

Peer Review: Under Review

This year, the students of the CSHL Frontiers and Techniques in Plant Science course engaged in a discussion on the merits of peer review. A pros-and-cons list guided our exploration of potential improvements or alternatives, and ultimately, we concluded that whatever form peer review takes, we need feedback on our science, better training on how to provide feedback, and better behaviors as a scientific community when providing that feedback.

The problem

In science, we publish our conclusions from experimental investigation to share information and advance our collective knowledge. Ideally, peer review before publishing promises a competent second assessment of these conclusions, which is particularly valuable for young researchers seeking advice and guidance from seasoned colleagues. These multiple views facilitate an objectivity that can catch mistakes and identify oversights. However, peer review is not without its faults; issues such as reviewer incompetence, bias, ego, and conflicts of interest can interfere with due process. The delay from time of submission to publication impedes careers and the advancement of science, while biases rooted in scientific nepotism might create power imbalances in the community. Even without these barriers, two-to-four reviewers may not reflect an accurate sample size for consensus on the legitimacy of conclusions presented in a manuscript.

Our solution

In an effort to remove bias, we could blind reviewers to the identities of authors, but this may fuel mistrust and familiarity with work would likely abrogate anonymity. Alternatively, having no blind parties might facilitate a greater sense of accountability, although personal issues may increase conflict. Yet, these issues may not reflect an inherent problem with peer review, but rather the potential of unconstructive behaviors to obstruct the process.

What would it look like if we moved on from the current structure of peer review? Preprints have emerged as a new platform that promises to solve the problems of the peer review process. With preprints, manuscripts are live within days, or even hours, a significant feature when evidence of productivity plays a crucial role for securing positions and funding. However, the obvious problem with this format is, ironically, the lack of peer review. This could be solved with metrics that track the record of reviewing for each preprint article, allowing consensus to naturally emerge. Or, we could merge both paradigms and release manuscripts as “under peer review” and later as “peer reviewed”. Yet, the ultimate issue with publishing papers that have not been peer reviewed concerns the young scientist; the seal of “peer reviewed” helps junior researchers discern competent science. It may be a mistake to ask young scientists to wait an unknown amount of time for the community to determine whether a paper is legitimate (if ever they do), and a shift toward exclusively preprint platforms would require a substantial buy-in from the community.

Ultimately, peer review is about feedback and training. As young scientists we need to learn how to read and write scientific literature. Active participation in the peer review process can help trainees improve their analytical writing skills, and with proper mentorship, we learn to articulate objective criticisms that improve the reviewed work. As young scientists, we need leadership in the community to create the reviewers we want reviewing our papers.

Regardless of structure, peer review is still a discussion among peers on the conclusions that arise from experimental investigation; it is a practice that can only be as good as its participants. Our international scientific cohort should operate with more positive community norms, and we should

focus on training the next generation of scientists to provide effective, unbiased feedback. Whether we continue with the current model of peer review, fully shift to a preprint platform, or find ourselves somewhere in between, we will always need competent and fair reviewers.

Doing our part

To set an example, we led a journal club-style discussion and group review of a preprint article, which you can read in the comments section here: <https://www.biorxiv.org/content/early/2018/05/14/321794>. We found that a group setting gave us the freedom to express concerns, but accountability to each other to remain fair and constructive. Our experience suggests that this might be a format employable in graduate programs to introduce students to reviewing.

Written by the students and TAs of the 2018 CSHL Frontiers and Techniques in Plant Science course:

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