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# Toward Creating an Inclusive SPS Community

The underrepresentation of women in science, technology, engineering, and mathematics (STEM) fields is an issue that has been studied extensively [1]. Yet women still face many challenges, even though the demand for many STEM occupations has exploded. Many factors contribute to the low number of women in the STEM field. From an early age, girls are exposed to many cultural cues that dissuade them from participating in STEM fields. This gender bias is enforced by implicit or explicit messages from multiple sources—the toys girls receive at a young age, the classroom environment, the way that the media and popular culture depict the traits and talents of girls and women, the lack of women role models and encouragement from family and friends, and many other factors that deter girls and young women from visualizing themselves as scientists and pursuing STEM educations and careers. The power and predominance of these cues are confirmed by the low numbers of women in those fields. While progress has certainly been made over the past many decades, recently, many of those gains have plateaued or decreased, including women's share of STEM jobs and the pay gap [6], [7]. This long-time dearth of women in STEM academia, industry, and research positions makes it very difficult to foster meaningful cultural changes because these environments remain tailored pri-

marily to men, offering few incentives, accommodations, and opportunities and little support to women, or in some cases, environments that are unwelcoming and even hostile for women.

This lack of diversity isn't only a gender divide. Many other segments of society are underrepresented in STEM, including individuals from racial and ethnic minorities (particularly women of color) and from low-income socioeconomic backgrounds, individuals who identify as LGBTQ+, and people with disabilities.

In recent years, addressing the issue of the underrepresentation of women and minorities in STEM fields has gained significant attention in many countries and professional organizations around the world. This is not only an issue of fairness, human rights, and social justice; this is because increased diversity benefits scientific progress through increased innovation [1], [2]. Diversity enriches all aspects of our personal and professional lives.

Unfortunately, while strides have been made, in many parts of the world, women still face societal and legal barriers to basic education. There are also countries and cultures where LGBTQ+ individuals face criminal charges or legal discrimination based on their sexual orientation and/or gender identity. Such discrimination, of course, has many negative impacts on society, health outcomes, economic growth, and social stability [3]. At the IEEE Signal Processing Society (SPS) level,

these forms of marginalization thwart our efforts to attract and foster the very best minds available to advance the field of signal processing.

In the SPS, the lack of diversity is quite prominent. To get a glimpse into this issue, along with getting feedback on many other issues, a survey of SPS members was conducted in 2022 by the IEEE Strategic Research Department on behalf of the SPS. A random sampling of 7,500 SPS members was invited to participate. Based on 1,222 responses, about one in five (19.1%) respondents considered themselves to be part of an underrepresented group. When asked about the underrepresented group they belonged to, only 84 respondents answered. In total, 14% identified as women, 83% as men, and 0% as nonbinary, while 3% chose the option "prefer not to answer."

A majority of the surveyed SPS members attested that the organization has sufficient diversity in terms of ethnicity, gender, and geographic composition and a diverse, inclusive, and equitable culture. However, members belonging to underrepresented groups in their profession were significantly less likely to view the SPS leadership as sufficiently diverse in terms of ethnicity, gender, and geographic composition and were also less likely to attest to the SPS being a diverse, inclusive, and equitable organization. Moreover, significantly more women than men disagreed with a statement attesting to the SPS having sufficiently diverse gender

representation in its leadership. The 2022 survey findings suggest that the majority of men may not perceive under representation as a problem, which could lead them to believe that there is no need to support measures to increase diversity.

The SPS adheres to the IEEE Code of Conduct, which includes providing equal opportunity to its members regardless of ethnicity, race, nationality, disability, socioeconomic status, sexual orientation, religion, gender, age, and personal identity. The Society supports a welcoming and inclusive environment that promotes diversity in the signal processing community. The SPS has a diversity pledge [5], according to which:

> *The IEEE Signal Processing Society is committed to diversity, equity, and inclusion in all its operations. This includes boards, committees, panels involved in governance (BoG, ExCom, and nominations to BoG and ExCom), conferences (General Chairs and Organizing Committee members, Technical Program Chairs and members, panels), publications (Editors-in-Chief and Associate Editors), technical committees, distinguished lecturers, chapter chairs, officers, and staff.*

The current SPS membership breakdown is 77.58% male, 13.57% female, and 8.85% other. While we have made progress in bringing the percentage of women volunteers in line with the percentage of women members, there is still significant room for improvement because the percentage of women members is low. Additionally, fewer women are represented on editorial boards and technical committees and women receive less recognition in terms of award nominations, and ultimately, awards. This is clearly illustrated in Figures 1–5 on the representation of women in various boards and committees of the SPS. On the positive side, it is worth noting that in recent years, there has been a significant increase in the involvement of women in leadership positions at the SPS, with women representing more than 50% of voting members of the SPS Board of Governors (BoG). We should note here that the majority of BoG members are elected by the SPS members worldwide.

