

## Peer Review and bioRxiv

The *Biophysical Journal* is committed to rigorous and fair peer review. Peer review serves our authors by helping them improve their research and how it is presented. Peer review serves our scientific community by assuring that the papers published in the *Biophysical Journal* have been carefully evaluated for both technical validity and scientific significance. Finally, prepublication peer review serves the general societal good by helping guard against bad science, which could lead to poor or even dangerous public policy. Indeed, in this age of rapid dissemination of both facts and fiction, publishing bad science actually provides cover to the enemies of rational science-based decision making (e.g., the politicization of climate change or the myth of an association between childhood vaccination and autism).

But why am I writing an editorial about an idea that should be so self-evident and has been a bedrock of the scientific enterprise for 200 years? Unfortunately, the value of prepublication peer review has been questioned recently in very provocative blogs, tweets, and editorials, often by prominent scientists. The primary argument against peer review is that it may delay the dissemination of important science and that it can be capricious. But the attack is also often promoted by publishers of an expanding list of new journals advocating “postpublication peer review.” These are driven to publish as many papers as possible, because their business models rely on a high number of contributing authors and/or a large volume of published articles.

I am proud of *Biophysical Journal*'s fair and thorough review process, which is overseen by an outstanding Editorial Board composed of working scientists rather than professional editors. We also pride ourselves on the speed of our review process. Of course, peer review is not perfect. We simply cannot guarantee that every single decision will be completely fair and quick. But it is the best system we have to assure that published science is valid, replicable, and important. It is also the best system to deter political agenda-driven or snake oil “science.”

But is there more that the biophysics community and *Biophysical Journal* can do to promote the rapid and free exchange of ideas prior to peer review? We can certainly learn from the successful track record of the arXiv (<https://arxiv.org/>)

preprint server, which has established itself over the last 25 years as a valued medium for the dissemination of ideas and results in the physics community. Indeed, *Biophysical Journal* has long had the policy of accepting submission of papers that had been previously deposited in arXiv. Recently, we enhanced the *Biophysical Journal* submission site so authors of articles posted on arXiv may enter their article ID number to autopopulate their submission to *Biophysical Journal* with the appropriate metadata for that paper. However, not all papers produced by the biophysics community are appropriate for arXiv, and even those that are deposited there may not be noticed by scientists who are more focused on biology.

For these reasons, we have welcomed the new bioRxiv (<http://biorxiv.org/>) repository established by Cold Spring Harbor Laboratory (CSHL). Indeed, in January of this year, *Biophysical Journal* was among the first pilot group of six journals that enabled direct submission of papers from the bioRxiv website. After depositing your paper on bioRxiv, you may click a button to automatically submit the paper to *Biophysical Journal*. CSHL is, of course, a venerable not-for-profit research institute. They have offered bioRxiv as a free service to the life sciences research community.

Deposition of manuscripts in bioRxiv (or arXiv) eliminates the concern that the peer review process can be long and capricious; research is available to the world within a day of submission for all to study, praise, or criticize. In fact, deposition on preprint servers has the collateral benefit of providing immediate and permanent open access to research results. There are some scientists who might worry that their ideas will be stolen if circulated prematurely in this manner. But the long track record of arXiv demonstrates this is not generally a concern; indeed, I see no reason why the date of preprint submission shouldn't serve as evidence of priority after a paper is ultimately published in a peer-reviewed journal. For these reasons, I intend to deposit papers from my own lab in bioRxiv and have recently completed my first pleasant experience doing so.

But, at the same time, the value of blind peer review should not be compromised. I believe that only peer-reviewed work should be considered in personnel decisions and grant reviews. Any relaxation of this standard would lead to chaos. Also, bioRxiv will need to carefully consider

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the societal impact of papers they expose to the public. The potential for danger in this regard will be stronger for bioRxiv than it has been for arXiv. As an extreme example, drug trials should simply never be published without rigorous peer review. But there may also be more subtle problems. A study claiming a link between cell phone use and brain cancer (<http://biorxiv.org/content/early/2016/06/23/055699>) appeared recently in bioRxiv and was widely reported in the lay press and social media, despite clear shortcomings. Thankfully, some experienced science writers recognized that the work was not peer reviewed and that it followed on a long history of previously debunked claims of this sort. So, after the initial flurry, there was a quick series of articles and blogs critical of the study (e.g., the thoughtful piece by Aaron E. Carroll in the New York Times: “Why It’s Not Time to Panic About Cellphones and Cancer”; <http://www.nytimes.com/2016/06/02/upshot/>

[why-its-not-time-to-panic-about-cellphones-and-cancer.html?smid=tw-share&\\_r=1](http://www.nytimes.com/2016/06/02/upshot/why-its-not-time-to-panic-about-cellphones-and-cancer.html?smid=tw-share&_r=1)). On the one hand, it is reassuring that the lay press ultimately got this story right. But it also raises questions. How many people were influenced by the initial news of this study, never seeing any of the later skeptical articles? How would a preprint with similar sensational public health implications, but without the history of previous bad science, be reported by the mainstream media? I urge the publishers and Advisory Board of bioRxiv at CSHL to consider these issues and develop policies to deal with them. I also applaud them for undertaking this bold and noble initiative to serve the life science research community.

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