest that members of this organization tend to have positive experiences in their workplaces, these patterns differed substantially across demographic category.

The survey results pointed to several concerning trends regarding the marginalization and professional devaluation of under-represented members of this organization. We find pervasive gender differences in workplace experiences: women had significantly more negative experiences on nearly *every measure in our analysis*, net of variation by age, education level, employment sector, and other demographic factors. Similarly, persons with disabilities, LGBTQ respondents, and racial/ethnic minority respondents reported significantly more negative experiences than their peers across a number of different marginalization and professional devaluation measures.

Regarding marginalization, women, persons with disabilities, LGBTQ, and Hispanic respondents had more experiences of marginalization than men, persons without disabilities, non-LGBTQ and white respondents, respectively. Most of these patterns were echoed in the professional devaluation measures, whereby women, persons with disabilities, LGBTQ and Hispanic respondents more frequently reported that their competency and value was questioned in their workplace than their peers.

Finally, a notably high proportion of respondents across employment sectors reported systematic biases in their workplaces and witnessed differential treatment in their organizations in the last three years. For example, 32% of respondents reported witnessing differential treatment by gender in their organizations in the past 3 years, and over 24% of respondents believed that women had to work harder than men to be perceived as competent.

The fact that these chilly climates are strongest in higher education institutions, where the majority of members are employed, suggests that issues in higher education are particularly important to address.

Broadly speaking, results from this study highlight both areas that are encouraging and areas that require further consideration. These results indicate crucial considerations regarding the satisfaction and retention of talented women, racial/ethnic minorities, persons with disabilities, and LGBTQ individuals in STEM, as both workplace climate and experiences of discrimination have an impact on organization members' satisfaction, and subsequent retention in STEM.

Suggestions for Moving Forward

The results reviewed above point to three key areas of intervention that the organization should consider:

1.
Women and racial/ethnic minorities report persistently more negative work experiences compared to white men. Feelings of marginalization and experiences of exclusion are significantly more common among these respondents. The organization should consider ways it can help foster inclusion for women and people of color, as well as having open dialog about the ways that the STEM expertise of women and people of color are undermined in members' workplaces.

2.
LGBTQ-identifying respondents were also more likely to experience marginalization and exclusion. While LGBTQ identity may be less visible, members of this organization identifying as LGBTQ were significantly more likely than non-LGBTQ respondents to report a chilly climate. A few STEM professional organizations have begun to consider LGBTQ inclusion issues alongside other axes of disadvantage; these results indicate that dialog and efforts addressing anti-LGBTQ bias in this field are much needed.

3.
Lastly, disability status was a significant factor across a number of the marginalization and devaluation measures. Disability status is rarely considered and discussed within the context of inclusion and diversity in STEM-related professional organizations. However, over 18% (about 1 in 6) members of this organization have some kind of disability, whether physical or mental, and those who do frequently report more negative workplace experiences. The organization should consider initiatives and programming that allow persons with disabilities to articulate ways that this organization could better provide support and promote their interests.

Recommendations

Given the unique entity of the professional organization and its reach, our recommendations for STEM diversity and inclusion initiatives within ASM may also be applicable for ASM members to utilize within their own workplaces.

Our recommendations for the American Society for Microbiology include:

- Regular dialog with constituencies of disadvantaged groups (e.g., through focus groups and panels) to identify ongoing issues and ways the organization could provide support through programming, networking, and policy change.
- Regular 'climate surveys' measuring factors such as marginalization, inclusion, and professional (de)valuation.
- Increase the number of ASM employees and leaders who are persons with disabilities, LGBTQ persons, and people of color—in all categories, from administrative to professional.
- Recommend dual/multi membership and other partnerships with minority-centered STEM professional organizations.
- Partner with companies and organizations that offer employment opportunities for biology teachers of minority status.
- Consider—or provide greater support for—minority-group-focused caucuses within the organization which can serve as information and networking hubs.
- Integrate diversity and inclusion programming into current conferences (e.g, the expansion of the current new faculty or employee training to involve a seminar on macroaggressions in workplaces; adding an implicit bias workshop into a leadership/management training; sponsoring workshops about supporting underrepresented students in STEM majors).
- Create and continue programming at ASM conferences regarding disability etiquette, hidden illnesses, work habits, and accommodations testing.
- Ensure that the diversity represented in the organization is reflected in the choice of keynote and plenary speakers at regional and national conferences.
- Share the events and materials of minority and women centered STEM professional organizations (e.g, advertising the Women in Microbiology conference in the organization newsletter).
- Create an ASM scholarship fund specifically to help advance the education and careers of

women, persons with disabilities, LGBTQ individuals, and people of color.

