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# Ten Strategies to Reduce Gender Inequality at Scientific Conferences

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Conferences organized by professional societies provide scientists and professionals with an excellent opportunity to disseminate their work, network with like-minded researchers, and form collaborative relationships for future endeavors. However, these opportunities are rarely distributed equally between women and men in science. Addressing gender inequity should be a primary consideration for all societies hosting conferences. Yet, many STEM conferences are struggling with gender biases and the understanding that gender inequity also applies to non-binary gender and overlapping social identities. At the Society for Conservation Biology's 4th International Marine Conservation Congress (IMCC4), "Promoting the Participation of Women at Science Conferences" was one of four focus groups of the Diversity Focus Group Series. This paper outlines 10 feasible intervention strategies delineated during the Women at Science Conferences focus group discussion as positive encouragement for professional societies to continue toward gender equity. The 10 interventions to reduce gender inequity at conferences include adopting community principles and a Code of Conduct, appointing a Safety Officer, requiring a registration honor system pledge and conduct surveys, offering a mentorship program, organizing focus groups, giving benefits for participating in diversity programming, assisting with child care, proffering travel grants, providing badges on lanyards, and randomizing the conference program. These strategies are intended to reduce participation barriers for women scientists at conferences, and range in the amount of planning they require to provide options for all societies regardless of their fiscal or labor capacity.

**Keywords: conferences, women in science, diversity, equity, equality, intersectionality**

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## INTRODUCTION

Despite recent improvements in gender equity, the National Science Foundation (NSF) reports that white women in the United States occupy only 20% of science, technology, engineering, and mathematics (STEM) jobs and women of color hold less than 10% (National Science Foundation and National Center for Science Engineering Statistics, 2015). In the European Union, women fill approximately half of STEM positions as students in tertiary education (European Commission, 2009), but only 30% of research positions (European Commission, 2010). These gender biases are reflected in all aspects of professionalism in STEM, including at scientific conferences.

Conferences organized by professional societies provide scientists and professionals with the opportunity to disseminate their work, network, and form collaborative relationships for future endeavors. However, these opportunities are rarely distributed equally between women and men. Many STEM conferences struggle with gender biases, which manifest themselves as reduced opportunities for women to disseminate their research to the same capacity as men through discrimination in abstract selection and speaker panels, or increased barriers to participation such as less funding and lack of family-friendly resources (Addessi et al., 2012; Yentsch and Sindermann, 2013). For instance, over 15 years of the Society for Conservation Biology (SCB) conferences, only 36.4 and 31.7% of symposia organizers and presenters were women, respectively, including students of which more than 50% are women (Sardelis and Drew, 2016). Similarly, 1,500 scientists signed a petition to boycott the 15th International Congress of Quantum Chemistry in response to the conference's list of exclusively male speakers, chairs, and honorary chairs (Arnold, 2015). Equal counts are only part of the issue, as there are myriad reasons that women and people of color are consistently underrepresented in STEM fields and events. These reasons, rather than their symptoms, need to be addressed. As such, it is important to understand the difference between equality—where everyone is treated exactly the same—and equity—where differences in social position and privilege are recognized and addressed. Treating all delegates exactly the same and ignoring individual circumstances can amplify discrimination.

Because conferences increase the visibility of women in science and their research, gender bias can inhibit their careers. Increased visibility creates opportunities for other women to participate, motivates junior female scientists by providing role models, and helps eliminate the misconception that women are less competent scientists than men (Jones et al., 2014). Thus, stereotypes against women at conferences can impose a glass ceiling upon career progress. While gender inequity may not be deliberate, addressing it has to be intentional: societies hosting conferences should consider gender inequity a priority.

Gender inequity also applies to non-binary gender identities and intersectional diversity. Intersectional diversity refers to interconnected and overlapping social categorizations such as gender, race, and class that create an interdependent system of discrimination and disadvantage (Ontario Human Rights Commission, 2017). It is notable that not all gender bias is intentional or implicit. If conference organizing committees proactively prevent inequality, they set a tone for their entire conference, setting an example for delegates and future conferences. Thus, we articulate some challenges faced by women at conferences so they may be uniquely addressed, while the long-term goal of our work is to be expanded to include intersectional diversity.

