*Special Issue—Future of Publication***Science Open Reviewed: An online community connecting authors with reviewers for journals****Lonnie W. Aarssen and Christopher J. Lortie***Lonnie W. Aarssen* (aarssenl@queensu.ca), Dept. of Biology, Queen's University, Kingston, ON, Canada, K7L 3N6*Christopher J. Lortie* (lortie@yorku.ca), Dept. of Biology, York University, Toronto, ON, Canada, N6S 2E2

Science is structured discovery. Progress requires public dissemination, pre-publication peer-review, and a reputation economy defined by the merit of the published product (Figure 1). Modern science, however, has become more like a mission for elitism, than a mission for discovery. Pre-publication peer-review filters are now used by many journals primarily as a censorship tool for editors to preserve and elevate journal impact factor and to compete with other journal editors for impact factor status (Aarssen 2012, Wardle 2012). This culture is now systemic within academia because it generates author addiction to chasing impact factor as a reputation metric, and review is blind in most cases, thereby protecting practices from scrutiny, accountability and improvement. Concealment of reviewer identity (known only to the editor) as well as the contents of their reviews (disclosed only to the author) has the earmarks of a secret society, where power in assigning merit—and granting permission—for publication in science is held by a select few who are neither elected by, nor accountable to, the community of researchers. In many cases, paths of influence can be traced to vested interest (in elevating impact factor status) from profit-driven commercial publishers. In addition, reviewers are usually voluntary, with no compensation and no significant reward for quality service, and so—combined with being able to hide behind anonymity—there is no deterrent against biased and poor-quality reviews with draconian recommendations for rejection. Elitist editors commonly like this because they can use these negative reviews—combined with a claim of limited page space for (now outdated) paper publication—as justification for manuscript rejection in order to protect and inflate

journal impact factor. Authors then become jaded, yet still with little choice but to remain addicted to chasing impact factor—thus raising susceptibility to academic misconduct, wasting reviewers' time (in the 'tragedy of the reviewer commons'), eroding reviewer incentive, and hence shrinking the pool of available and willing reviewers, especially good ones. All of it impedes the progress of science, both directly through poor practices and lag times, and indirectly through lost opportunities for discussion and feedback (Aarssen 2012).

In this paper, we announce the launch of [Science Open Reviewed](#), extending an idea introduced in an earlier IEE editorial (Aarssen and Lortie 2010). SciOR is an online registry service dedicated to peer-review practice involving optimal filters for the progress of science—as a mission for discovery, rather than a mission for elitism. Specifically, SciOR provides support for extension and refinement of mechanisms and opportunities for: (1) increasing reviewer incentive and reputation rewards, and thus increasing the pool of available and willing reviewers; and (2) promoting transparent and accountable open peer-review, and thus limiting the incidence of biased and poor quality reviews often associated with blind reviewing.

SciOR is based at [Queen's University](#), Canada, where—for its advisory editorial board—it draws from the Queen's community of over 250 researchers within the natural and health sciences. Peer-reviewed papers registered with SciOR, including with reviewer commentaries, can be published in any journal that provides an offer of acceptance, or in the online open-access journal, [Proceedings of Science Open Reviewed](#), published at Queen's University.

The progress of science as a mission for discovery

Figure 1. The progress of science as a mission for discovery.

What SciOR does and how it works

SciOR is an online community that connects authors with reviewers for journals (Box 1):

