

## Issues in science publishing: what's hot and what's not?

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**Abstract:** Science is in crisis: a crisis of trust, and a crisis of values. Yet, this is an opportune moment for scientists to examine the issues that underly science to discover how they may be of use, beyond their laboratory or field experience, to improve the research and publishing landscapes to create an environment that suits their needs more. Traditionally, the science publishing landscape had been controlled by the science, technology and medicine publishers, who have always taunted their peer review systems as being fail-safe. Yet, considerable moss has been gathered by the post-publication peer review (PPPR) movement over the past few years, indicating that the voice of the average scientist now carries more weight, and more value, than ever before. Despite this, most scientists are unaware of their potential power of opinion. Especially when it comes to commenting on, and correcting, the already published literature. Commenting by name, or anonymously, is the new PPPR publishing reality. There needs to also be a concomitant movement away from artificial metrics, such as the impact factor, which serve only as ego-boosting parameters, and which distract the wider readership from the weaknesses of the traditional peer review system currently in place. Increasing cases of the abuse of peer review, such as the creation of fake identities, affiliations or e-mail addresses further highlights the need for scientists to be vigilant, without necessarily being vigilantes. The discovery, within a matter of years, that the literature is more corrupted than was previously thought, in some cases caused by clear cases of editorial cronyism, or abuse, has resulted in a need for scientists to exceed their functions as mere scientists to evolve into whistle-blowers. Some ethical guidelines are in place, such as those by COPE, yet what is being increasingly witnessed, is a discrepancy between preached values by select COPE member journals, and the literature that they have published. Authorship issues continue to be plagued by inconsistencies in the application and verification of the ICMJE's definitions. In a bid to expand their publishing options, open access has also reached a crisis with wave upon wave of

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predatory journals, leaving scientists in a quagmire. This paper serves two purposes: to raise red flags and to call for greater awareness and discussion of these issues.

**Keywords:** authorship, COPE, editorial oversight and responsibility, erratum, ethics, expression of concern, ICMJE, peer review, post-publication peer review, publishing issues

In my every day dealings with scientists, editors and publishers, and in my interaction in the blogosphere, by name or anonymously, I often encounter individuals who appear to be unaware of many critical issues that underlie the dynamics of science publishing, or its challenges and problems, despite their position and prominence in several fields of study. Drawing attention to some pressing issues currently affecting scientists is the sole purpose of this paper. Unfortunately, in my opinion, there is potentially still a large swathe of scientists who believe that their role in science is simply a passive one, namely of conducting research and of getting that research published, but without being pro-actively involved in aspects associated with the publishing process, without being sufficiently critical of the key players within the publishing process, or without being actively involved in the correction of the already published literature. The passive nature of the vast majority of scientists may be related to a fear of negative repercussions for speaking their opinions openly. This trend may be changing as more and more scientists take to blogs and social media not only to expand their avenues of more widely disseminating their research results and views (Costello 2015), but also to express their dissatisfaction. The passive role of a scientist within the publishing process should not be confused with a redundant or ghost/guest author, whose role in a scientific manuscript is negligible.

A scientist's choice of journal tends to center around the Thomson Reuters Journal Citation Reports (JCR) impact factor (IF), often (incorrectly) equating this metric with quality (The PLoS Medicine Editors 2006). This incorrect notion that the IF is associated with quality – very unfortunately cemented by a “ranking” system that relies almost exclusively on the IF – is fortified by the fact that increasing numbers of retractions are correlated with higher IF journals (Fang et al. 2011). That wide perception is not necessarily the fault of scientists but may in fact reside at the level of their institutes or even ministries of education who propose reward systems that require quantitative factors, like the IF, to validate their productivity. Yet, the issue of having one's work in open access (OA) format, which would facilitate wider dissemination and more citations, may be a more pertinent aspect to decide the journal of choice and could trump a decision based on the IF, although the selection of the OA format is not without its fair share of risks (Kamat 2015). The issues of abstracting and indexing are also important, as are the probability and speed of acceptance and cost of publication, and articles that can be easily searched on major scientific data-bases, or even on Google, tend to sway the choice of journal that scientists make, fortifying the notion that there is an increasing trend towards OA. However, recent reports have indicated that academic profiles on Google Scholar may be manipulated or distorted caused by the inclusion of fake citations (Beall 2014a; Ferguson 2014). Therefore, employers who hire scientific personnel, or peers who judge and value other peers, but who simply look at h-indexes, Altmetric values or other scores that rely on such metrics need to factor in these risks and need to evaluate profiles very carefully. The mind-set of scientists, and their institutes, thus needs to evolve away from such artificial metrics and needs to consider a more holistic approach (Fanelli 2015) and also a wider range of academically sound metrics to validate academic excellence or productivity (Teixeira da Silva 2013a).