- Spotlight individuals in microbiology (e.g., a website feature) who are addressing issues of marginalization and exclusion within the field.
- Ensure all organization websites and emails are fully ADA compliant and compatible with accessibility plug-ins.
- Video-record and close-caption significant keynote addresses at ASM conferences and make them available online for those who are unable to attend.
- Expand the Diversity section of the ASM website to include LGBTQ identity and disability status.
    - Consider adding information, Q&As, and resources regarding disability etiquette, gender identity etiquette, and so forth, accessible to all who visit the ASM website.
    - Consider featuring articles, stories, and interviews regarding the underrepresentation of women and people of color in microbiology and STEM as a whole.
    - Consider adding a retention and recruitment section on the website listing advice and current research on supporting women and people of color in STEM education (geared toward those in academia teaching minority students).
- Share and publicize ASM's diversity goals to increase accountability.
- Develop a diversity, equity, and inclusion (DEI) 'seed fund' for ASM members to establish DEI initiatives in their workplace.
- Collaborate with a diversity-centered consulting firm to receive further recommendations, learn hiring practices to combat inequity, and create other methods of increasing membership diversity.

Note that the findings here are reported along single axes of inequality, and cannot reveal all patterns of marginalization that may pertain to groups experiencing multiple forms of marginalization simultaneously. Further work in the STEM Inclusion Study that aggregates survey responses from multiple professional associations will provide further analysis on these intersections.

This organization's participation in the STEM Inclusion Study is an important signal of its willingness to consider and confront diversity and inclusion issues among its membership. Inequality in STEM is an intractable problem that has no silver bullet solution. It will take deliberate and sustained effort to help move the needle in this and other STEM-related professional organizations.

METHODOLOGICAL APPENDIX

Inclusion and Marginalization Questions	
(a) Insensitive Comments	I have read, heard and/or seen insensitive comments in my workplace that I found offensive. (mean = 2.3)
(b) I Fit In	Overall, I feel I 'fit in' with the other people in my workplace. (mean = 3.86)
(c) Noticeable Mistakes	I worry that my mistakes are more noticeable than the mistakes of others. (mean = 2.96)
(d) Chilly Climate	How often does the following happen at work: (1) A co-worker makes a negative comment or joke about women, (2) A co-worker makes a negative comment or joke about racial/ethnic minorities, (3) A co-worker makes a negative comment or joke about LGBTQ people, (4) A co-worker makes a negative comment or joke about people with disabilities. (mean = 1.41)
(e) Harassed	In the last 12 months, I was harassed verbally or in writing on the job. (mean = 1.25)
Professional (De)valuation Questions	
(a) Same Standard	I am held to the same standard as others for promotion or advancement. (mean = 3.67)
(b) Less Credit	My boss gives me less credit than I deserve. (mean = 2.53)
(c) Work Harder	I have to work harder than my colleagues to be perceived as a legitimate professional. (mean = 2.82)
(d) Supervisor Respect	My supervisor treats me with respect. (mean = 4.13)
(e) Respect Work	In my workplace, my work is respected. (mean = 4.09)
Workplace Fairness Questions	
(a) Women Work Harder	Generally speaking, women in my workplace must work harder than men to convince colleagues of their competence. (mean = .292)
(b) LGBTQ Work Harder	Generally speaking, LGBTQ individuals in my workplace must work harder than non-LGBTQ individuals to convince colleagues of their competence. (mean = .063)
(c) REM Work Harder	Generally speaking, racial/ethnic minority individuals in my workplace must work harder than non-minority individuals to convince colleagues of their competence. (mean = .218)
(d) Harassed Race	Overall, in the last 3 years, have you ever observed a person or persons being treated differently in your workplace due to any of the following characteristics? Race or ethnicity. (mean = .229)
(e) Harassed Gender	Overall, in the last 3 years, have you ever observed a person or persons being treated differently in your workplace due to any of the following characteristics? Gender. (mean = .35)
(f) Harassed LGBTQ	Overall, in the last 3 years, have you ever observed a person or persons being treated differently in your workplace due to any of the following characteristics? Sexual Identity. (mean = .073)
(g) Harassed Disability	Overall, in the last 3 years, have you ever observed a person or persons being treated differently in your workplace due to any of the following characteristics? Disability. (mean = .058)