## DIVERSITY FOCUS GROUP SERIES

At the Society for Conservation Biology's 4th International Marine Conservation Congress (IMCC4), "Promoting the Participation of Women at Science Conferences" was one of four focus groups of the Diversity Focus Group Series (http://conbio.org/mini-sites/imcc-2016/program-events/focus-groups/). The Women at Science Conferences focus group was open to all delegates of every gender, background, and nationality. The 3 hour discussion welcomed 22 delegates from a spectrum of genders, including two mothers with infants. Safer spaces are committed to safety for individuals or communities that are targets of discrimination, and the focus group provided delegates with a space to voice their opinions. The feedback they provided included praise for improvements and concerns about unaddressed areas of potential gender bias at IMCC4, which informed this paper.

Demonstrated by the inclusion of the focus group series, SCB respects their obligation to encourage diversity and equity. The focus group provided participants (particularly those who identify as women) with an opportunity to speak out against unfair circumstances without being ostracized (Ahmed, 2017). This is an acute issue in academia because there are both demonstrated and perceived evaluative threats to speaking out; women and people of color speak out less than their counterparts for fear of or in response to negative gender-based feedback (London et al., 2012). Research has found that "ethnic minority or female leaders who engage in diversity-valuing behavior are penalized with worse performance ratings, whereas white or male leaders who engage in diversity-valuing behavior are not penalized for doing so" (Hekman et al., 2017). As SCB moves toward IMCC5 in 2018, and notably their first outside of North America and Europe in Sarawak, Malaysia, taking a firm stance on equity becomes an immediate necessity.

By championing inclusion, taking initiative, and driving social change, conference committees can impact academic culture, inspiring delegates to apply lessons learned at inclusive conferences at their home institutions. Following suit, this paper outlines 10 feasible and realistic intervention strategies delineated during the focus group as positive encouragement for professional societies to continue toward gender equity. These strategies are intended to reduce participation barriers for women scientists at conferences, and range in the amount of planning they required to provide options for all societies regardless of their fiscal or labor capacity.

## TEN INTERVENTIONS FOR GENDER INEQUITY AT CONFERENCES

### Adopt Community Principles and a Code of Conduct

Codes of Conduct are rules that outline social norms and ethical responsibilities based on central principles and values of an organization (Favaro et al., 2016). A Code of Conduct is a tool organizers can use to ensure delegates feel safe during conference proceedings by reassuring participants that inappropriate behavior is not permitted. The IMCC4 Code of Conduct (http://conbio.org/mini-sites/imcc-2016/registration-participation/code-of-conduct) had 5 rules:

1. Treat everyone with respect and consideration.

2. Communicate openly and thoughtfully with others and be considerate of the multitude of views and opinions that are different than your own.
3. Be respectful and mindful in your critique of ideas.
4. Be mindful of your surroundings and of your fellow participants. Alert SCB staff if you notice a dangerous situation or someone in distress.
5. Respect the rules and policies of the conference center and all venues associated with IMCC4.

The list of unacceptable behaviors made it clear that some of these guidelines were premised on gender-based discrimination and harassment: it indicated zero-tolerance for derogatory or sexist comments or behaviors. We recommend organizers from other professional societies incorporate expectations and consequences for gender-based discrimination into their conference scheme. The IMCC4 Code of Conduct was widely shared on the conference's social media platforms and addressed in the opening sessions. Similar strategies should be used to circulate the Code of Conduct to all participants to ensure it is upheld. Finally, IMCC4's Code of Conduct has been adopted and amended by at least one other conference (Gathering for Open Science Hardware, 2017), demonstrating how a Code of Conduct can help a professional society garner respect by example for future conferences.

In addition to applying to a conference's programming, the community principles and Code of Conduct should apply to interactions within the conference committees, during conference planning, and at events preceding the conference. This includes policies regarding bathrooms to respect transgender delegates, policies to ensure the comfort of victims of harassment, and inclusive policies to respect disabled delegates.

## Appoint a Safety Officer

Codes of Conduct should require that a Safety Officer be appointed. For example, the planning committee of IMCC4 appointed a member of the Society for Human Resource Management as their expert Safety Officer. Alternatively, university Human Resources personal are often equally qualified to fill this role. The Safety Officer should enforce the Code of Conduct and act as a non-affiliated party should a violation occur, since violations may come from high ranking members or within the organizing committee (Favaro et al., 2016). Safety Officers are identifiable people that delegates can approach if they feel unsafe or witness a breach of the Code of Conduct, and they are a visible reminder of the Code of Conduct's importance.