This need to quantify productivity using artificial metrics, as well as a parallel movement of resistance against the dominance of the IF (DORA 2015), has led to the unprecedented emergence, in 2014, of *neo* or pseudo metrics (Beall 2015a), currently listed at 32, all with the ultimate aim of swaying the authorship in the direction of their member journals. In some cases, these metrics have the potential of being deceitful by feigning a valid JCR IF. Within a very short time span, a wide array of questionable metrics and equally questionable OA journals (numbering 693 publishers and 507 stand-alone journals to date; Beall 2015b) has emerged, commonly referred to as predatory open access journals, or POAJs. Within the POAJs, hijacked journals, currently listed as 59 (Beall 2015c) pose a different danger because their web-sites and content appear to be legitimate, but only because content has literally been lifted from the original, copied web-sites. The Beall lists and blog, however, have documented flaws (Oransky 2014). A recent analysis quantified the number of references in the entire journal fleet of Global Science Books that contained references of journals listed on the 2013 list of Beall's POAJs (Teixeira da Silva 2014a). One of the lessons of that small meta-analysis is the difficulty with which editor boards can control the choice of references that authors can include; for this reason, POAJs can now use legitimate journals to deposit their often flawed findings, as a cuckoo does its eggs in the nest of another unsuspecting bird. Dealing with the issue of the "gaming" of the IF or other metrics, as well as the risks of POAJs, would require a reorganization at the level of universities or ministries.

A curious note in a recent acknowledgement to reviewers by the world's leading horticultural journal, *Scientia Horticulturae*, published by Elsevier (*Scientia Horticulturae* 2015), reads "Peer review is the cornerstone of the scientific publishing process. Experts volunteer their time to provide scientific critiques of manuscripts submitted to our journal that assist the editors make informed decisions about which to accept. The increased pressure to publish in high-impact journals, the growing the demand to turn around articles in a timely manner and the emergence of many new journals have placed great strain on our valued pool of reviewers." This indicates a veiled concern that the world of science publishing is getting more cluttered, and that the communal peer pool is both getting more stressed and stretched more thinly as the pool of competing publishers – legitimate academic ones and POAJs – rival for the increasing pool of scientific papers. One of the more serious and unintended consequences of this strain placed on the peer pool, which is often not remunerated for its professional services, but should be (especially for peers conducting work for for-profit publishers; Meo 2014), is that the peer reviews themselves may become more lax, rushed, or less precise (Gernert 2008). When peer review becomes lax, the basic premise of traditional peer review, which is to ensure strict quality control, fails. When traditional peer review fails (Teixeira da Silva and Dobránszki 2015a), then post-publication peer review (PPPR) must step in to cover for the gaps caused by editorial oversight, or worse, editorial incompetence (Teixeira da Silva 2013b, 2014b).

The main function of PPPR is to correct the literature by adding critical or supportive comments (Kriegeskorte 2015). However, the discovery of errors in the literature can sometimes reveal more serious issues, some of which are breaches of publishing ethics, or of publishing protocols (Knoepfler 2015). In more obvious cases, this can lead to retractions, which are either called for by scientists, or which may be enforced by the editors and publishers. A spotlight on select 2012-2014 retractions in the plant sciences reveals several serious issues with the current publishing model across a wide array of publishers and journals, affecting prominent and lesser known scientists (Teixeira da Silva 2014c). Some of those issues include a lack of uniform standards that guides editors when faced with a claim from the scientific community, or when faced with ethical issues within papers. In some extreme cases, the editor board must be called out publicly, especially when they fail to

