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EDITORIAL

Inclusion and diversity in developmental biology: introducing the Node Network

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As we move into the third decade of the 21st Century, it's a sad fact across society that discrimination based on gender, race, sexual orientation, disability, age and all manner of other characteristics is still rife, and we still have a long way to go to ensure equal opportunities and treatment for all. Science and academic publishing are not exempt from such concerns: many studies have demonstrated disparities in hiring, funding and publishing based on gender and ethnicity (e.g. Murray et al., 2019 preprint; Ginther et al., 2011; Dutt et al., 2016), and doubtless there are other, less well documented, biases we should be aware of too. To tackle these issues effectively, we need to better understand them and then we need to take action.

At The Company of Biologists, we have begun to look at the extent to which both our publishing and charitable activities suffer from gender disparities. This work is still ongoing, and in the future we would like to extend it to cover other factors such as geography and career stage. However, we think it is valuable to share some of the take-home messages from the data we have gathered so far, and to discuss some of our plans and initiatives in this area. The analyses we have conducted so far are based primarily on data on papers, authors and reviewers from across our journal portfolio, and a brief overview of the approach and the key results are provided in Box 1.

What do these data tell us? Although it is hard to find accurate statistics on the proportion of female Principal Investigators (PIs) in the life sciences, reports from both the USA and the UK have stated that around 30% of grant recipients are female (Zhou et al., 2018; https://report.nih.gov/nihdatabook/category/16), whereas the proportion of women among the most senior academic staff in the EU is significantly lower (She Figures 2018: https://op.europa.eu/en/publication-detail/-/publication/9540ffa1-4478-11e9-a8ed-01aa75ed71a1/language-en/format-PDF/source-search). We therefore think that the proportion of women among our corresponding author pool (30.3%) is probably reasonably representative of the community – at least in Europe and the US. It is also encouraging that the proportion of female corresponding authors submitting to Development in the past 3 years is considerably higher than this – over 40%. However, it is disappointing to see that papers with female corresponding authors fare somewhat less well through editorial assessment and peer review, and that disproportionately few of our reviewers are women (see Box 1 for more details). Very preliminary data suggest that disparities also exist for ethnicity and geography, but we need to explore these further. We have shared these statistics with our editors and discussed ways to address these issues.

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So what are we doing to tackle the situation and ensure we are as inclusive an organisation as possible? One aspect that we can directly control is the make-up of our editorial team and advisory editorial board. Our 14 editors are based on four continents, and five (36%) are women. Women make up 33% of our Editorial Advisory Board, and – although we still have work to do – we have increased our representation of board members from outside Europe and North America. Importantly, we have also appointed a number of board members at an early stage of their career – helping to ensure we better understand the needs of early-career researchers. Specifically, we are delighted to have welcomed Justin Crocker (European Molecular Biology Laboratory, Germany), Fredrik Lanner (Karolinska Institutet, Sweden), Samantha Morris (Washington University in St. Louis, USA), Patrick Müller (Friedrich Miescher Laboratory, Germany), Andrea Pauli (Institute of Molecular Pathology, Austria), Wei Xie (Tsinghua University, China) and Yi Zeng (Shanghai Institute of Biochemistry and Cell Biology, China) – all of whom have started their labs within the last 6 years or so.

We are also trying hard to widen our pool of reviewers, and encourage authors to consider diversity (in career stage, geography and gender) when suggesting potential reviewers – although we are unlikely to use all your suggestions, they are helpful to us in recruiting suitable reviewers. Our editors are also thinking actively about this and are trying particularly to invite more early-career scientists to participate in the peer review process, either with their mentor or independently. This can be a challenge, as we are often not familiar with those less established in their career, but we encourage reviewers to train their mentees in reviewing papers and – importantly – to let us know who they have co-reviewed with, so we can invite that person directly to review again. On that note, we would like to thank all those who reviewed and co-reviewed papers for us in 2019 (listed in the Supplementary Information) – without you, we could not operate as a journal.

The challenges faced by our editors in identifying appropriate people to review papers are reflective of a broader issue in academic science: a small number of individuals are overburdened with a large number of invitations and responsibilities, whereas many others can find it hard to get their profile known. Too often, conference speaker slots are filled by the 'usual suspects', we struggle for diversity on committees and panels, and students starting out in the field lack role models from backgrounds with which they identify. To help combat these issues, we're excited to announce the launch of the Node Network, a directory of developmental and stem cell biology researchers. It is designed to help those organising conferences, assembling committees, seeking speakers for seminar series, looking for reviewers and so on to identify individuals who might not otherwise come to mind.

