

Is there a glass ceiling in academic publishing?

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A University of Washington study finds that women authors make up a fraction of the research published in high-profile journals. Credit: U. of Washington

Five years ago, *Nature*—one of the most prestigious research journals in science—published an [editorial](#) pledging to improve on the low number

of women editors and authors in its pages.

For many readers and scientists, that acknowledgement was a long time in coming. Yet with the hindsight of today's re-examination of the treatment of [women](#) at all levels of society, the editorial could seem almost prescient.

In the time since that editorial, however, not much has changed, according to a new University of Washington study published online and cited in a letter printed March 7 in *Nature*. The preliminary study, by UW psychology professor Ione Fine and doctoral student Alicia Shen, finds that many high-profile neuroscience journals had a low representation of female authors. For example, fewer than 25 percent of *Nature* [research articles](#) listed women as the first author—usually the junior scientist who led the research. Among last authors—typically the senior laboratory leader—just over 15 percent were women. *Nature's* top-tier competitor, *Science*, had similarly low numbers of women authors.

What most concerned the UW team was that over a 12-year period ending in 2017, the percentage of female authors across these journals showed little improvement: less than 1 percent annually, with many journals showing no increase at all.

For the sake of comparison, the UW team also looked at the number of women who received major National Institute of Health grants during the same time period. Those numbers were much higher, and increased slowly but steadily, with just under 30 percent of grants in 2017 awarded to women.

"These research grants are awarded based on significance, impact and productivity. We shouldn't see this huge discrepancy between NIH funding and last authorship in high impact journals," Fine said. It's particularly troubling, the study's authors say, given that publishing in

high-profile journals is virtually imperative for winning academic awards or positions at top-ranked institutions.

Gender disparities in STEM fields has garnered more attention in recent years. While National Science Foundation-compiled data show that women make up a [growing](#) proportion of STEM faculty, their numbers remain significantly lower than those of men. A 2016 [survey](#) by the Society for Neuroscience showed that a little more than half of neuroscience doctorates are awarded to women, but women make up an average of only 30 percent of neuroscience faculty.

Other studies of gender and authorship have also pointed to the possible contribution of publication bias. A small-scale study focusing on *Nature Neuroscience*, in 2016, showed similar results to the UW findings. And in 2013, a study led by the UW's Jevin West and Carl Bergstrom, though an analysis of publications in the JSTOR digital library, found that women also are much less likely to be featured in prominent first- or last-author positions.

The issue extends beyond science: In spring 2017, an economics lecturer at the University of Liverpool found that papers written by female economists took an average of six months longer to get published than those written by men.

For this study, Shen, Fine, and their psychology co-authors research associate Jason Webster and professor Yuichi Shoda, turned to the MEDLINE database of articles, which is hosted by the U.S. National Library of Medicine. They focused on 15 journals that publish neuroscience research, accounting for nearly 167,000 research articles from 2005 to 2017, and analyzed the author bylines using another database that predicts gender based on more than 216,000 distinct first names.

Some journals did have a proportionate number of female authors. The journals with the highest percentage of first authors were *Neuropsychology Review* (53 percent) and *Brain* (43 percent); among last authors, numbers were highest in *Neuropsychology Review* (39 percent) and *Current Opinion in Neurobiology* (27 percent).

"From our analysis, it is not that women are not conducting research and publishing, they are just much less likely to get their work into the really high-profile journals," Shen said.

Fine and Shen suggest several solutions for all journals: to record and report article authorship by gender; to train reviewers to avoid bias, provide reviewers with more specific review criteria, akin to those required for grant awards; to adopt double-blind reviewing; or to establish byline quotas.

"It's ridiculous to think bias isn't at play in these very elite journals," Fine says. "There are glass ceilings in technology, in politics, in business. It's very hard not to believe that this is not just another glass ceiling."

Increasing the number of women faculty in STEM fields is the goal of the UW ADVANCE Center for Institutional Change. But if publication presents a barrier, then some universities may be challenged to hire and promote women, said Eve Riskin, UW associate dean of engineering for diversity and access, professor of electrical engineering and faculty director of ADVANCE.

"Research shows that diverse teams lead to better solutions," Riskin said. "Research also shows that female students in STEM do better when they have female faculty as instructors. Holding women to higher standards for publication makes it harder for universities to increase their number of female faculty members in STEM and in leadership positions."

The study's authors have also made their code publicly available, with the hope that students or faculty in other fields will take on the same challenge, determine the gender breakdown of bylines in a given set of journals, and call for change.

"These journals make a lot of money and wield a huge amount of power. Finding a way to fix this problem is the least they can do," Fine said. "They are under the same legal obligations to avoid discrimination as other businesses."

More information: Jevin D. West et al. The Role of Gender in Scholarly Authorship, *PLoS ONE* (2013). bioArxiv. [DOI: 10.1371/journal.pone.0066212](https://doi.org/10.1371/journal.pone.0066212)

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