## Require Registration Honor System Pledge and Conduct Surveys

Delegates might feel more comfortable supporting conference equity anonymously, either due to fear of stigma or unfamiliarity with advocacy. Incorporating an honor system pledge into initial conference registration may facilitate this. Pledges would commit delegates to accomplish small acts during the conference, including the intention to report observed inappropriate behavior, to use universal pronouns where applicable (singular pronouns that are gender-inclusive, such as "they"), to not interrupt or speak over women colleagues, or to be more welcoming of all delegates. Additional suggestions should be developed and proposed by each conference's Safety Officer in consultation with the conference organizing committee.

Moreover, conference organizers can assess the extent of diversity programming at each delegates' home institution to develop a reference point for how knowledgeable delegates are of gender disparity through a short survey during the registration period. For example, surveys could ask if participants have a leaky pipeline program at their institution or what tactics they have encountered at other conferences, including any diversity trainings they have completed (Blickenstaff, 2005). Low scores would indicate the necessity of implementing intervention strategies, while high scores would allow more nuance and breadth in diversity programming. Exposure to a survey during registration also reminds delegates that the society takes equity seriously and increases awareness and sensitivity toward disparity (Jackson et al., 2014).

## Offer a Mentorship Program

A proposition communally agreed upon during the IMCC4 focus group was the introduction of a voluntary mentorship program, where senior women scientists with research and conference-going experience spend time with first-time attendees. This will provide newer delegates with a mentor to maximize their returns from the conference, making them more comfortable with networking, socializing, and attending talks. Other organizations have run similar programs, including the Society for the Social Studies of Science (http://www.4sonline.org/meeting/mentorship_program) that paired tenured professors with non-tenured professors, non-tenured professors with post-docs, and post-docs with graduate students. Implementing a network of support for women and first-time student and non-student attendees will be particularly beneficial for societies looking to facilitate the inclusion of a more diverse delegation.

Additionally, early-career participants may gain a role model in both the short and long terms. Overall, the mentorship program should be aimed at increasing the visibility of senior women scientists to younger colleagues or first-time conference attendees. While there are many reasons for attrition of women in science and engineering (Preston, 1994, 2004; Blickenstaff, 2005; Stout et al., 2011), research has shown that people with mentors report more procedural justice in their workplaces (Scandura, 1997). They also cite mentorship as a key reason for their success (Ragins et al., 1998), particularly when women have female mentors (Noe, 1988; Ragins and McFarlin, 1990; Wallace, 2001; Settles et al., 2007). This can help address the leaky pipeline, where a gender filter removes women from the academic stream at each increasing level (Blickenstaff, 2005; Stout et al., 2011).

## Organize Focus Groups

Organized events integrated into conferences that facilitate participation from delegates ensure that perspectives of individuals directly affected by conference planning are understood and appreciated. We encourage organizing committees to include focus group series on diversity and

equity in their programming to ensure feedback and progress are prioritized. Building upon the progress at IMCC4, focus groups can act as a space where information regarding gender and other social differences at conferences can be disseminated to delegates. For example, some professional organizations collect demographics information on their delegates and members: the American Society of Ichthyologists and Herpetologists has published the proportions of men and women members with anonymity (http://www.asih.org/about). This information could be used to bridge the gap between delegates and committees, showing their willingness to acknowledge inequity and address it proactively.

## Give Benefits for Participating in Diversity Programming

Participation in diversity programming could be a highly encouraged aspect of all conference-goers' schedules by providing incentive for participation, including registration discounts toward future conferences or an additional drink or food voucher for larger conference events. These benefits can be adapted to facilitate the financial capacity of each professional society. It is crucial that a broad range of participants—not just women and people of color—attend diversity programing to foster an overall culture of gender equity and allyship. Even if participants at the diversity events do not contribute as speakers, their exposure to the content is beneficial for the broader community, potentially adjusting attitudes toward gender equity (Jackson et al., 2014). Encouragement from the conference committee to participate will demonstrate to delegates how seriously the committee considers gender bias issues, and may lead delegates to do the same.

## Assist with Childcare

Women are disproportionately responsible for childcare, amplifying the difficulties that face conference attendees who are parents (Howe-Walsh and Turnbull, 2016). This responsibility imbalance can be overcome if conference organizers consider childcare an essential conference service. Laws and regulations stipulate strict and complex requirements and liability insurance for child care in the U.S., even in a volunteer capacity. These regulations vary by state and will depend on where the conference organization is headquartered and where the conference is hosted. An example is Washington, DC, where SCB is headquartered: regulation falls under the Office of the State Superintendent of Education (OSSE), and even voluntary conference childcare does not fall under exemptions from regulations (Office of the State Superintendent of Education (OSSE), 2016).