The SPS recognizes the importance of diversity and inclusion and has several ongoing efforts to increase the percentage of women and underrepresented minorities who enter the field of signal processing [5]. The SPS has a
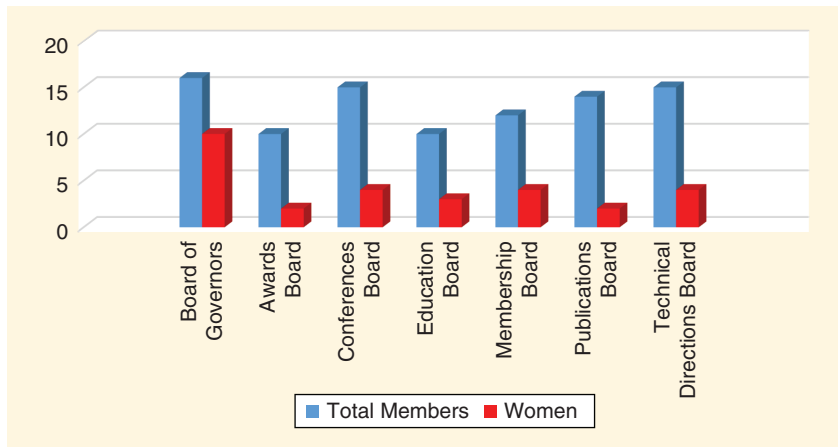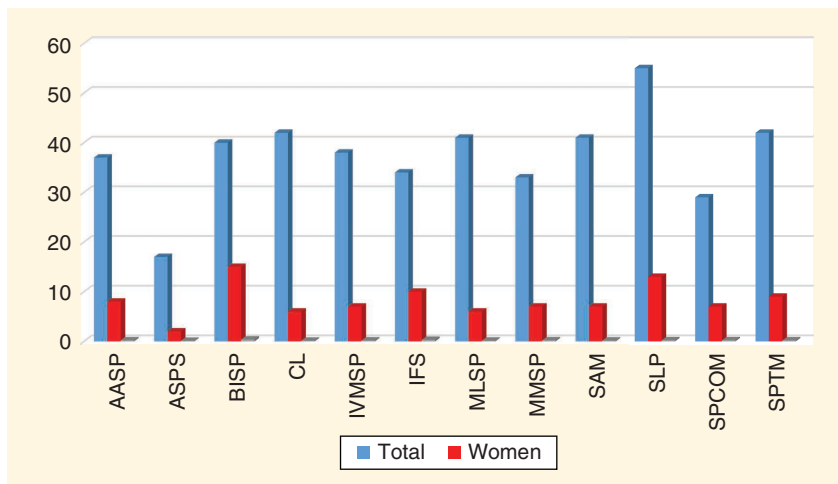


