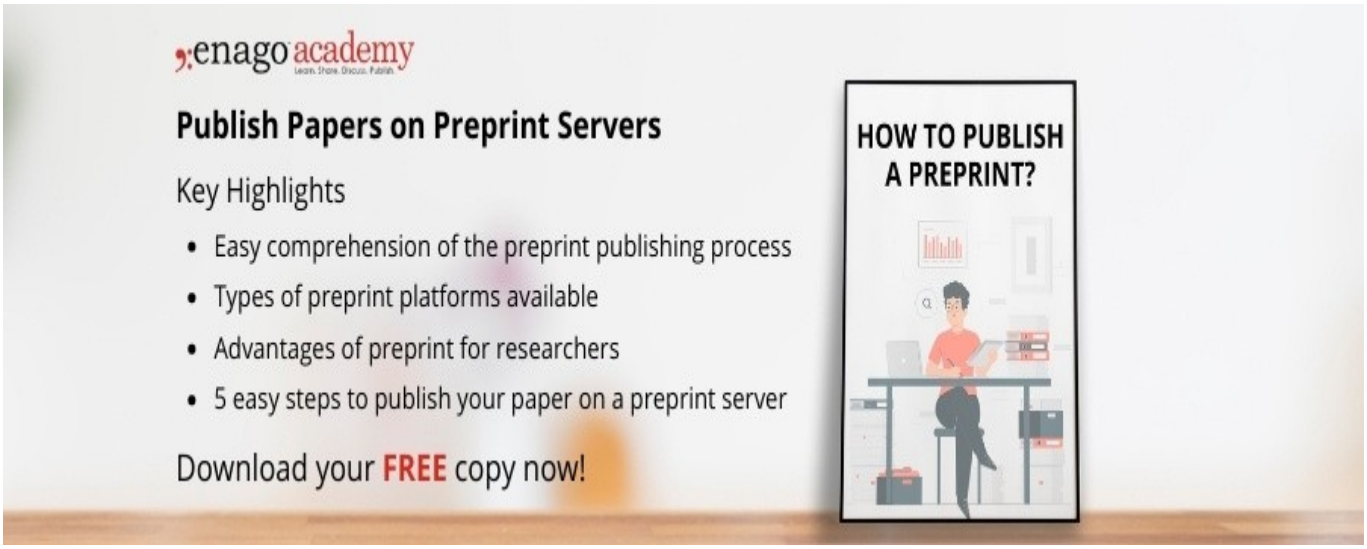
Description

Multiple platforms have appeared over the past decade for the online deposition of pre-publication scientific articles. Will they durably change the traditional academic publishing panorama?

Pre-prints and the Diffusion of Scientific Results

ArXiv, the online depository for pre-publication articles in mathematics, physics, and economy, was launched in 1991, and now has over one million articles. Researchers in Life Sciences and the medical field are in general more reluctant to using online repositories. Indeed, one key feature of biological results is reproducibility; and the authenticity of research results and protocols is often only guaranteed after peer-reviewing.



In a bid to attract more researchers from biology and medicine into pre-publishing, bioRxiv was launched by the Cold Spring Harbor Laboratory in 2013. It enables researchers to post pre-publication, non-journal-formatted manuscripts, to which the scientific community has free access. From one hundred publications posted in 2013, the site lists over 4700 published in 2016. This way of publishing is thus becoming more common among the life sciences community, having even motivated a congress dedicated to this movement. Other websites proposing the upload of life science articles at no cost or at a low cost are PeerJ Preprint, and the 'quantitive biology' section of arXiv.

Pre-published papers, or pre-prints, have two major differences with traditional articles, which make their publication quicker. First, manuscripts do not have to follow strict guidelines for formatting text, images, and references, which is a time-consuming burden for researchers. Second, manuscripts do not undergo peer-review, a long, and sometimes opposed as biased, process. This thus enables a quicker dissemination of a scientific result between its occurrence on the bench or computer and its accessibility to the scientific community.

In the case of sensitive subjects, such as epidemics or food-poisoning, a facilitated diffusion of scientific results might prove very useful, not only to the research community but to the global

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population. This was the case with the recent outburst of the Zika virus, with a plea by multiple publishers to openly share articles and data on this topic. Still, not all scientific results require quick diffusion. In many instances, a careful, thorough verification of results, followed by a second one by reviewers, is relevant for the establishment of robust and durable scientific results.

Open Access and Peer-reviewing

BioRxiv and the likes are not a publishing system parallel to traditional journals. Preprints can indeed have a second life and be published in a traditional, peer-reviewed journal at a later stage. Often times, comments by readers can help improve the research work between its pre-print state and its actual submission to a journal. The main hindrance biologists initially resented with the use of arXiv, was the prevention of a subsequent submission to a peer-reviewed journal, with a quantified impact-factor. With post-pre-print submission now possible for most journals, this problem is now solved.

Readers of preprints can add their comments on a manuscript, which will be viewable by all, not only by the authors. This is a major difference to peer reviews, which generally remain hidden to all but the authors and editor of a study. Comments offer an opportunity to enrich a scientific debate. A multiplicity of comments could be a good substitute to peer-reviews: instead of being revised by only a few peers, comments by many readers within a given field would often represent a more robust evaluation of a study. Websites where their use is made easy could hence quickly reach numbers of comments sufficient to have an evaluation of a study which would be as robust, or more, than peer reviews.

Evolution of Pre-print Publishing

With pressure continuously increasing on researchers to gather funding for their research, opportunities to reduce costs on other budgets are welcome. With publication costs around $ 1500 for most journals, preprints may prove a relieving alternative. However, the absence of peer review or any filter to submission might be a problem, since the pressure to publish may push many to cheat in published pre-prints. In order to prevent publication of biased or false experiments being able to have long-term negative consequences in a field, a way has to be considered. The use of comments, e.g. marking an article as “dubious” or “to be confirmed” until a threshold number of positive comments by diverse peers has been reached, could be a possible solution.

One further change that has to be considered for pre-prints to spread is to alter the impact of journals on researchers’ careers, as some state. Nowadays, the value of a journal one has published in is one of the first criterions for deciding the worth of a researcher. Another is the number of citations gathered. The former criterion is an impediment to the more generalized use of pre-prints only and maintains the existence of traditional publishing. As for the latter, it is not compatible with an open access, arXiv-like publishing. Accepting pre-prints as additional value in a grant application would also favor that pre-print publications be more spread out. This step has already been taken, in the U.K., by some important funding agencies.

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One possible problem that would also arise with the generalization in the use of pre-prints is whether they should all be published under the same organization, such as the NIH or the National Library of Medicine, or co-exist on different web platforms. This second option could result in the same limitations as the journal-based publication system, with the “value” of an article corresponding to the website it is published on instead of its quality assessment by its readership.

Category

1. Publishing Research
2. Selecting Journals

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