In the "Inclusion and Marginalization" questions, the variables *InsensitiveComments*, *Harassed*, and *ChillyClimate* were all coded on a 1-3 scale, with 1=Never, 2=At least once in the past year, and 3= At least once a month or more.

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APPENDIX 6. LISTING OF CURATED RESOURCES

Appendix 6 provides a curated list of resources relevant to diversity, equity and inclusion (DEI) efforts. The list is separated into two sections, (i) model diversity plans and reports and (ii) other resources (e.g., journal articles, perspective articles, reports, assessments, etc.). The Task Force curated the list of diversity plans and reports so that ASM has a database of exemplars for DEI strategic plans and accountability reports. The additional resources section is a list, curated by the Task Force, which provides perspective articles, empirical research and in-depth analysis reports relevant to DEI.

TITLE	SUMMARY	YEAR	SOURCE	PUBLICATION TYPE
Addressing Systemic Racism in the Sciences	Part 1 of AAAS's plan, which includes objectives (ex., communicating demographic information for members and volunteers) for addressing systemic racism in the sciences.	2020	American Association for the Advancement of Science (AAAS)	Plan
Baseline Assessment of Demographic Representation in AAAS/Science Functions	Baseline assessment that examines the availability and quality of AAAS's demographic data and presents the current demographic representation for AAAS/Science Functions and Science Family Authors and Reviewers.	2020	American Association for the Advancement of Science (AAAS)	Report
IDSA Inclusion, Diversity, Access and Equity Roadmap and Strategies	Strategic report from IDSA to address diversity equity inclusion and incorporate it into the Society's operations and values.	2020	Infectious Diseases Society of America (IDSA)	Plan
The Time is Now: Systemic Changes to Increase African Americans with Bachelor's Degrees in Physics and Astronomy	Report supporting the need for systemic change within physics, and providing guidance to implement change. This report provides a good example of determining targets and goals based on quantitative data (ex. see page 21).	2020	American Institute of Physics	Report
ASAE Diversity + Inclusion Strategic Plan 2019-2021	Executive summary and strategic plan to implement diversity and inclusion at ASAE. Provides a good example of how to outline milestones/objectives using a 3-year timeline.	2019	American Society of Association Executives (ASAE)	Plan
Roadmap on Diversity and Inclusion - Progress Report, April 2019	Overview of John Hopkins University's progress on efforts and initiatives that contribute to fostering DEI. This report provides examples on how to track data to determine progress and success in DEI.	2019	Johns Hopkins University	Plan
AGU Diversity and Inclusion Strategic Plan	AGU's strategic plan for specific strategies and tactics to implement and achieve DEI goals. AGU released a DEI plan in 2002. This plan is the revised and enhanced version of AGU's 2002 plan. This is a good example of how to update and enhance a DEI plan once initial objectives are achieved.	2018	American Geophysical Union	Plan