- *Where reviewers can advertise their services and advertise their record of previous reviewing service*—Reviewers register to indicate the subject areas that they are interested in reviewing, and may also post their record of previous reviewing service for published papers within which they are acknowledged as reviewers—thus providing a detailed record of reviewing reputation. Registered reviewers hold a PhD, or are registered in a PhD program at an accredited institution.
- *Where authors can shop for reviewers*—Authors register to view the list of registered reviewers, their profiles, and their records of previous reviewing service. Registered authors may make their own arrangements, through email contact, to negotiate—directly with registered reviewers—the terms for providing a review, including any fees that reviewers may require for services. Peer-review is open (non-blind), using the author-directed peer review (ADPR) model (Aarssen and Lortie 2010). Authors are advised to make reviewing arrangements that are free of potential conflicts of interest.
- *Where authors can post their paper titles and abstracts to attract reviewers, and from which reviewers can shop for papers to review*—Registered authors post their paper titles (and abstracts if they wish), online where registered reviewers or any other site visitors may shop for papers to review. Registered reviewers are provided with author identity and contact information and, if interested in reviewing a posted paper, they may make their own arrangements through email contact, to negotiate—directly with authors—the terms for providing a review, including any fees that reviewers may require for services. If a site visitor is interested in reviewing a posted paper, they may register to have access to author identity and contact information. Reviewers are advised to make reviewing arrangements that are free of potential conflicts of interest.
- *Where authors and reviewers can make arrangements for payment to reviewers through Paypal service*—Registered authors and registered reviewers who have negotiated a payment arrangement for review may, if they wish, request liaison through SciOR (provided on a purely cost recovery, non-profit basis). Upon completion, the review is submitted to SciOR, where it is then submitted to the author after Paypal transaction is completed.
- *Where authors and reviewers can register their reviewed papers and the associated reviews*—Once a registered author's paper has been reviewed by at least two registered reviewers, and revised as required (with revisions endorsed by reviewers), the registered author and the registered reviewers may mutually agree to submit the revised paper and the reviews (together) to SciOR (accompanied by declarations of no conflicts of interest)—where they will be registered together for browsing (under password protection) by registered journal editors. Authors who are not yet registered with SciOR, but already have a revised manuscript based on at least two reviews may also register (and arrange for their reviewers to register) with SciOR, and then subsequently mutually agree to register the paper and reviews. Authors are advised to retain earlier reviewed versions of manuscripts in the event that editors request to see them. The author retains the right to de-register the paper (and its reviews) at any time.

Box 1. Science Open Reviewed is a not-for-profit service—run *by* researchers *for* researchers:

Providing registered *authors* with:

- a personal page for posting titles/abstracts of papers that authors wish to have peer reviewed;
- a registry listing of available reviewers for authors to contact to negotiate a review;
- liaison for arranging any negotiated reviewer remuneration, to ensure that reviews are well-executed and timely;
- registration of their peer-reviewed papers (and their reviews), ready for perusal by journal editors;
- optional publication of their registered peer-reviewed papers — for a nominal author fee — in [Proceedings of Science Open Reviewed](#) (with fees waived for 2013).

Providing registered *reviewers* with:

- a personal page for advertising their reviewing services;
- a reputation economy, by publishing a record of previous reviewing service;
- a listing of papers available for reviewing, and author contact information for making an offer to review;
- liaison for arranging any negotiated remuneration for reviewing service — as fair and motivating compensation for professional service;
- registration of their reviews linked to registered papers that are ready for perusal by journal editors;
- optional (and free) publication of their peer-reviewed reviewer commentary/response papers in [Proceedings of Science Open Reviewed](#).

Providing registered *editors* with:

- a registry listing of peer-reviewed papers, and their reviews, for which offers can be made to authors for publication in the editors' journals — thus eliminating the need for editors to spend the considerable time and effort normally needed to find, correspond with, and follow up with willing reviewers.

- *Where journal editors can browse registered peer-reviewed papers that are ready for publication*—Journal editors register (to receive password-protected access) to browse the registered peer-reviewed papers and their reviews—thus freeing editors from the often onerous task of seeking and corresponding with willing reviewers, and chasing them to provide timely reviews. Authors may also invite editors of their choice to register and view the authors' submissions. If interested in making an offer for publication, a registered editor makes his/her own arrangement to contact the author (and the reviewers if desired) directly. If publication is successful (following an offer from either a registered or unregistered editor), the paper (if still registered) is de-registered upon acceptance or upon publication, and the paper is cited in the SciOR archive of published articles. The reviews may remain registered (at the discretion of the registered reviewers) with a link to the paper's listing in the SciOR archive of published articles.
- *Where authors can publish their registered peer-reviewed papers in Proceedings of Science Open Reviewed*—If authors do not receive a publication offer from another journal (or are not interested in publishing in another journal), they may elect to publish their registered peer-reviewed papers in the

open-access, electronic journal, [Proceedings of Science Open Reviewed](#)—subject to editor evaluation of reviewer reports, and routine screening for fraud check and reviewer conflicts of interest. Proc SciOR is operated on a purely cost-recovery, non-profit basis. For a nominal author fee (waived for 2013), peer-reviewed papers can be published online immediately upon registration. Papers may first require revision to meet the journal's formatting requirements and standards of quality for English and data (e.g. figure) presentation. Reviewers' names are disclosed in all primary articles published in Proc SciOR. Articles are also reviewed post-publication by other reviewers registered with SciOR who volunteer to post reviews that are linked online to the published article.

