



Voices of the new generation: open science is good for science (and for you)

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In the race to publish papers and secure funding, science can sometimes seem like a competition. But, in reality, modern science relies on open sharing and collaboration. One unexpected aspect of open science is the role it has played in uplifting the careers of myself and my lab members.

Only a few years ago, posting a preprint of a manuscript was rare in biomedical science (although not in other fields). Since the introduction of *bioRxiv* in 2013, this has rapidly changed. In the same way that a constructive paper review can spur new ideas and strengthen the work, preprints enable authors to quickly get feedback from a much larger community than just a handful of selected reviewers. And, as we have seen during the COVID-19 pandemic, preprints empower scientists to get their work out quickly and share new findings without delay. For example, our lab's preprint on a more infectious SARS-CoV-2 variant was available on *bioRxiv* eight months before its journal publication. Preprints are also an effective tool for coping with the delays of the publication process, which can be especially difficult for those early in their careers. Preprints provide a citable and easily shareable reference for grant and job applications.

Another key tenet of open science is data reproducibility and re-use. For example, in molecular and cell biology, Addgene has made it straightforward to deposit and distribute DNA constructs, transforming a previously laborious process for plasmid requests into just a few clicks (and with the added benefit of professional quality control). I was surprised by the power of this resource sharing during my postdoc. In 2014, I managed to improve the titer of a lentiviral CRISPR plasmid and deposited the improved plasmid to Addgene, thinking it would be useful to perhaps a few other labs. Little did I know that in 2015 it would become the single most requested plasmid in the entire [collection!](#) The wide use of this plasmid also aided my faculty job search: on more than one interview, I was queried about the use of this plasmid by the faculty host for their specific research.

Open science also provides a foundation for communicating science, establishing connections and obtaining

support. In the age of Twitter and online communication, I find that my colleagues all over the world share exciting discoveries in a rapid way that is simply not possible with traditional, yearly conferences. Also, for new graduate students or those without the means or time to attend a conference, social media makes it easy to see a field through the eyes of different experts. Beyond sharing new work, Twitter and online communities such as New PI Slack let scientists at all stages realize that they are not alone and that many struggles that we face as scientists are universal. This global support network has been a wonderful, unexpected benefit of engaging in online science discussion. Local colleagues at our institution are still important of course but social media can expand our science networks and add a global perspective. Many new colleagues I have met only through Twitter and may have never met otherwise.

At its core, I have come to believe that open science isn't any one action or practice but more of a philosophy: it reflects an openness to trying new ways to communicate with our fellow scientists and make research accessible. In 1942, Robert Merton, in his essay 'Science and Technology in a Democratic Order', laid out four core norms for good scientific research. One of these norms, communalism, dictates that scientists should publicly share their discoveries. We may sometimes fall short of this ideal but, if my experiences are any indication, both individual scientists and research in general are better when science is open.

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Competing interests

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Credit: Judy Quinn, New York Genome Center

“open science isn't any one action or practice”

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