



A call for disruptive innovation in science publishing with a new open data-sharing platform for the life sciences

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“A disruptive innovation is an innovation that helps create a new market and value network, and eventually goes on to disrupt an existing market and value network (over a few years or decades), displacing an earlier technology. The term is used in business and technology literature to describe innovations that improve a product or service in ways that the market does not expect.” -Wikipedia

On April 3rd, 2012 Nature Precedings, Nature Publishing Group’s experiment in free pre-print publishing was shut down and no longer accepts submissions. According to the Nature Precedings website it was created in 2007 as “a place for researchers to share documents, including presentations, posters, white papers, technical papers, supplementary findings, and non-peer-reviewed manuscripts.” It was designed to “provide a rapid means for scientists to share preliminary findings, disseminate emerging results, solicit community feedback, and claim priority over discoveries.”

Table 1

Benefits of An Ideal Open Data-Share Platform

1. Negative data can be reported and shared
2. Preliminary data reporting can foster collaborations
3. Demonstration of feasibility and preliminary data for grant applications with shrinking page limits
4. Students can publish their findings on small projects that enable them to establish themselves in scientific research
5. Novel findings can be established in a permanent and citable digital record
6. Findings from unfunded pilot projects can be reported
7. Free general public access to scientific findings
8. Copyright is retained by the creator of the work, the researcher, not the publisher
9. Fast (days) compared to the established peer review model (months)
10. Venue for early crowd-funding of small project

It was designed in a way to “make such material easy to archive, share and cite.” Now that Nature Precedings is no more, a new disruptive open data-sharing platform (ODSP) for the life sciences is needed. Based, in part, by the model Nature Precedings established. Here I propose 5 qualities of an ideal ODSP and outline 10 benefits (see **Table 1**) to scientists for embracing such a potentially disruptive model.

1) *Quality control:*

One important element of an ODSP is quality control and one sure way to jeopardize a new platform is to allow low quality submissions. Nature Precedings had in place two quality control mechanisms: 1. Only qualified and credentialed scientists with a demonstrated peer reviewed track record were allowed to submit files; 2. A curation team to determine if the submitted file had genuine scientific content reviewed submissions. During the 5 years Nature Precedings was in operation about 3400 total files were posted and assigned digital object identifiers (DOI), including slide presentations, posters and manuscripts. Of those, around 2250, or about 2/3rd were stand-alone manuscripts and the rest were slide presentations and posters. Given that slides presentations and posters are intended for a live audience and rely on interaction with the author to fully understand the findings it is unlikely that these types of files can have a meaningful impact as stand-alone permanent digital archives. Furthermore, curating these low-quality submissions is not cost-effective. An ideal ODSP should be dedicated to scientific findings in the form of stand-alone articles that are worthy of a permanent digital record that carry with it copyright and intellectual property claims. Some type of curatorial screening is beneficial and articles should be submitted and endorsed by legitimate and credentialed scientists with a track record of peer reviewed publishing.

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2) User-Friendly:

In order for a new ODSP to disrupt the current established model of science publishing and be successful it should be easy to use and convenient. In the traditional scientific publishing model each journal has its own detailed formatting requirements and if the manuscript is actually sent out for review it can take months to a year for the article complete peer review resulting in publication. On Nature Precedings, submissions took less than 10 minutes to upload and were usually posted in less than one day after submission. An ideal ODSP should allow minimal formatting requirements and should be posted quickly to establish precedent with a permanent DOI. From the busy science community's perspective articles should be succinct with standard professional formatting. At www.neuro-cloud.net we have had success with a 1000 words and two figure limit for preliminary findings.

3) Low cost:

The established science publishing groups charge between \$1000-\$3000 per article. An ideal ODSP should be available online free of charge to allow researchers to spend their grant or institutional funds on the research itself. Cloud server hosting of content is negligible today and lower costs means more scientific findings can be published, including valuable negative findings that can save researchers wasted time. To offset costs users can elect to allow advertising with their article or pay a fee to be advertising free.

4) Permanent and Citable:

To have an impact scientific findings must have a permanent DOI and establish a searchable archive that is citable. Researchers who make a new discovery should be allowed to upload their findings in a ODSP that establishes precedent and is citable by other scientists acknowledging their discovery. If a finding cannot be replicated then that should be part of the archive and citable as well.

5) Social and Search Engine Optimized:

Given the recent popularity of social networking, the science community should be able to share interesting articles within their network. This practice not only serves as an interesting metric to judge the social impact of ones findings, but it also exposes non scientists to potentially interesting findings, which has the benefit of educating the public at large on what scientists actually study. Search engine optimization (SEO) allows new scientific findings to appear in search results in search engines, like Google, which increases impact and exposure over the traditional science publication database PubMed.

The Future and Benefits of ODSP in Scientific Publishing

Given the profitability of scientific publishing it is unlikely that the pillars of the scientific publishing establishment will create the ideal free ODSP that would disrupt their model. For example, in 2010, Elsevier reported a profit margin of 36% on revenues of \$3.2 billion. This was the 5th year in a row that profit margins increased despite the fact that government funding for science decreased or did not increase during this period. Nature Precedings had many qualities of an ideal life sciences ODSP, but unfortunately it was shut-down with no plans for a replacement for the life sciences community. Recently a few sites like, www.f1000research.com, www.figshare.com, www.arxiv.org have emerged as possible sites that could replace Nature Precedings. F1000 research is set to launch in the summer of 2012 and touts itself as the successor to Nature Precedings. Here is an excerpt from its website. "F1000 Research is a new fully Open Access publishing program across biology and medicine, that will start publishing later this year. It is intended to address the major issues afflicting scientific publishing today: timely dissemination of research, peer review, and sharing of data. Diverging from traditional journal publishing, F1000 Research will offer immediate publication; open, post-publication peer review; open revisioning of work including ongoing updates; and encourage raw data deposition and publication. In addition, F1000 Research will accept a broad range of article formats and content types." Hopefully, this new model of scientific publishing will be successful and give researchers more control over their creative works, increase the open sharing of emerging scientific findings and foster collaborations.

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COLLABORATIONS

Donald C. Cooper and Andrew L. Varnell are the cofounders of www.neuro-cloud.net an ODSP for the neuroscience community designed to give researchers a venue for sharing emerging data and establishing collaborations. Anyone interested in participating or collaborating please visit www.neuro-cloud.net/ODSP/collaboration

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