**FIGURE 1.** SPS major boards voting members.
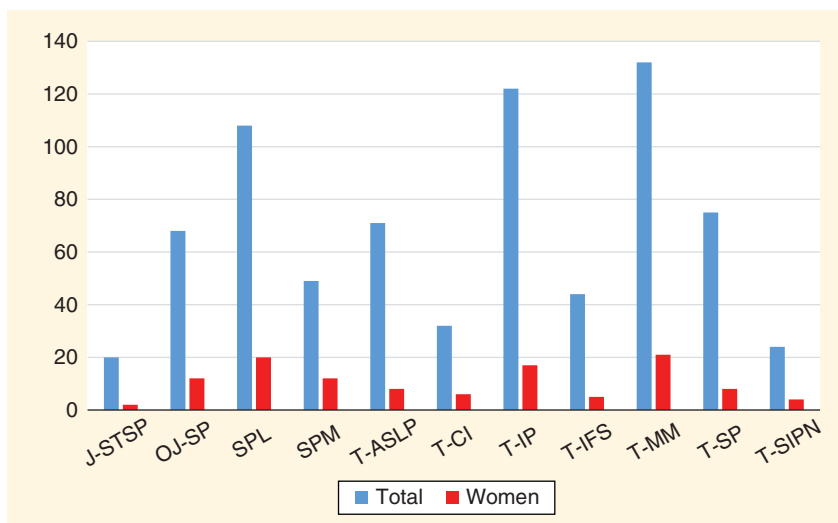


**FIGURE 2.** Technical committees.



**FIGURE 3.** Editorial boards.

K-12 Outreach Initiative Program, which strives to increase the visibility of the SPS and the signal processing discipline to K-12 students belonging to groups underrepresented in STEM fields regionally and globally, by developing exciting and impactful educational programs that utilize tools and applications with hands-on signal processing experiences. The SPS recognizes that diversity breeds diversity and that diversity among faculty will provide inspirational role models that inspire students to excellence. In that spirit, the SPS is offering PROGRESS (Promoting Diversity in Signal Processing) [4], [5], a workshop that aims to motivate and support women and underrepresented minorities to pursue academic careers in signal processing. PROGRESS is offered to nonmembers as well as members. The SPS also offers the Mentoring Experiences for Underrepresented Young Researchers Program (ME-UYR), which provides mentoring experiences in the form of a nine-month collaboration to connect young researchers from underrepresented groups together with an established researcher in signal processing from a different institute, and typically, another country. The SPS also makes available several resources [5] for individuals to understand the issues and challenges for underrepresented people and provide ways they can help.

By actively seeking to understand the challenges that women and underrepresented minorities face and standing up against discrimination, SPS members can work toward creating a more welcoming and inclusive community. Becoming an ally and actively supporting efforts and policies that promote equity and inclusion are crucial in ensuring that all members feel valued and included. Additionally, it is important to recognize and celebrate the accomplishments of women and underrepresented minorities and help promote their visibility and advancement in our professional community.

Creating a truly diverse and equitable SPS certainly requires sustained effort and commitment from all members. It is important to recognize that diversity is not just a moral imperative but a pillar for innovation and progress. When
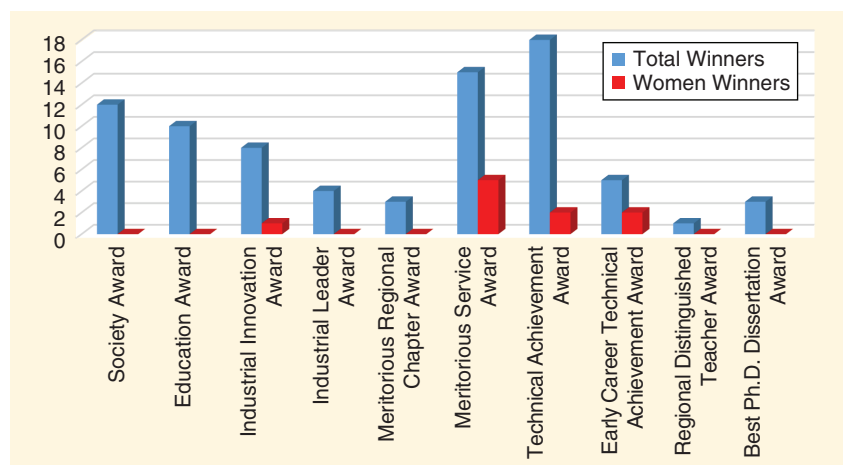


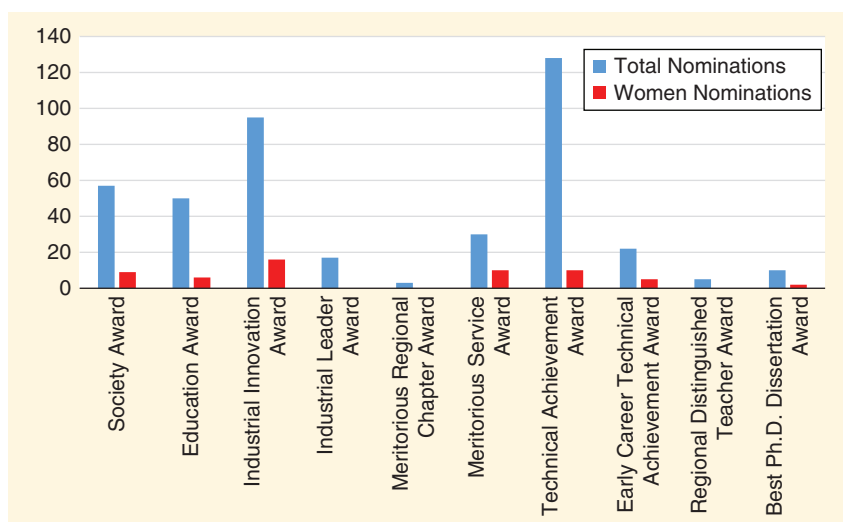**FIGURE 4.** Society awards (2011–2021).



**FIGURE 5.** Society awards nominations (2011–2021).

people from diverse backgrounds and experiences come together and feel comfortable unleashing their skills, talents, and passions, they contribute unique perspectives and ideas that can lead to creative solutions and breakthroughs.

Thank you for doing your part toward furnishing a more diverse, fairer, and more equitable world for our community!

## Acknowledgment

## References
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