Inspired by efforts such as Anne's List (a listing of female neuroscientists – https://anneslist.net/) and DiversifyEEB (a directory of female and under-represented minority ecologists and evolutionary

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Box 1. Gender analysis across The Company of Biologists' journals

This analysis was done primarily by Sam Holden, a PhD student at The Sainsbury Laboratory and University of East Anglia, Norwich, who in 2018 spent three months as a PIPS intern with us as part of his PhD program. Sam was helped in his analysis by the Royal Society of Chemistry (RSC), who developed the algorithm used to assign gender to names (and have recently published detailed statistics on gender bias: https://www.rsc.org/globalassets/04-campaigning-outreach/campaigning/gender-bias/gender-bias-report-final.pdf). Many thanks to Sam for his work on this project, and to our colleagues at the RSC for their support.

Methodology

For each of our five journals, we downloaded data on all research papers submitted between October 2006 and May 2018 and extracted the following information:

- Outcome of submission (editorially rejected, rejected post-review or accepted)
- Name of first author
- Name of corresponding author (note that this may be the same as the first author)
- Names of individuals suggested by authors as potential reviewers
- Names of individuals invited to review the paper
- Names of reviewers who completed a report on the paper

We ran the lists of names through an algorithm that assigns gender to names, along with a confidence value in the assignment. We assigned a gender to names where the confidence value was greater than 90% – allowing us to assign gender to around 75% of authors and 85% of reviewers. It should be noted that the algorithm was developed using a dataset of mainly Western names, and the majority of names with 'unassigned' gender are Asian. Thus, the results outlined below do not necessarily reflect patterns that might apply to non-Western authors and reviewers.

To allow more rigorous statistical analysis, data were pooled across all the journals and the whole >10 year timespan, though we have also looked at trends over time and between journals. In addition to calculating basic statistics on the gender balance of our author and reviewer pool, we also analysed the success rate of submissions based on author and reviewer gender.

Key results

- Almost exactly 50% of first authors (typically the junior researchers who contributed most to the research) are female – implying minimal gender disparity at the level of the PhD students and postdocs in our community of authors. However, among corresponding authors (typically PIs/lab heads), only 30.3% were female.
- The gender of the first author had no influence on the success rate of the submission. However, papers from female corresponding authors showed a slight but statistically significant (P<0.05) reduction in acceptance rate – only 28.5% of corresponding authors on accepted papers were female.
- Disparity is seen at both initial editorial assessment and at peer review: papers with female corresponding authors are less likely to be sent out for peer review than those with male corresponding authors (67.3% versus 71.0%) and, once sent out for peer review, are less likely to be accepted for publication (52.9% versus 56.2%).
- There is a greater gender imbalance in our pool of reviewers than our pool of corresponding authors: 26.1% of people invited to review a paper are female, and 25.8% of completed reviews are by women (the similar numbers suggesting that both genders are equally likely to accept an invitation to review). These figures have improved over the 10 year time-window: in 2007, only 23% of reviewers were female; this reached 29% by 2017 (though this is still below the 30% proportion of female corresponding authors).
- Authors are more likely to suggest reviewers of the same gender as themselves. However, we have not found evidence that female-authored papers are at a disadvantage if reviewed by men (though the data on correlations between author and reviewer gender are hard to interpret).

biologists – https://diversifyeeb.com/), the Node Network is an inclusive directory for members of the developmental biology and stem cell communities – providing information on scientific field, academic position and other professional interests as well as highlighting aspects of diversity including gender, race/ethnicity, sexual orientation and disability. It's meant for all developmental and stem cell biologists, whoever and wherever you are, and we hope that it will become a go-to resource for a wide range of professional purposes. The Network will be hosted on our community website, the Node, and has been carefully designed both for ease of use and to protect the personal data we are storing. For more information on the Node Network, please go to https://thenode.biologists.com/networkinfo/. Its success depends on participation from our community, and we hope you will enter your own details into the directory, encourage your colleagues to do likewise, and use it to find others.

The Node Network is, of course, just a small contribution to the efforts to improve diversity and inclusivity in our field and community, but we hope it will prove valuable. As always, we welcome your feedback on this initiative – and on other steps we might take in this area – so please feel free to get in touch.

Supplementary information

Supplementary information available online at
http://dev.biologists.org/lookup/doi/10.1242/dev.187591.supplemental

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