This can be overcome by seeking out a professional service for conference childcare as options for parent delegates. This should also include consistent, adequate, and thorough communication with parents in the months preceding the conference. Ample communication in advance provides parents with knowledge of the efforts organizing committees have made and what is feasible. It may also contribute to diminishing some of the stigma around families attending conferences by placing it at the forefront as an open topic of conversation. Additionally or alternatively, childcare grants can be offered (for example, Cell Symposia's Elsevier Family Support Award: http://www.cell-symposia-aging-metabolism.com/submit-abstract/). These small grants will help subsidize local childcare costs or the travel of a caregiver. Nursing rooms are also a simple and effective way for parents to feel comfortable at conferences. These can be as informal as small spaces with designated signs on the door, or more formally prepared spaces that are particularly suited to nursing and pumping.

## Proffer Travel Grants

Funds aimed at facilitating the participation of early-career women at conferences should be established, since women often face greater financial restrictions due to lower pay than men (Shen, 2013). The Society for Integrative and Comparative Biology established the Dorothy Skinner Fund "to recognize women in the early stages of their careers" (http://www.sicb.org/students/skinner.php3). The American Fisheries Society provides women scientists with funding through the J. Frances Allen Scholarship Award "with the intent of encouraging women to become fisheries professionals" (https://equalopportunity.fisheries.org/awards/). Travel grants remove barriers to participation and demonstrate a society's recognition of the importance of including women as primary participants in their conferences.

## Provide Badges on Lanyards

One IMCC4 focus group member suggested an easy-to-fix accessibility issue regarding nametags. It is common practice for name badges to be provided to delegates at conferences; however, badges on clips are most easily worn on button-down or front-pocketed shirts more commonly worn by men. Badges on lanyards are universally wearable. While most conferences now offer participants lanyards, badges should continue to be phased out. Lanyards may be slightly more expensive than clip-on badges, but offering a sponsor the option to place their logo on lanyards is an easy way to overcome the expense.

## Randomize the Conference Program

To avoid bias toward later-career men filling presentation slots, conferences should randomize program assignments. Delegates could be informed of and agree to this format in advance of submitting an abstract. Accepted abstracts can be randomly assigned to full oral presentations, speed presentations, or posters, making each program presentation category more diverse. Another way to mitigate the privileging of later-career men at conferences is disallowing any all-male panels. These suggestions necessitate that abstracts are also selected without bias toward men over women scientists, accomplished by excluding names from the submission review processes.

# IMPLICATIONS OF EFFORTS

Safety is a non-negotiable aspect of conference accessibility and a particular concern for women and delegates who identify as women. Women in science continue to experience harassment, intimidation, bullying, and discrimination, and conferences are

no exception (Favaro et al., 2016). It is crucial that organizing committees provide a safer space for delegates to collaborate at conferences. This can counteract the reality that many women, LGBTQ, and minority scientists feel other professional spaces, such as labs or offices, are not places they can freely contribute.

Most importantly, it must be strongly reminded that respecting diversity does not require conferences to sacrifice quality. On the contrary, greater gender and racial diversity expand perspectives (Harding, 1991; Cummings, 2004; Denson and Chang, 2009), positively impact professional skills such as collaboration (Jehn et al., 1999; Chatman and Flynn, 2001; Denson and Zhang, 2010), and improve performance in financial terms. This points to a trend that gender and racial diversity or heterogeneity can provide modes of success that homogeneity cannot (Erhardt et al., 2003; Page, 2008; Hunt et al., 2015). However, mere inclusion without robust integration does not allow these benefits to take root (Ely and Thomas, 2001; Polzer et al., 2002; Mannix and Neale, 2005). Expanding the definition of scientific conference quality to include delegates of more diverse backgrounds and career levels can allow scientific disciplines to benefit from diversity.

## CONCLUSION

Scientific conferences are an excellent venue for the emergence of novel research and professional fellowship. To continue providing delegates with beneficial experiences, societies must focus on promoting equity and diversity at their conferences. We highly encourage the implementation of intervention strategies, either the examples listed above or others brainstormed by conference committees, to ameliorate non-optimal conference environments. Without a robust and multiplex delegation, conferences will be stagnant and miss the opportunity to include all perspectives.

## AUTHOR CONTRIBUTIONS

All authors listed, have made substantial, direct, and intellectual contribution to the work, and approved it for publication.

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