TITLE	SUMMARY	YEAR	SOURCE	PUBLICATION TYPE
Diversity & Inclusion Action Plan - American Association for Anatomy	DEI roadmap and outline of goals from the American Association for Anatomy. Provides an example of a timeline oriented DEI strategic plan.	2017	American Association for Anatomy (AAA)	Plan
Faculty Diversity Action Plan Johns Hopkins School of Medicine	Highlight of challenges and proposed remedies regarding diversity and inclusion at John's Hopkins.	2016	Johns Hopkins University	Plan
A Toolkit for Recruiting and Hiring a More Diverse Workforce	Toolkit (e.g., how to's, checklists, minority organizations) for hiring managers at the University Health Services at UC Berkeley. Provides good advice on how to ensure recruitment and selection of diverse candidates.	2013	University of California, Berkley	Plan
Achieving excellence through equity, diversity, and inclusion	Principles for achieving equity, diversity and inclusion in academic medicine.	2020	Association of American Medical Colleges (AAMC)	Article
A view from my basement	AAAS CEO reflects on his experience as a CEO amidst the COVID-19 pandemic and Black Lives Matter movement.	2020	American Association for the Advancement of Science (AAAS)	Article
Diversity and Inclusion Are Not Enough	This article supports that eradicating systemic racism will take more than only diversity strategies and initiatives.	2020	Inside Higher Ed	Article
The Diversity-Innovation Paradox in Science	This article examines how diversity breeds innovation, yet individuals from underrepresented groups are less likely to hold successful careers.	2020	Proceedings of the National Academy (PNAS) of Sciences of the United States of America	Article
Making people aware of their implicit biases doesn't usually change minds. But here's what does work	Interview style article that discusses how implicit bias training will uncover biases within an individual, but more work is needed to make a change.	2020	Public Broadcasting Service (PBS)	Article
Ten Simple Rules for Building an Anti-Racist Research Lab	Interview style article that discusses tips on how to build an anti-racist research lab.	2020	Public Library of Science: Computational Biology	Article

TITLE	SUMMARY	DATE	SOURCE	PUBLICATION TYPE
Active learning narrows achievement gaps for underrepresented students in undergraduate science, technology, engineering and math	Research article on why replacing traditional lecturing with active-learning courses will decrease achievement gaps for URM students.	2020	Proceedings of the National Academy (PNAS) of Sciences of the United States of America	Article
Systemic racism persists in the sciences	How racial diversity within the scientific workforce can contribute to decreasing racial disparities in STEM fields.	2020	Science Magazine	Article
Leveraging Promising Practices: Improving the Recruitment, Hiring, and Retention of Diverse & Inclusive Faculty	Outline of steps institutions can take to boost faculty diversity in the STEM fields.	2020	Open Science Framework (OSF)	Plan
Anti-Racism in Higher Education: A Model for Change	Model for change in higher education to better distribute leadership and institutional power amongst all racial groups.	2020	Race and Pedagogy Journal	Article
Black scientists matter	Reflection article on racism in science.	2020	Science Magazine	Article
How to Move DEI Conversations Beyond Just Talk	Association leaders share feedback on how to move the needle in DEI efforts within an organization.	2020	Associations Now	Article
How I Built a Diverse Leadership Team at a Predominantly White College	Article discussing best practices for prioritizing and affirming the goals of equity and inclusion in building a leadership team.	2020	The Chronicle of Higher Education	Article
Scientific societies advancing STEM workforce diversity: Lessons and Outcomes from the Minorities Affairs Committee of the American Society for Cell Biology	Illustration of impact from scientific societies supporting the development of URM scientists.	2019	Journal of Microbiology and Biology Education (JMBE)	Article
Chief Diversity Officers Today: Paving the Way for Diversity & Inclusion Success	Report that outlines the roles and responsibilities of Chief Diversity Officers, and best practices for diversity and inclusion functions.	2019	Weber Shandwick	Report

