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bioRxiv: a progress report

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bioRxiv (biorxiv.org) is a not-for-profit, online archiving and distribution service for preprints¹ of research papers in the life sciences. It was launched in November 2013 by Cold Spring Harbor Laboratory, a research and educational institution, and receives financial support from the Laboratory and The Lourie Foundation. Scientists have shared their work and ideas through the Laboratory's meetings, courses, and publications for more than eighty years. bioRxiv extends that mission for the digital age by enabling scientists to make findings immediately available to the research community worldwide and receive feedback on draft manuscripts before submitting them to journals. There is no charge to post or read papers on bioRxiv.

Authors submit to the service after a simple registration on the site. Manuscripts must be unpublished in a journal. When posting a paper, authors designate their results as new, confirmatory, or contradictory and assign the paper to one of 26 subject categories. Authors retain copyright and choose from several distribution/reuse options. After submission, papers are screened for offensive or unscientific content but not edited, peer reviewed, or typeset. They typically post on the bioRxiv site within hours of submission. New versions can be posted at any time up to journal publication and/or assignment of a journal DOI.

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Related papers on bioRxiv can be grouped as Companion Papers or in Channels. These features alert readers to the existence of related papers within the service. Companion Papers are an unnamed, finite group that authors submit to bioRxiv in a coordinated way. A Channel contains a growing, named,

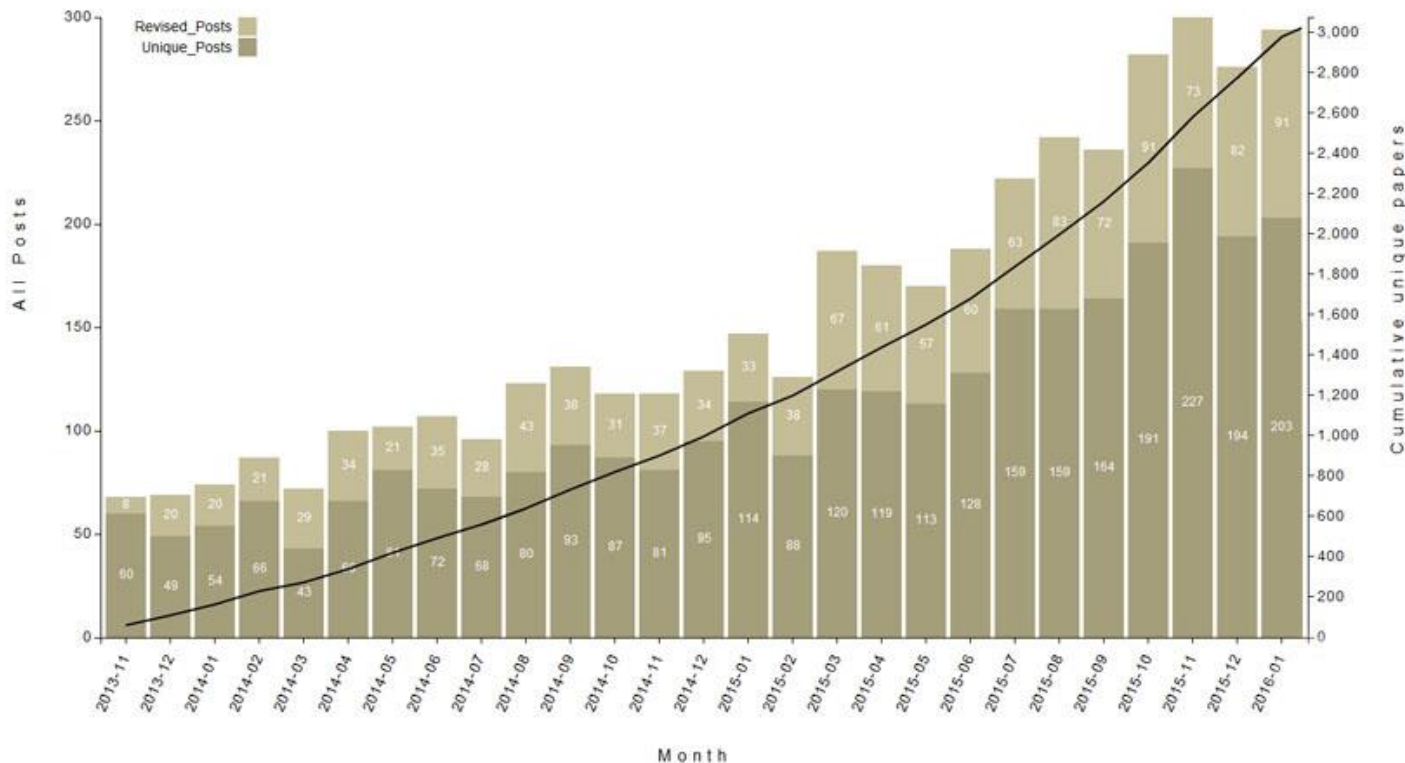
¹ The term "preprint" is anomalous in this era of digital publication but is widely understood to mean "an unpublished draft of a research paper" so is used here for convenience.

