New study documents gender disparity in computational research publications

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Women are consistently underrepresented in scientific research positions—a disparity that is particularly egregious in computational fields.

Now newly published research from Harvard Medical School reveals this gender gap extends to paper authorship with most papers that appear in peer-reviewed publications written by men.

The findings are published Oct. 12 in *PLoS Computational Biology*.

The study analyzed paper authorship by gender across several fields—computational biology, quantitative biology, biology and computer science. The analysis reveals that gender disparities in the interdisciplinary fields of computational and quantitative biology were worse than they were in biology—a relatively gender-balanced field—but better than they were in computer science, a decidedly male-dominated field.

Although the study was not designed to identify the factors behind the variation in gender ratios across the three disciplines, it did reveal that the presence of senior female scientists appears to lead to less disparity overall. Indeed, papers with female senior authors had more female co-authors than did papers with male last authors.

The researchers analyzed authors' genders in papers published between 1997 and 2014. The gender gap has narrowed over time, but at a sluggish pace of under 1 percent improvement per year. As of 2014, more than 80 percent of computer science authors and close to 70 percent of computational biology authors were still men.

The gender difference between fields was evident even when controlling for authorship position, publication year, and journal impact factor.

"There is a persistent belief among some that there are inherent biological reasons that explain why there are fewer women in computing than men," said study co-author Melanie Stefan, a past HMS curriculum fellow and now a lecturer at Edinburgh Medical School. "But the fact

that there are more women in some fields of computing than in others points to other factors at work."

The researchers say that interdisciplinary fields such as computational biology may be a foot in the door for young female scientists to transfer into computation after getting started in a more welcoming field such as biology.

One explanation, the researchers suggest, is that the lack of female laboratory heads in computer science may be discouraging young women from joining the field. Meanwhile, the greater number of female laboratory heads in biology and computational biology may serve as role models or mentors who support younger women—and they may be more rigorous about recognizing their female lab members' contributions, the researchers say. That notion is borne out by the fact that publications with female senior authors tended to have more female co-authors.

"Our hope is that open discussion of gender disparities encourages senior scientists to be more thoughtful of gender in their own research teams," said co-author Kevin Bonham, who conducted the study while a lecturer and computational biologist at HMS and who is now a currently a post-doctoral research fellow at the Harvard T.H. Chan School of Public Health and the Broad Institute. "Bringing this perhaps uncomfortable issue to the surface is important, because awareness reduces unconscious bias," he said.

More information: Kevin S. Bonham et al. Women are underrepresented in computational biology: An analysis of the scholarly literature in biology, computer science and computational biology, *PLOS Computational Biology* (2017). DOI: 10.1371/journal.pcbi.1005134