TITLE	SUMMARY	DATE	SOURCE	PUBLICATION TYPE
The Governance Gap: Examining Diversity and Equity on Nonprofit Boards of Directors	Guidelines to create a diverse and equitable workplace in non-profit associations, starting with the BOD.	2019	Koya Partners	Report
NSF INCLUDES: Special Report to the Nation II	Progress report on the NSF INCLUDES program and overview of the program's efforts and contributions.	2019	National Science Foundation (NSF)	Report
Factors Contributing to the Success of NIH-Designated Underrepresented Minorities in Academic and Nonacademic Research Positions	Report of survey data on underrepresented minorities (URMs) in life science academic (e.g., faculty) and non-academic (e.g., research-related) positions. The research in this article seeks to ascertain variables that contribute to URM's success (e.g., favorable or desired outcome).	2018	Cell Biology Education (CBE) - Life Sciences Education	Article
The Role of a Professional Society in Broadening Participation in Science: A National Model for Increasing Persistence	Overview of the benefits of having sustainable diversity programs to support students.	2018	American Institute of Biological Sciences	Article
Culture of Inclusion: Assessment Overview	Overview of what elements to measure when assessing the level of inclusion in an environment.	2018	Gallup	Plan
Diversity and Inclusion … From Scratch	Perspective article on what is needed to integrate diversity and inclusion into the cultural DNA of a company.	2018	Korn Ferry	Plan
Awake to Woke to Work: Building a Race Equity Culture	Methodological report on building an inclusive and equitable culture in non-profit and philanthropic organizations.	2018	ProInspire	Plan
Diversity and Inclusion: Opportunities to Advance - Florida Society of Association Executives	Report on diversity and inclusion in Florida associations and the Florida Society of Association Executives.	2018	Florida Society of Association Executives	Plan

TITLE	SUMMARY	DATE	SOURCE	PUBLICATION TYPE
Diversity Sourcing - 5 Best Practices	Best practices for a diverse workplace.	2017	ClearCompany	Article
Diversity and Inclusion Strategic Planning Toolkit	DEI strategic planning toolkit developed by AAMC to serve as a guide for institutions and organizations in the DEI planning process. The guide provides nine essential tasks to help navigate the diversity and inclusion strategic planning process.	2016	Association of American Medical Colleges (AAMC)	Article
A Retrospective Evaluation of the American Society for Microbiology Fellowship Programs	Summary of the findings for the retrospective evaluation of three ASM fellowship programs – ASM Undergraduate Research Fellowship, ASM Undergraduate Research Capstone Program and the ASM Robert D Watkins Graduate Research Fellowship.	2015	American Society for Microbiology (ASM)	Report
Achieving Speaker Gender Equity at the American Society for Microbiology General Meeting	Roadmap to gender equity at a large scientific meeting.	2015	mBio	Article
Groups of diverse problem solvers can outperform groups of high ability problem solvers	Research article discussing that diverse teams are better problem solvers.	2004	Proceedings of the National Academy (PNAS) of Sciences of the United States of America	Article

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APPENDIX 7. KALEIDOSCOPE GROUP, INC. (KGI) EXECUTIVE SUMMARY AND RECOMMENDATIONS

Appendix 7 contains the executive summary and recommendations from the ASM 2020 Member Perception Survey final report. ASM's third-party DEI consultant – The Kaleidoscope Group, Inc. (KGI), developed the ASM 2020 Member Perception Survey final report.

BACKGROUND AND APPROACH

Report Introduction

- Survey data was analyzed from many different member perspectives:
  - Total Members
  - Global Total
  - US Total
    - Gender
    - Race
    - Age
    - Years ASM Member
    - Highest Educational Level Achieved
    - Scientific Track
    - Current Role

Please note: in order to respect GDPR compliance for collecting personal data, demographic questions were only answered by US respondents.

- Many DEI specific strategies will be shaped according to overall members needs, in conjunction with differing experiences and needs of demographic groups such as women, African Americans, Asians, Latinx, Early Career and Global members.
- In examining survey results, key differences in perceptions were driven by these same demographic groups. There were few differences when examining results by the other more industry-related groups.
- For these reasons, the executive summary and primary report focuses on the Overall Member, Region (US vs. Global), and within the US also Gender, Race/Ethnicity, and Age.
- Analysis for the remaining groups has been provided under separate document for reference.

Analytical Explanation

A 5-point agreement scale is used for most EDI survey statements.

Top two box scores are the percentage of respondents who selected a 4 or 5 as their response to a survey statement..

The middle indicates neutrality, which can mean either the respondent does not have a feel one way or the other about the statement topic OR they are not totally certain of how they feel.

Bottom two boxes represent disagreement with a survey statement.

