

# Preprints as tools to advance careers

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**Preprints benefit researchers' careers in a number of ways. They allow authors to control the timing of dissemination of their work and provide early evidence of productivity that can be cited in job applications, grant proposals and reviews for tenure and other awards.**

Preprints are drafts of manuscripts shared by authors in public repositories before they have completed the peer review process. The practice has become increasingly common since the launch of the [bioRxiv](#) preprint server by Cold Spring Harbor Laboratory in 2013 and the emergence of its sibling [medRxiv](#) (launched in 2019) as a crucial venue for the rapid sharing of clinical studies during the pandemic. By enabling researchers to communicate findings months-to-years before an article is published in a peer-reviewed journal, preprints have immense potential to benefit society by increasing the rate at which new discoveries are made and translated into knowledge and practices that impact human health. However, preprints also represent useful tools for career advancement. Scientific papers are a major mechanism by which research output is demonstrated, evaluated and quantified, and by making these available early as preprints, scientists can benefit at important points in their careers.

In a recent survey of [bioRxiv](#) and [medRxiv](#) authors, 77% of authors said sharing preprints increased awareness of their research and 36% said progression in their field was a benefit<sup>1</sup>. Preprints provide a mechanism for authors to get early feedback that improves both their manuscript and their research. They also alert other researchers to new findings before the journal article appears, with the caveat that the work has not been vetted by peer review and so may require additional scrutiny. For early career researchers (ECRs) in particular, the rapid availability of work can give them a boost at critical stages in their career. A timeline illustrating an example of this in the cancer field is shown in [Fig. 1](#). After seeing another researcher's preprint online, a newly appointed principal investigator was able to initiate a successful collaboration 7 months before the paper appeared in a journal. For a tenure track investigator with a limited window to demonstrate productivity, this represented a considerable head start towards tenure.

As posting on [bioRxiv](#) and [medRxiv](#) is almost immediate and controlled entirely by the author, preprints are particularly well suited to support time-sensitive job or grant applications. A preprint on the [bioRxiv](#) server, for example, typically becomes publicly available within 24–72 hours of submission. Journal publications, by contrast, can take months or years to become available, especially if there are multiple cycles of revision and/or rejection, and therefore the timing is not predictable. Because preprints are permanent, citable objects, they can be cited in applications and resumes as evidence of recent progress. A third of surveyed [bioRxiv](#) and [medRxiv](#) authors say they have done this<sup>1</sup>.

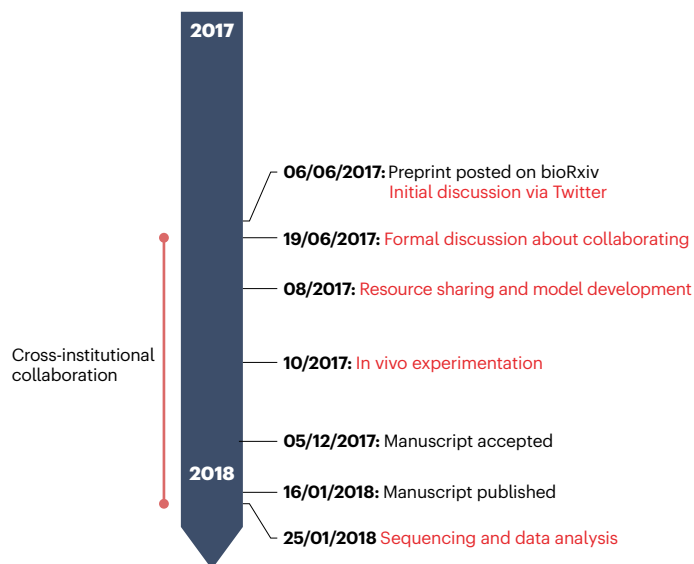
The ability to include preprints in job applications is especially beneficial for ECRs, for whom the timeline of journal publication may be incompatible with a relatively short-term fellowship. Consequently, there are many instances in which individuals have obtained a faculty position before formal publication of the work they performed as a postdoctoral fellow. Numerous universities now indicate that they will consider preprints when evaluating faculty and tenure candidates. The Francis Crick Institute in the UK, for example, will “accept preprints as citations in employment applications and group leader reviews”<sup>2</sup>. Similarly, New York University (NYU) Langone guidelines state that “evidence of outstanding achievement” includes preprints<sup>3</sup>.

