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EDITORIAL

Gender disparity in scientific publishing: What can we do?

JEM Editorial Team

Despite the exceptional contributions made by women to STEM (science, technology, engineering, and mathematics) fields over the past decades, women remain under-represented at advanced career levels. Although equivalent numbers of women and men graduate in STEM fields, employment numbers still show a higher proportion of men holding STEM jobs than women (National Science Foundation, 2019; UNESCO, 2017). Adding to this, women who overcome these challenges are met with further disparity in grant awards (National Institutes of Health, 2020). By having fewer women's voices at decision-making levels, the scientific community misses out on the vital and unique perspective that women bring to research. Moreover, the community runs the risk of discouraging talented young women from pursuing careers in science.

At *JEM*, we are committed to reducing gender bias in scientific publishing. As a first step in this direction, we have started to compile some statistics on how men and women fare in our editorial and publication process. We recognize that the current data are still very preliminary (the analysis is currently limited to papers submitted to *JEM* in 2018), but we believe that being transparent about our editorial process is a crucial first step to identify areas in which we need to improve and shine light on the larger issues faced by women in science.

Gender analysis of papers submitted to *JEM* in 2018

Since we do not ask for gender disclosure at submission, we manually analyzed the editorial decisions for studies submitted to *JEM* in 2018 (see Fig. 1 legend for methodology). In 2018, 76% of manuscripts submitted to *JEM* were from male corresponding authors (CAs) versus 24% from female CAs (Fig. 1 A). This lower proportion of manuscripts from female CAs could be a reflection of the high ratio of male to female principal investigators in the STEM fields.

We are proud to share with our readers and authors that the preliminary data shown in Fig. 1 indicate a lack of bias in the *JEM* editorial process. In 2018, the proportion of papers sent for external review was equivalent between female and male CAs (16.5% of submissions from female CAs and 16% of submissions from male CAs were sent out for review; Fig. 1 B). Similarly, comparable proportions of studies were invited back after external review among the two groups (55% of the manuscripts from female CAs and 52% of manuscripts from male CAs were invited back to *JEM* after review; Fig. 1 C). Since 93% of all papers that were invited after review in 2018 were eventually published in *JEM*, we feel comfortable saying that there was no gender disparity in *JEM* publications from 2018. Although these data were derived from a single year, we believe that this analysis embodies our commitment to fairness and our continuous effort to make editorial decisions independent of the CA's gender. These data, while preliminary, are also indicative of the commendable effort made by the scientists on our academic board and in our professional editorial team to ensure equal treatment of genders.

Going forward

This analysis is just a starting point, and we recognize that there is still a great deal of work to be done to defeat gender disparity in scientific publishing and increase the representation of women in STEM. As a step in this direction, we started to revise the *JEM* academic editorial board in 2016 and are proud to say that 43% of our board is now composed of female scientists (6 out of 14), each highly accomplished in their respective fields. We have also started to revise the *JEM* advisory board and increased the numbers of women advisory editors up to 29%. Efforts are underway to (i) further increase the representation of women on our advisory board and in our reviewer panels and (ii) continue our monitoring of the impact of gender on our editorial process, expanding it over the course of multiple years.

To inspire the new generation of women in STEM, we have asked the six women on our academic editorial board to share their experiences in science and the roadblocks they have encountered in their careers (O'Garra et al., 2020). Female scientists are often perceived as a uniform group, but as you will see from this Viewpoint, our academic editors emphasize that the rich diversity, in terms of culture and experiences, among women in STEM is pivotal in shaping their career trajectories. The challenges they overcame paved the way for today's women in science, and it is inspirational to see their continued

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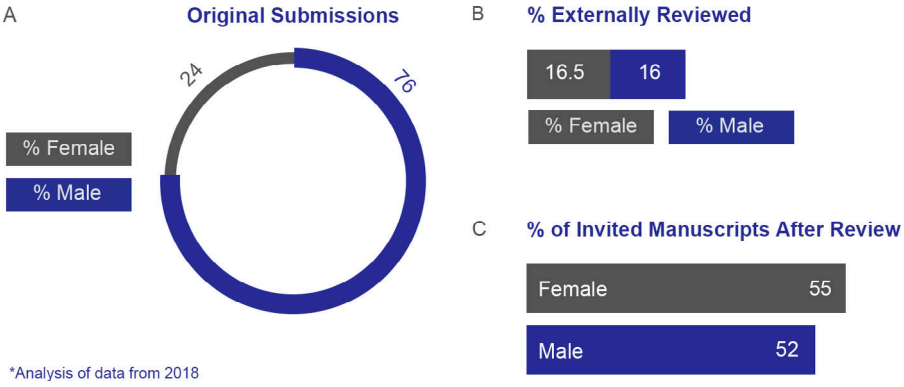

Figure 1. **Methodology for gender analysis.** We downloaded data for all original primary research papers submitted to *JEM* from January 2018 through December 2018 and extracted the following information: Outcome of submissions (editorially rejected, rejected post-review, invited post-review); and the names of the CAs. We ran the CAs' names through an algorithm (Namsor) that assigns gender to names. The algorithm used assigns gender to Western and Asian names with an 20% margin of error. To overcome the limitation of the algorithm and provide a more accurate analysis, genders were then manually checked and confirmed.

commitment to make sure that women are awarded equal opportunities as they move forward in their careers. We also interviewed *JEM* advisory editor and newly elected American Association of Immunologists president Dr. Akiko Iwasaki. Dr. Iwasaki is a role model for many young women, and men, pursuing graduate studies and beyond. In her interview, she shares her experiences working as a woman in STEM, gives us her thoughts on the challenges of unconscious bias and changing the environment of academia, and gives some words of advice for the next generation of scientists (Houston, 2020).

Disparity in science goes beyond gender, and scientists also experience discrimination based on their race, ethnicity, sexual orientation and identity, geography, and more. Editors have been found to over-rely on reviewers based in developed nations, giving less review opportunities to researchers based in developing nations (Singh Chawla, 2018). Hiring committees have been shown to have ethnicity biases (Eaton et al., 2019). Intersectionality, when different biases (for example, gender and race) coexist, adds an additional layer of complexity to inequality in science (Langin, 2019). At *JEM*, we remain committed to creating a bias-free environment for our authors, reviewers, and editors. As a next step, we are now focusing on increasing the geographic diversity among *JEM* advisory board members. We hope that with our efforts, we will foster a better community that brings together scientists from all walks of life.

Lastly, we would like to thank our academic editorial board member, Dr. Susan Kaech, for initiating the conversation on gender disparity in scientific publishing and encouraging the *JEM* editorial team to perform this analysis. We would also like to thank *JEM* managing editor, Sylvia Cuadrado, for generating the gender data analyzed above.

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