Top 2 Box Scores		Middle Box	Bottom 2 Box Scores	
Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Agree
5	4	3	2	1
Favorable		Neutral	Unfavorable	

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EXECUTIVE SUMMARY

Key Strengths

1 Sense of Pride in being an ASM Member

- Most members, across all demographic groups, feel a strong sense of pride in being an ASM member.

2 ASM and Member Values Align

- Across all groups there is high agreement that ASM's values align with the values of its members.
- Based on the open comment feedback, this appears connected to scientific and scholarly research and discovery.

3 Respect for Diverse Members

- 80% of members agree that ASM shows respect for members of all backgrounds, cultures, and perspectives.

4 Access and Opportunity

- Having access to information needed to submit *a manuscript for publication in an ASM journal* and/or *a proposal or abstract to present my work at ASM microbe or another ASM event* both scored well in total and across groups.
- Additionally, there is strong satisfaction with having opportunities to *present my work as ASM meetings and events* and *publish my work in an ASM journal,* both in total and across US-based demographic groups.

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Key Considerations

1 Mentorship opportunities for key target groups

- More than two-thirds of Early Career members and over half of African American, Asian and Latinx members would like access to a mentor or sponsor through ASM to help them navigate their career.
- In many qualitative responses, the positive impact of having a mentor was mentioned by underrepresented groups.

2 Increased focus on Diversity, Equity and Inclusion topics

- In many qualitative responses to how ASM may better serve their needs, members from historically underrepresented groups express a desire to increase exposure and discussion of DEI topics
- A focus on DEI was considered from many different angles by members, from broadening research and scholarly exploration to increased exposure of diverse member achievements to support of broader social and racial justice issues.

3 Global Opportunity

- Global members were less likely than the US and key demographic groups to feel they have access to microbial science resources, guidelines and programs that ASM provides to support my work.
- They also had considerably lower agreement on having equal opportunity at ASM and opportunities to publish work in an ASM journal or present work at ASM meetings and events.

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Key Opportunities

1 Many members do not feel they have a voice at ASM

- *When I speak up, my opinion is valued by ASM* received just 38% agreement at the total level and was even lower among other demographic groups.
- An additional 58% of members are uncertain whether their opinion is valued or have neutral feelings on the topic.
- There is also low agreement on available outlets for members to provide opinions (52%) and open and honest communication at ASM (52%).

2 US-based members perceive low diversity representation

- Diversity among ASM's leadership was one of the lowest scoring questions.
- There is also room for improvement in ensuring members accurately reflect the diversity of the broader microbial sciences.

	Global	Total US	Women	Ages 25-35	African American	Asian	Latinx	White
Member Representation	66%	49%	45%	41%	31%	54%	45%	51%
Leader Representation	58%	42%	41%	37%	24%	49%	41%	43%

Key Opportunities

3 Some ASM practices are not considered fair or equitable

- At the overall level and across groups, there is low agreement that *…the nomination requirements for fellowships and awards at the Academy are fair and equitable*.
- There is similarly low agreement in total and across groups that *…policies and practices to nominate and select ASM committee and board members are fair and equitable*.

4 There is low satisfaction with opportunities to volunteer or serve on committees

- This is one of the lowest scoring statements among all members, and even lower among some demographic groups.
- In the additional qualitative analysis of historically underrepresented groups, either a lack of awareness of existing committees, how to get involved, and a desire for more opportunities were all frequently expressed.

5 Broader equity concerns exist across demographic groups

- Fair treatment, equal opportunity and merit-based recognition all have low agreement among African Americans, Latinx, Early Career and to a lesser degree Women and Asians.

Factor Results

- Belonging and Access and Opportunity stand out as ASM's greatest strengths.
- Majority of Factors fall in the average scoring range suggesting specific areas of improvement.
- Diverse Representation and Have a Voice are areas of improvement for ASM.

Top Statements

- Overall, respondents feel that their values as scientists align with ASM's.
- They are also very proud to be an ASM member.
- The access to information for submitting manuscripts and proposals is another area of strength for ASM.

Low Statements

- The lowest scoring question is about feeling valued when speaking up.
- Diverse representation in leadership has very low agreement.
- Examine low agreement and high neutral for access to mentoring.