- *Where reviewers can submit response papers for peer-reviewed publication in Proceedings of Science Open Reviewed*—A registered reviewer for a primary article published in Proc SciOR (or a published article in any other journal and acknowledged as a reviewer within that article) may submit a commentary (response paper/opinion piece) inspired by his/her review of the published article. This submission will be reviewed by the original author(s) of the earlier published article and by the editors of Proc

SciOR—and so if accepted for publication, the commentary can be cited as a peer-reviewed publication on the reviewer's CV, thus adding to the reviewer's detailed record of reviewing reputation. No author fees are charged for publication of reviewer commentaries that respond to primary articles published in Proc SciOR.

Benefits of SciOR

SciOR is based on an open (non-blind) author-directed peer review (ADPR) model (Aarssen and Lortie 2010), offering several advantages over traditional journal/editor-directed blind peer review:

(1) *More rapid publication.* ADPR avoids the common fate of manuscripts sitting for weeks on the desks of busy/neglectful editors, waiting to be sent out for review, stalled by the difficulty of finding reviewers, or waiting to be processed for author revision in response to reviewer comments. With the ADPR model, all of this is already addressed and completed prior to submission. [Many editors now respond to the difficulty of finding reviewers by inviting them from the list of 'preferred' reviewers that authors are now required to provide during submission to most journals—and so a form of 'author-directed peer review' is already routinely practiced by many journals.]

(2) *Reduced need for author fees charged by journals.* Because journals/editors are not involved with the often frustrating and time-consuming tasks of arranging and managing peer-review (searching, correspondence, processing, handling), journal charges for author fees—especially for open access electronic journals—can be substantially reduced. The author fee for Proceedings of Science Open Reviewed is presently only CAN \$100 (waived for 2013).

(3) *Relief for the 'tragedy of the reviewer commons'.* Because the reviewing is done only once, there is no need for multiple reviewing by multiple reviewers when authors need to submit the same paper to additional journals following earlier rejection from other journals. This means less wasteful/redundant reviewing (hence more rapid publication)—and importantly, a profoundly reduced workload for the academic community in general.

(4) *Simultaneous submission to multiple journals.* Because the journal is not involved in arranging peer review, and the reviewing is already done, there should be no reason why the author could not submit the paper to several journals at the same time—just as several journal editors can, at the same time, view a registered paper on SciOR while deciding whether to make a

publication offer. This allows authors to find acceptance more rapidly, plus it maximizes their chances of publishing in the most desirable possible journal—contributing again to more rapid and more visible publication, and hence the progress of science.

(5) *Greater reviewer incentive.* Although the ADPR model does not require that reviewers be paid, such compensation may be necessary for many reviewers to allocate reviewing time (e.g. on weekends or evenings) within a demanding work schedule and a busy personal life (Lortie 2011). Accordingly, remuneration combined with reviewer acknowledgement in published articles, plus opportunity for reviewers to post/publish a peer-reviewed commentary on the reviewed paper (in the event that it is published), together with a registered record of reviewer service with SciOR—provide the important principal advantage of reviewer incentive. In the traditional 'honour' system model for peer review, authors are essentially obligated, and in some cases literally 'forced' to review manuscripts in return for opportunity to have their own manuscripts reviewed. But best efforts and high quality outcomes—in any task—are rarely achieved by force. In contrast, rather than being 'forced' to review, or 'too busy' to review, incentives with the ADPR model—managed through SciOR—encourage academics to compete with each other as 'reviewers for hire', especially for opportunity to review the best papers. This frees up the best authors to do what they do best (which may not include the best reviewing), and it rewards the best reviewers for what they do best (the best reviewing). Importantly, this also expands the reviewer pool, which is currently limited by the connections, familiarity, or imagination of over-worked editors under the current model.

(6) *Higher quality manuscripts (less reviewing-time spent on poorly-prepared papers).* With a pay-for-service reviewing model, authors should be especially careful in producing a high quality manuscript before sending it out for first review (to avoid unnecessary payment for multiple reviews of multiple revisions). This contributes, with the above factors, to promoting greater overall efficiency of the peer-review system, and more rapid progress of science.

(7) *Higher quality reviews.* Paid service combined with published reviewer acknowledgement, and opportunity for reviewers to post/publish their peer-reviewed commentaries on reviewed papers, not only minimize reviewer bias and promote greater reviewer accountability, but also engages reviewers more directly, more cooperatively (Leek et al. 2012), and more productively in the mission for discovery that the manuscript represents.

