



EDITORIAL

What are preprints?

Since 1991, preprints have increasingly been distributed over the Internet, as opposed to paper copies. Preprints date back to at least the early 1960s, when the National Institutes of Health (NIH) in the United States began circulating preprints in the biological sciences. After six years, journals stopped accepting submissions shared via these channels. Then, in 2017, the Medical Research Council and the Wellcome Trust began accepting citations of preprints in grant and fellowship applications [1, 2].

Subsequently, various initiatives were introduced. As of January 2017, NIH, the Medical Research Council, the Wellcome Trust, and other biomedical research agencies encouraged launching a central site for life-sciences preprints [3, 4]. This initiative was followed the same year by SciELO announcing plans to set up a preprints server – SciELO Preprints. [5] In March 2017, NIH issued a new policy promoting research preprint submissions [6, 7]. In April 2017, the Center for Open Science announced the launching of six new preprint archives [8]. At the end of that decade, libraries and discovery tools increasingly integrated Unpaywall data, indexing millions of preprints and other green open-access sources and serving over half of the requests by users without subscriptions [9].

In academic publishing, a preprint is a version of a scientific manuscript prior to formal processes of peer reviewing and publication in a scientific journal. The preprint is presented by the author in a preprint server, occasionally as an advanced or incomplete version but mostly as a final version of a future article. These servers are fully compatible with academic journals; moreover, several scientific communities and journals (commercial and open-access ones) incorporate in their editorial policies the use of preprint servers by the author [10].

Publishing preprints can have some advantages such as immediate open access, public dissemination of recent and invisible work such as doctoral dissertations and scholarships, contribution to the free flow of information, more possibilities of early feedback and comments, early credit, promotion of young researchers, increasing the number of citations, precedent of a date of publication of the results to establish priorities, probabilities of academic collaborations, probability of reducing predatory publishing, transparency, may announce negative outcomes and controversies, may provide a DOI, link to ORCID, plagiarism check, may offer grants and awards, good place for hypothesis, and early detection of science misconduct.[5] Publishing preprints also allows authors

to increase the list of publications, optimizing their CV to show experience, evidencing that the author has carried out research and is submitting it for evaluation by an academic community. Additionally, preprints give more visibility because they are free and available to a broader audience than a formal article, which often requires paying for access. On the other hand, preprints can be shared with anyone, including social networks [11].

On the contrary, disadvantages include lack of peer-review, concerns about premature data, media coverage not addressing accurately preprints, risk of double citation, citation dilution, lack of ethical guidelines, deficiency in quality assurance (an issue under discussion), lack of respect for COPE or ICMJE guidelines, breach of intellectual property regulations in some countries, possible harm to health, information overload, violation of Ingelfinger rule (disseminating only new, novel initiatives), poor quality articles [12].

Steps to publish a preprint [11]:

- *Identify the preprint server and target audience:* Before making a decision about publishing to preprint servers, it is essential to check your target journal's manuscript area. It is also important that preprint servers are indexed by major search engines like Google Scholar so that they can be found easily.
- *Write compelling abstracts and titles:* These are essential to showcase a research contribution and attract more readers.
- *Check the policies of preprint servers and journals:* to publish a paper on a preprint platform, after registration and upon submitting the paper, it undergoes a moderation process that includes verification of basic scientific content, and compliance with ethical standards. If the article is going to be formally published, the peer-reviewed journal's policies regarding preprints need to be reviewed. For example, IOP Publishing supports previously published articles as preprints, but not if they were made under a Creative Commons license.
- *Verify that co-authors agree to publish the preprint:* a preprint that has not been approved by all authors may result in immediate rejection in the selected repository.
- *Link your preprint to the published journal article:* Once the preprint is published, promote it on your social networks, including academic networks. If the

preprint server does not link the preprint to your final article, link to it yourself so the scientific community knows there is a final version after the peer review process.

There are several preprint servers including: Cornell University's arXiv.org is a server for the areas of physics, mathematics, statistics, and computing; the ASAPbio initiative led by scientists in the field of biology; bioRxiv directed by Cold Spring Harbor Laboratory hosts works also in this area (biology); ChemRxiv offered by Cambridge Open Engage is a chemistry repository; engrXiv operated by Open Engineering Inc.; MedRxiv contains health science articles; Scielo preprints; Figshare backed by Digital Science a subsidiary of SpringerNature; Authorea is a server of articles, data, figures and preprints maintained by the publisher John Wiley & Sons; preprints.org; F1000Research; PeerJPreprints published by a company of the same name co-founded by Jason Hoyt, CEO (formerly at Mendeley), and Peter Binfield, editor (formerly at PLOS One) [13, 14]; PsyArXiv maintained by The Society for the Improvement of Psychological Science [15]; Research Square; SocArXiv hosts engineering and social science preprints, is part of the University of Maryland [16] and SSRN (Social Science Research Network). All these preprints are indexed in detail by Google Scholar, allowing immediate visibility by the research community. The Open Science Framework website also indexes all major preprint servers.

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