curated collection of related, topic-specific papers that their authors agree should be linked together after posting. The curator must be an author of one of the papers.

Journals may enable authors to post their paper on bioRxiv at the same time as they submit it to the journal. In a recent pilot project, soon to be expanded, authors of manuscripts posted to bioRxiv can submit their papers directly to participating research journals (currently 8), avoiding the need for reloading files and re-entering information at the journal’s submission system.

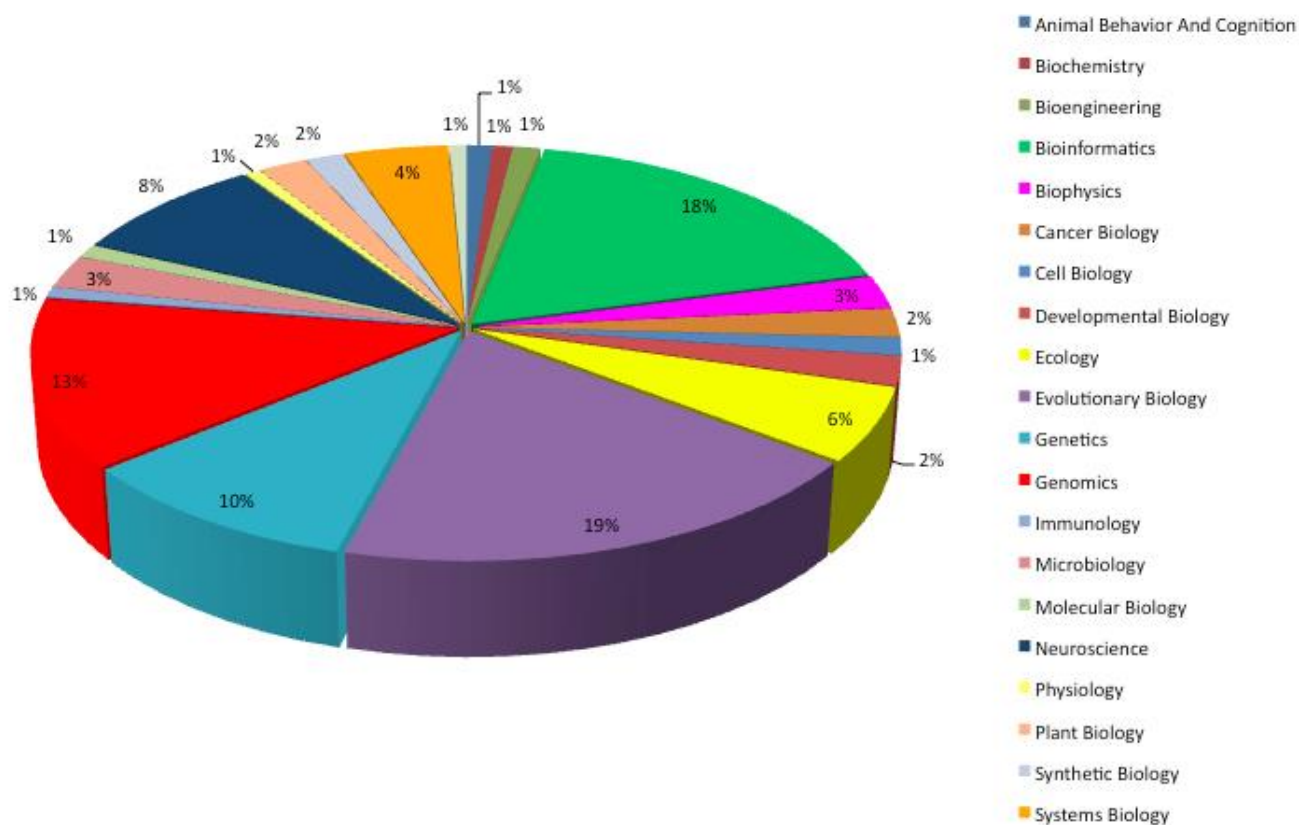
Since bioRxiv began, 3100 papers have been received from more than 1500 institutions in 40 countries. The most prolific have been Stanford, Harvard, Cambridge, U. Washington, Cornell, Oxford, Cold Spring Harbor, and Berkeley. The monthly submission rate has steadily increased since launch and doubled between May and December 2015 (Fig. 1).