Disparities among Target Groups

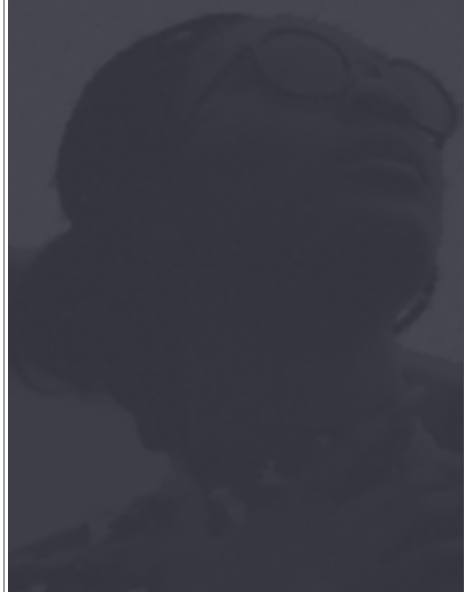
The chart below shows the questions that have some of the largest disparities between the highest scoring group (men) and other relevant groups.

	Men	Women	US Total	Global	Ages 25-35	Asian	Latinx	African American
Wants Access to a Mentor	29%	38%	34%	51%	67%	55%	51%	56%
Has Equal Opportunity to Advance Career	62%	59%	59%	51%	53%	52%	51%	36%
Fair Treatment of Everyone	67%	63%	63%	69%	58%	65%	55%	40%
Recognition Merit Based	66%	60%	63%	75%	60%	62%	56%	48%
Nomination Policies for Comm/Board are Fair	54%	46%	49%	64%	39%	51%	45%	34%
Nomination Requirements for Fellowships and Awards are Fair	52%	45%	48%	56%	44%	51%	46%	34%

≥ +10 percentage points | +5-9 percentage points | -5-9 percentage points | ≥ -10 percentage points

RECOMMENDATIONS

Recommendations



- Lift all voices through celebration and recognition
- Strengthen trust through transparency
- Develop an approach to diversity that demonstrates commitment and accountability
- Ensure members have a voice and equal opportunity through program development

Recommended Action Steps

Lift all voices through celebration and recognition	• Celebrate/promote the pride of ASM membership among such a diverse group of individuals. • Emphasize the shared scientific research and innovation values of all members across communication touchpoints. • Consider implementing "member spotlights" focusing on thought leadership and new ideas to help increase positive perceptions around valuing different perspectives. • Intentional, consistent, and proactive strategies to highlight and honor diverse member identities and topics that feature their unique perspective on broad microbial topics AND to elevate their research into issues that impact diverse communities more.
Strengthen trust through transparency	• Review nomination policies and practices for ***fellowships and awards***, revise as needed for equity and consistency, then ensure the requirements are fully transparent and clearly communicated. • Review policies and practices for nomination and selection of ***committees and boards***, revise as needed for equity and consistency, then ensure the requirements are fully transparent and clearly communicated. • Share select survey results with the broader ASM member community, positioned to reinforce commitment and accountability around DEI.

Recommended Action Steps

Develop an approach to diversity that demonstrates commitment and accountability	• Develop a strategic plan for recruiting/retaining diverse members. • Develop a strategic plan for increasing diversity in ASM leadership. • Review partnerships with diverse organizations that support building member and leadership representation, assess the value those partnerships bring, and adjust investment and resources accordingly. • Look for ways to increase volunteer opportunities and events where members can serve, learn and grow, and build their professional networks – and develop purposeful practices to support diverse participation.
Ensure members have a voice and equal opportunity through program development	• Increase outlets and platforms where members can voice their opinions and offer suggestions for the broader ASM organization. • Consider monthly topics where members can share their thoughts and knowledge in a forum among peers. This can help expand the reach across different roles and scientific tracks. • Increase mentorship for early career respondents, members of color and global members. Begin mapping possible mentors with mentees from the current membership database, aligning scientific track. • Review all membership practices to further explore low perceptions of equal opportunity and fair treatment.

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