Finding and securing a job can be a long and arduous process, particularly for ECRs, whose comparatively limited networks often put them at a disadvantage. The universal accessibility of preprints can connect researchers to new colleagues in their field and expands networking opportunities beyond in-person events, which are less accessible to researchers who have limited travel budgets or are subject to visa restrictions. [bioRxiv](#) and [medRxiv](#) therefore open up the global job market, generating a more diverse applicant pool, which benefits both job candidates and the hiring organization.

Additionally, preprints offer advantages for potential employers. They provide details of candidates' most recent research, rather than work they likely performed several years earlier. Meanwhile, sharing of preprints by the hiring lab may help to attract applicants whose expertise is aligned with the lab's current research and not older work described in more dated journal publications. Many institutions rely on journal name as a quality proxy when assessing a candidate's publication record; however, since the journal version can take a year or more to appear, a nimble employer may get in early by approaching preprint authors. Given that preprint servers do not select for article quality and do not have impact factors, preprints could be seen as *primatur* free, meaning readers cannot use the venue in which it appears to infer the quality of the article prior to reading it. This has the potential to reduce dependencies on journal title as a quality proxy.

As in the case of job applications, the control over the timing of dissemination of research that preprints afford is highly advantageous to researchers applying for grants, as numerous funders now accept preprints as evidence of recent productivity. The Human Frontier Science Program and European Molecular Biology Organization (EMBO) postdoctoral fellowships are just two examples among many. Indeed, the ability to cite a preprint in a grant proposal is one of the top five reasons why [bioRxiv](#) and [medRxiv](#) authors post preprints, such that nearly half of surveyed authors say this is a reason for posting<sup>1</sup>.

It is important to emphasize that preprints do not just help ECRs but also provide crucial early evidence of research productivity for scientists being assessed later in their careers. The Howard Hughes Medical Institute (HHMI, USA) provides a good example: those looking to apply for or renew HHMI investigator status (a formal appointment independent of one's primary employment) must highlight their five most important recent papers when being assessed and these can include preprints<sup>4</sup>. Several HHMI investigators have confirmed they have included [bioRxiv](#) preprints among the papers they put forward,



**Fig. 1 | A preprint provides a head start in cancer research.** The figure shows the timeline of a study on melanoma in which a new assistant professor was able to launch a collaboration after seeing work done by another group<sup>11</sup>. Since the work was posted as a preprint, it was discoverable 7 months early and stimulated a collaboration that was already generating data<sup>12</sup> by the time the preprint was formally published<sup>13</sup>. The figure shows events around the manuscript, and research inspired by the manuscript (in red). Figure courtesy of Mike Feigin.

and in at least one case their renewal was critically dependent on these as the work could not have appeared in a journal in time for their assessment (A. Dillin, personal communication). The National Institutes of Health (NIH) in the USA allows preprints to be cited in grant applications, proposals and reports, and has emphasized to grant reviewers that these should be taken into account in evaluations<sup>5</sup>. Other national and transnational bodies have issued similar guidance, including UK Research and Innovation (UKRI)<sup>6</sup> and the European Research Council (ERC)<sup>7</sup>.

**“preprints are particularly well suited to support time-sensitive job or grant applications”**

Preprints are also enabling new forms of academic output to develop. The decoupling of dissemination from peer review has stimulated the emergence of alternative forms of peer review that can allow scientists to volunteer to participate in the process (particularly students, postdoctoral fellows and academics outside the USA and Europe who may not be invited to review as frequently as they would like). These take the form of community-driven preprint-review

platforms and services (for example, [PCI](#), [PREreview](#) and [preLights](#)) and institutional journal clubs that publish peer reviews. Importantly, these preprint review initiatives have the potential to help the >90% of scientific trainees who opt not to pursue a career in academia<sup>8</sup>; not only do preprints put them in control of the timing of research dissemination when pursuing job applications outside academia, but these new forms of peer review allow them to create other outputs that showcase their skills and productivity<sup>9</sup>.

Preprints therefore have the potential to benefit both individual scientists and science itself. Rapid dissemination of new findings accelerates the scientific process, and the feedback authors receive by sharing early drafts with a wider audience can markedly improve papers. Their decoupling of dissemination of research from its evaluation also has the potential to enable new models that experiment with and improve peer review<sup>10</sup>, a process critical to the scientific endeavour. Broader adoption of preprints in the life sciences will allow us to realize these benefits, but this depends on reassuring scientists that they themselves will gain from sharing work early, rather than being penalized for doing so. Evidence that preprints are key tools for career advancement brings us a step closer to that goal.

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#### Competing interests

R.S. is co-founder of the preprint servers bioRxiv and medRxiv. S.H. is content manager for bioRxiv and medRxiv and a co-founder of PREreview.