

Given frustrations with academic structures, how can we build a more human-centered open science?

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Open science has finally hit the mainstream. [Alex Lancaster](#) looks at the emerging criticisms leveled against how we publish and disseminate science and argues it may be time to reframe the open science project. Rather than relying on instrumentalist language of “carrot-and-sticks” and “rewards-and-incentives” we should instead focus on the actual working conditions for scientists and the political economy in which they are embedded.



[Preprints](#). [Research Parasites](#). [Scientific Reproducibility](#). [Citizen science](#). Open science really hit the mainstream in 2016. So what is open science? For some it simply means more timely and regular releases of data sets, and publication in open-access journals. Others imagine a more radical transformation of science and scholarship and advocate “open-notebook” science with a continuous public record of scientific work and constant release of data. [Michael Nielsen](#), author of [Reinventing Discovery: The New Era of Networked Science](#) describes open science, less as a set of specific practices, but a process to amplify collective intelligence to solve scientific problems more easily:

To amplify collective intelligence, we should scale up collaborations, increasing the cognitive diversity and range of available expertise as much as possible. This broadens the range of problems that can be easily solved ... Ideally, the collaboration will achieve designed serendipity, so that a problem that seems hard to the person posing it finds its way to a person with just the right microexpertise to easily solve it.

Although attempts to reform the way we do publish and disseminate science have been underway for decades (arXiv in the 1990s) to open access publishing (early 2000s), this year open science really hit the radar, unleashing a torrent of opinion. Criticism of open-science tends to fall into one of two camp: “conservative” and “radical” (this terminology is not intended to imply an association with any conventional political labels, they are simply used for convenience).

The conservative critique: What are all these damn people doing with my data?

The conservative response to the timely release of pre-publication data is best summarized by the phrase: “are you kidding me? why would I do that?” The apotheosis of this notion appeared in an [editorial](#) in the *New England Journal of Medicine* which described with some horror the “emergence of a new class of research parasites”. They further concluded that some of these parasites might not only use that data for their own publications, but might seek to examine whether the original study was correct. Many scientists took to Twitter to express their amazement that anybody would object to a re-examination of the data, since falsification is presumed to be the backbone of the scientific enterprise. Use of the hashtag #IAmAResearchParasite was trending for several days.

Given the current incentive system, however, this response is totally rational. In a model where labs or principal investigators are largely funded on “high-impact” papers and grants, there is intense pressure to keep the lid buttoned on data as long as possible, even if a collaborative process could, in principle, produce a better result.



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The second area where open-science approaches run into problems is the battle over preprints. Although well-established in physics (about [80% of pre-prints](#) end up in “traditional journals”), In biology, traditional publishers especially by “high-impact factor” journals published by conglomerates like Elsevier, have been fiercely resisted them ever since [e-Biomed](#) was proposed as a biology-version of arXiv in 1999. Mike Eisen, one of the pioneers of e-Biomed and PLOS has explicitly proposed that we should eventually just do away with journals and move to a complete [preprint + post-publication peer review system](#). Obviously a nightmare scenario if you’re the head of [multibillion dollar highly profitable publishing conglomerate](#) that benefits from the free labor of scientists (peer review has been [estimated to be worth ~£1.9 billion](#) per year).

Other aspects of the open science movement, including building tools for reproducibility, “rewarding” non-paper research products such as code, infrastructure and raw data itself promise to be equally important, but despite the progress made in the last 6 years, are activities that are still largely unrewarded by the current academic system. However, thinking about open-science solely in terms of economic incentive structures, may be a wrong, or at least incomplete, way to think about open-science, leading to...

The “radical” critique: Be careful what you wish for

Arguments for open-science made in response to these “conservative” critiques tend to assume that release of more data, code, papers is a pure good in and of itself, and mostly don’t directly challenge the political and institutional economy in which they are embedded. But [David Tyfield](#) in “[Transition to Science 2.0: “Remoralizing” the Economy of Science](#)” suggests that the release of vast troves of data, papers or research results, could simply exacerbate trends towards the increasing corporatization of science and will disproportionately benefit large corporations. Let’s consider the trends that concern Tyfield and other scholars:

1. Capturing of academic labor output by commercial interests

[Academia.edu](#) is now a familiar destination for scholars to share their work. Recently their editor program in which (unpaid) editors would be selected to recommend publications on Academia.edu was [roundly criticized](#) and led to the Twitter hashtag: #DeleteAcademiaEdu. In “[“Should This Be the Last Thing You Read on Academia.edu?”](#) [Gary Hall](#) compares Academia.edu’s business model to Uber:

...the majority of academics who are part of Academia.edu's social network are the product of the state-regulated, public higher education system, as is their research... But just as Airbnb and Uber are parasitic on the public 'infrastructure and the investment'..., so Academia.edu has a parasitical relationship to the public education system, in that these academics are labouring for it for free to help build its privately-owned for-profit platform by providing the aggregated input, data and attention value.

My sense is that those running Academia.edu and ResearchGate are in it for idealistic reasons, and don't see themselves as the next rapacious Uber-like company, but Hall's point is that the business model that they operate under may force them to become increasingly extractive.

