

World view



By Richard Sever

Teach PhD students and postdocs preprint review

Institutions owe it to young researchers to prepare them for careers outside academia. Preprint review is a perfect opportunity.

Few PhD students ultimately pursue the career for which they have been trained. A rapid expansion in PhD programmes over several decades without a concurrent increase in faculty numbers means that, in the United Kingdom, less than 5% of PhD students will become principal investigators (PIs), a Royal Society report found in 2010 (see go.nature.com/2r1y6pb). The numbers are not much better for the United States (R. C. Larson *et al. Syst. Res. Behav. Sci.* **31**, 745–750; 2014).

The rest go into industry, pursue science writing, editing, patent law or other science-related careers, or leave science entirely. They generally do so armed with just a thesis and one or two research papers on a rather arcane topic, but little other tangible evidence of their abilities. We need a recognized, equitable way for PhD graduates to demonstrate the transferable skills they have gained.

For me, that way is to train them in preprint review.

I was once one of those postgraduates, choosing to leave the bench with little on my CV other than grades and degrees. In the years since, both in my current role as assistant director of Cold Spring Harbor Laboratory Press and in previous positions, I have often had to sift through dozens of CVs when hiring people for editorial positions.

Occasionally, interviewers like me see relevant experience on a CV, when someone has worked on a student journal, for example, or written a newspaper article, that helps us to decide whether to shortlist them. But internships outside academia and other writing opportunities are generally the preserve of a fortunate few.

Peer reviewing preprints would guarantee young researchers some concrete outputs that illustrate their ability to critique work, write about science and discuss subjects outside their immediate focus of research. By building such training into our scientific institutions, rather than relying on outside opportunities to which many do not have access, we can create a fairer system in which not just the well-connected can demonstrate their abilities.

Peer review is an opportunity to demonstrate transferable skills, but most of the institutions that grant PhDs don't train people in peer review. Journal peer review tends to be confined to PIs; at most, a student might work with their PI to learn the ropes. Even then, they are unlikely to be credited. The process takes place mainly behind closed doors and reports are not publicly registered, so job applicants cannot cite them as evidence of their abilities.

The rise in preprinting provides a fantastic opportunity for PhD students and postdoctoral researchers to engage

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Since we launched bioRxiv in 2013, increasing numbers of biologists have been posting preprints online, following the lead of physicists with the arXiv server, founded in 1991. These have yet to be scrutinized for errors, flawed logic or extra work that is needed, so they are ideal subjects for young investigators who want to demonstrate their criticism skills. Many student journal clubs increasingly discuss preprints because the work has not yet been formally evaluated and revised. Importantly, there is no gatekeeping: anyone who wants to peer review a preprint can.

Institutions could build their own platforms for students' preprint reviews, modelled on PREReview and preLights. PREReview is an open-source platform that enables users to compose, read and endorse long-form peer reviews of preprints. PreLights is a preprint-highlighting service in which early-career researchers select, summarize and comment on preprints. Both assign digital object identifiers (DOIs) to preprint reviews, and the reviews can be automatically linked to a scientist's ORCID (Open Researcher and Contributor ID) account. Preprint reviews thus have the potential to serve not only as a career currency, but as one that can be authenticated.

For institutions motivated to start peer-review training, PREReview spells out how to peer review constructively (see go.nature.com/3gzsex0) and ASAPbio's working group on preprint feedback has collected useful guides (see go.nature.com/3qdjapt). Individual labs and departments can also begin teaching peer review, as some already do. Ultimately, however, institutions should initiate this rather than depending on piecemeal efforts by individual PIs.

A few institutions have begun to offer formal training in peer review. New York University and the University of California, San Francisco, both run courses, for example.

Some might argue that preprint review is an unnecessary distraction – another hoop through which we force already busy people to jump – that's not necessarily of value to all trainees. But in my view, these new outputs would provide multidimensional information about candidates' qualities for potential employers in and outside academia. For researchers who stay in academia, training will improve their peer reviews. It might even prevent them from becoming the dreaded 'Reviewer 3', the incompetent critic who makes the process unbearable for authors.

PhD students and postdocs are often referred to as trainees, but what career are we training them for? In a 2022 *Nature* survey, only 32% of graduate students said that their supervisors had useful advice for careers outside academia (*Nature* **611**, 413–416; 2022). We need to do better. Ensuring that students have material evidence of transferable skills would be an important step forwards.

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