Fig. 1: Submissions to bioRxiv by month



There have been submissions in every subject category (Fig. 2) with evolutionary biology, bioinformatics, and genomics attracting the largest proportions of the total.

Fig. 2: Submissions to bioRxiv by subject category



More than 90% of papers are designated as New Results. Thirty percent of all papers have been revised at least once and the submission rate for revised manuscripts is rising.

Usage of the site is growing rapidly and in December 2015, both abstract views and PDF downloads reached their highest monthly totals so far.

Authors of bioRxiv preprints receive feedback via social media and on-site commenting. More than 20,000 tweets mentioned bioRxiv in 2015. Comments on the bioRxiv site are moderated and 10% of all bioRxiv papers have associated public comments. The frequency of commenting rose in 2015 and the technology involved will soon be enhanced. bioRxiv has partnered with The Hypothes.is Annotation

Project to explore new ways of encouraging feedback from readers. Anecdotally, authors report receiving much direct, private commentary through email.

The interval between a manuscript's appearance on bioRxiv and its publication in a journal may exceed 400 days. The median interval is 134 days. Authors choose to post preprints at a variety of times in the publication cycle of a manuscript, ranging from first draft to simultaneous submission of a completed paper at bioRxiv and a journal. bioRxiv declines papers that have been published or already assigned a journal DOI.

bioRxiv preprints have been published in more than 200 journals that vary widely in scope, specialty, prominence, publication model, and for-profit/non-profit status. Although 30% of all papers currently in bioRxiv have been published, at any one time many are still in journal review, so the overall percentage proportion of preprints that are eventually published is much higher. One year after posting, it exceeds 50%. In the past two years, many journals have changed or clarified their policies and will now consider for publication manuscripts that have been posted to bioRxiv. Some even solicit paper submission from preprint authors.

bioRxiv was launched to de-couple the dissemination of research results from the certification provided by peer review at a journal. The service is intended to accelerate the progress of science by allowing community members to make their own evaluation of work in their field before formal peer review. Since launch, bioRxiv has received much valued support from many stakeholders, including authors, journals, scientific societies, and readers.

bioRxiv has made a promising start. Its immediate goals are an increased rate of manuscript submission from the full range of biomedical disciplines, improvement in the delivery and extent of feedback to authors on their work, the further development of Channels, and deeper integration of the service within the ecosystem of scientific communication.

Acknowledgments

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