2. The tyranny of metrics

The counter-argument to the conservative critique of open-science is that it brings more research outputs *into* that system, thus "incentivizing" their generation. [Eric Kansa](#), in "[It's the Neoliberalism, Stupid: Why instrumentalist arguments for Open Access, Open Data, and Open Science are not enough](#)" discusses the limitations of this kind of thinking:

Metrics, even better Alt-metrics, won't make researchers or research more creative and innovative. The crux of the problem centers [A Hunger Games-style](#) "winner take all" dynamic that pervades commerce and in the Academy. A rapidly shrinking minority has any hope of gaining job security or the time and resources needed for autonomous research... Metrics, while valuable, need to carry fewer professional consequences. In other words, researchers need freedom to experiment and fail and not make every last article, grant proposal, or tweet "count."

Kansa argues that metrics simply add more steps in the treadmill, because unless the fundamental model for hiring and funding changes, new open-science "outputs" won't *substitute* for papers and grants, they'll just be *added* to them.

3. Who benefits?

Tyfield goes further and suggests that the locus of progress is at the wrong level, and that open-science prioritizes "scientific progress" in the abstract, above improving the lot of the individual humans that comprise it:

Yet, as we have seen above, one needs only to ask the more humdrum question of "where are the jobs?" to see that the focus in such accounts is firmly at the system level of the global "data web" and the accelerated "progress" of "science" while totally neglecting that of the human individual and his/her place in such a society.

Phillip Mirowski is even more [blunt](#) in his assessment::

... the objective of each and every internet innovation in this area is rather to further impose neoliberal market-like organization upon the previously private idiosyncratic practices of the individual scientist....Open Science 2.0... is engineered to position a few large firms at the electronic portals of

This seems to me an excessively pessimistic view of open-science. Many of the most exciting initiatives in open science have been grassroots driven efforts, [especially the push towards preprints in biology](#). It's hard to see how preprints are more market-like than already exists in the rush towards submission in prestige journals. Nevertheless, Tyfield and Mirowski are right to point out the dangers of a pollyannaish view of the digitization of scientific practices. After all, a democratic, decentralized and open-source ethos was part of the founding principles of many of the now-dominant market players in the digital economy such as Google. It is not unreasonable to be concerned that similar dynamics could occur in the open science world. No doubt they will occur. But, that is different to saying that all open-science practices are being explicitly engineered towards the undesirable neoliberal outcomes.

Reframing the question

Many arguments made in support or in opposition to open-science are ultimately unsatisfying because they frame “success” as individual scientists adapting to existing and fixed institutional structures and norms. We should, instead, turn this question around and ask how do we use open science approaches in the context of retooling our institutions to benefit actual living and breathing humans (scientists and nonscientists)? How can we use open science to enable as many people who have the interest and talent to pursue science for its own sake? This reframing takes the conversation out of the instrumentalist language of “carrot-and-sticks”, “rewards-and-incentives”, since any such system [can be used to service questionable ends](#). It also means prioritizing open science approaches that benefit not only institutions or science *in the abstract* but help improve the lot of individual working scientists.

So what would this look like? If traditional measures of research “quality” (see “[Excellence R Us: University Research and the Fetishisation of Excellence](#)”) and abstract notions of “progress” are insufficient, how will we know if or when open science is driving us towards an inclusive and humane approach to science? A partial list of what this might look like would include: “permission-less” innovation (the complete end of paywalls); a more equitable distribution of power and resources (funding geared towards living wages for the many, rather than stability and rewards for an elite few); a rise in independent scholarship (independent scholars would contribute back to the commons, perhaps by releasing under GPL copyleft-style licenses); and an open science that is structured [to enable learning and not surveillance and gatekeeping](#). There is obviously much overlap with [traditional arguments for open-science](#), but the structural nature of the actual working conditions for scientists and the political economy in which they are embedded need to be kept firmly in focus.

How to get there?

So how can we begin to build a human-centered open-science? Here's a few places to start:

1. **Strengthen existing public institutions such as libraries to support open science.** This is an area where there is an increased role for the state to provide the core infrastructure for open science that is not subject to the vagaries of the market.
2. **Explore platform cooperativism and commons-based models for open science.** The decentralized architecture of the Internet and the libertarian promises of the so-called “sharing economy” have not magically created a nirvana where people [get paid or credited fairly for value created](#). As we develop open science platforms we should draw inspiration from the [platform cooperativism](#) movement in which users have ownership or governance of the platform so that the benefits of open science practices are spread across many individuals and ideally one that [resists the encroachment of cheaters](#).
3. **Push for larger-scale social and economic changes.** In the long-run perhaps larger changes will be required to underwrite these ideals of an inclusive open-science. One such change is the push towards a [universal basic income](#) (UBI): paying all citizens a fixed basic income regardless of circumstances. Sociologists such as [Guy Standing](#) argue that the rise of automation and the precarity of work (already a reality with the [postdoctoral scholar glut](#)) will eventually make something like a UBI a necessity, (the [exact form it takes, however, is critical](#)), In science, a UBI could enable the true benefits of open science approaches by decoupling job security from arbitrary notions of research “productivity”. Of course, much science requires more than a single faculty member’s paycheck but UBI could have the effect of reducing the pressures (real or imagined) to [artificially “grow” one’s lab to satisfy institutional demands](#).

The naysayers out there (whether from the “conservative” or “radical” camp) are likely to scoff at many, if not all, of these proposed changes and dismiss them as non-starters, or quibble with the exact details. The current funding climate certainly doesn’t favour changes, but that doesn’t mean that change isn’t possible. We can start now.

A longer version of this piece originally appeared on the Ronin Institute blog as “[Open Science and Its Discontents](#)” and is reposted with the author’s permission.

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