respect their own editorial responsibilities, resulting in, also in extreme cases, the resignation of entire editor boards (Beall 2014b; Tatalović 2014). The issue of whistle-blowing to raise awareness, or to call out issues that are evidently wrong, but that appear to be protected by the traditional publishing establishment, also brings into focus new challenges about how the core of science activists, who see errors in the literature, but who are unable to get these errors corrected, are able to interact with the authors or editors of the journals in question. Whistle-blowing, by nature, carries a negative connotation, but within the realm of PPPR, serves an extremely important function: to point out the flaws and errors of the literature (Yong et al. 2013), or to point out the flaws of the editors or journals. An issue which appears to be more wide-spread than is being reported – or is only now beginning to be exposed – is that of false or pseudo peer review and the abuse of online submission systems to fake peer review (Ferguson et al. 2014). Such actions by scientists, supported in part by weak systems in place by publishers that lend the system to abuse, all ultimately weaken the integrity of the literature that has been published because the following three key questions linger: i) has a paper really been peer reviewed and what proof is there that this is so? ii) who actually peer reviewed a paper, and were those peers suitably qualified, taking into consideration the number and qualification of peers (Teixeira da Silva 2013c)? iii) can a peer reviewed paper be challenged, even for such issues as snubbing (Teixeira da Silva 2013d, 2014d)?

The answer to question iii above is a resounding yes. Without PPPR, the literature remains fouled by errors to varying degrees, including incorrect claims or methodologies, false or unsupported statements, unreproducible data sets, duplications (partial or full), falsifications, plagiarism and self-plagiarism. Two tools have emerged as very powerful means to list errors in and concerns with the literature, namely PubPeer (<https://pubpeer.com/>), which allows for identified, or anonymous, commenting, or a site that only allows for registered (i.e., by name) PPPR comments, i.e., PubMed Commons (<http://www.ncbi.nlm.nih.gov/pubmedcommons/>). The code of conduct for journal editors by the Committee on Publication Ethics (COPE) that is currently in place indicates that editors have the responsibility of following up claims made about journal articles, even those that are made anonymously (COPE 2015). Thus, the final onus of correcting the literature lies squarely on the shoulders of editors while the onus of reporting those errors lies on the authors' and peer pool's shoulders. Closely associated with PPPR is the issue of anonymity, an essential aspect to the reporting of errors within the literature, in particular to avoid reprisals that may result from such reports. Despite this essential ingredient to PPPR – which admittedly can lead to abuse in select cases – the fact that recent papers are somewhat denying its importance (Bastian 2014) indicates precisely why the issue needs to be debated more widely in public forums (Pubpeer 2015a).

Figure manipulation has become increasingly prominent in recent times as the techniques to create novel composite figures has improved, and thus detection of manipulation has become more complex. So much so that only in December 2014 were new and more comprehensive policies put into place by the American Journal of Botany (Jernstedt 2014). As one example, several figures by Dr. Oliver Voinnet and Sir David Baulcombe have become a passionate talking point at PubPeer (Pubpeer 2015b). Had PPPR not taken place at PubPeer, the claimed forthcoming retraction (Oransky 2015) and identification of problems associated with figure manipulation would never had been possible. Unless journals have clear and established policies regarding figure manipulation, such claims and concerns cannot be resolved. And without the public participation of the scientists whose work is being questioned, difficult decisions will have to be made by editors.

There is widening consensus that data sets should be made OA to allow the underlying data to be verified, for example, in a challenge on the paper's findings. Despite this call for wider OA data and open source technology (e.g., Gezelter 2015), it seems to be taking place

without an equivalent scrutiny of the possible risks involved, such as data theft or data manipulation by third parties (Teixeira da Silva and Dobránszki 2015b).

The final issue to be addressed in this paper is authorship. Readers are drawn to the fact that the ICMJE guidelines for authorship includes four clauses, and not three, as from October 2013 (ICMJE 2015): “Substantial contributions to the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND Drafting the work or revising it critically for important intellectual content; AND Final approval of the version to be published; AND Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.” This is extremely important since many publishers and science journals continue to apply the old (2006), three-clause definition, which may have wide-ranging repercussions on the validity of authorship.

Science publishing is without a doubt in crisis. Yet, crisis provides an excellent opportunity for change and improvement, including the pro-active participation of authors and editors in PPPR, the reform of education systems to de-emphasize the IF and other metrics or to apply them in a more balanced reward system that is not based exclusively on them. Authors have to be held accountable for what they have published as equally as editors and publishers must be held accountable for what they have approved for publication. Only then can public trust in science be regained and sustained.

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