(8) *Self-generating reputation economy for reviewers.* Because reviewer names are disclosed within the published paper, their reputations are automatically public and ‘on the line’. Most reviewers, therefore, are likely to be honest, fair and rigorous in their reviews; plus, if their reputations suffer, reviewers will lose out on potential income from future reviewing. Reviewers will not want their names associated as endorsements for inferior papers—at least not reviewers that will be regarded as having integrity with journals and authors. For the same reasons, reviewers will not want their names associated with papers for which there is a conflict (or perceived conflict) of interest with the author—especially since a registered review must be accompanied by the reviewer’s declaration of no conflict of interest. Importantly, with the ADPR model, and with a track record of reviewing service logged with SciOR, reviewers have an opportunity to become a ‘career reviewer’ by developing reputations for high-quality reviewing service. Better reviewers therefore will be in higher demand—like paid columnists/critics in popular media—thus providing potential for supplemental income for post-docs, adjunct faculty, and graduate students, or supplemental income for emeritus faculty (in retirement), or during a reduced academic appointment.

(9) *Self-generating reputation economy for authors.* In the traditional blind peer-review model, where editors secretly choose who does the reviewing, there is very little opportunity for quality control. In most instances, editors are forced to settle for whoever is willing to volunteer to provide a gratuitous review, and no one except the editor has knowledge of the reviewer’s credibility or track record of reviewing quality. In many cases—because of low reviewer incentive—a dozen or more requests are sent before willing reviewers for a manuscript can be arranged, and so they are not the most ‘preferred’—and hence not the best possible—reviewers for judging the quality of the manuscript. In contrast, with the ADPR model, authors have opportunity to seek and arrange review of their papers from the best reviewers and most reputable researchers in their fields—and can also avoid reviewers that the author suspects might be a ‘competitor’ or likely to provide a ‘retaliatory’ review. Editors, in contrast, are usually not sufficiently informed—nor as inclined—to avoid such biased reviewers. Having the endorsement of a top quality, unbiased reviewer/researcher in hand when submitting to a journal (and acknowledged in the published paper) represents strong evidence in support of the paper’s merit. The quality/impact of an article therefore may be judged as much or more by who the acknowledged reviewers are (combined with the article’s citation metrics), than by the impact-factor of the publishing journal. Authors, therefore, will not be

inclined to request reviews from close colleagues in order to avoid the perception of cronyism—especially since registered papers must be accompanied by the author’s declaration of no conflict of interest, and many editors and readers of published papers tend to know (or can easily discover) the identities of an author’s previous collaborators and close associates.

(10) *Income earned from one’s own reviewing service can be used to pay for having one’s own manuscripts reviewed, plus for paying author fees of open access journals.* Because the ADPR model allows open-access journals to reduce their operating costs, and hence their author fees, this leaves more author funds available to pay for one’s own manuscript reviews; plus, the remaining (reduced) cost for author fees can also be addressed through income earned from paid reviewing. In other words, one can earn enough income as a reviewer to cover both the costs of paying reviewers for one’s own manuscripts, plus the costs of author fees for publishing one’s own papers in open-access electronic journals. This is analogous to how real estate markets work: if financially constrained, you cannot buy a new house without first selling your current house, which in turn requires that the potential buyer (of your house) must first sell his/her house. With the ADPR model, however, there are no analogous real estate agents or lawyers to pay, and hence much of the money needed to support both ADPR and open-access publication is put back into the hands of front-line researchers, rather than into building profits for commercial publishers in the traditional peer-review system. Costs for paying reviewers could also be included as a legitimate line item for budgets in grant applications, just as it is routine to include budget entries for other professional services, e.g. statistical data analyses, molecular genetic lab analyses, soil chemistry lab analyses, English-editing service for non-English speaking researchers, and journal page charges/author fees.

Join the SciOR community

Registration at SciOR is risk free and cost free, with instant membership benefits: Registered authors can ensure that their papers are reviewed by top quality, unbiased reviewers, with their endorsements identified within the published article—and without authors being forced to provide reviewing service in return (because the best authors are not necessarily the best reviewers, and vice versa). Registered reviewers are presented opportunities for reviewing top quality papers—including with negotiable incentives—and can maintain their own public record of reviewing reputation. Registered editors are given immediate access to top quality papers already peer-reviewed by top quality reviewers—ready for publication—and thus eliminating the frustrating and

time-consuming task for editors in finding and corresponding with reviewers for their journals. Authors may also publish their registered peer-reviewed papers in [Proceedings of Science Open Reviewed](#), where no author fees will be charged during 2013.

Join a new cooperative community of researchers at [Science Open Reviewed](#)—authors, reviewers, and editors—working with each other, and for each other, to promote open, fair, accountable, and constructive peer review and dissemination of discovery, and hence the progress of science. Peer review can have the capacity to improve the work of others and advance and refine our ideas. However, keeping this process strictly within journals may be limiting the capacity for effective discussion. We see SciOR as a positive step towards community participation in the process of scientific dialog.

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