
Bridging the Troubled Waters of Peer Review with ing.grid: Towards Openness, Fairness and F.A.I.R.-ness

Agnes Kleinhans ¹, Michaela Leštáková ¹, Kevin Logan ¹, Peter F. Pelz ¹

¹ Chair of Fluid Systems, Technical University of Darmstadt

Peer review is a method for ensuring the soundness and trustworthiness of scientific results. It has become an essential part of the publishing process in science. However, the practice of peer review has been receiving more and more criticism, highlighting the challenges it faces. We present our own experience with pushing peer review forward in the independent, scholarly-led journal ing.grid founded in 2021. ing.grid is a diamond OA journal for FAIR data management in engineering sciences that accepts manuscripts as well as software and data submissions. To improve the review process, we have implemented a post-publication Open Peer Review Process that allows for fast publication of the first version of the submission as a preprint while also aiming for fairer, high quality reviews. Through the implementation of Open Peer Review, ing.grid has established a publishing process that is more transparent and accessible, aligning with the principles of Open Science and FAIR data management.

Keywords: Open Peer Review, Open Science, FAIR Data, Scholarly Publishing, Engineering Science

1 Introduction

Open peer review (OPR) is an evolving model of peer evaluation that emphasises transparency by revealing the identities of both authors and reviewers, or through the (anonymised) publication of reviews. This approach contrasts with traditional peer review methods, such as double-anonymised reviews and single-anonymised reviews, which maintain (reviewer) anonymity.

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ing.grid is an independent, scholarly-led, diamond open-access journal for FAIR (Findable, Accessible, Interoperable, Reusable) data management in engineering science. Established in 2021, ing.grid promotes transparency and openness by following the principles of Open Access, Open Review, Open Data, and the FAIR principles. By integrating OPR into its publishing process, ing.grid reflects its commitment to these ideals.

This paper investigates the significance of OPR in the changing landscape of academic publishing, particularly emphasising its application in ing.grid. It reviews the benefits and challenges of OPR on research transparency and integrity. Through this exploration, the paper aims to enrich ongoing conversations about the future of peer review and the shift towards more open, inclusive, and transparent publishing practices.

2 Why open peer review?

Since 2001, there has been a constant emergence of Open Peer Review (OPR) in the publishing industry. The number of open report journals has increased from 38 journals in 2001 to at least 617 journals by the end of 2019 (Wolfram et al. 2020). Remarkably, a mere five publishers are responsible for 81 % of all recognised OPR journals (MDPI, SDI, BioMed Central, Frontiers Media S.A., Kowsar, see Wolfram et al. 2020). This highlights the significant influence publishers have had so far in advancing open report initiatives. OPR is especially practiced in Medical and Health science disciplines, in contrast to Humanities and Technology, with optional open reports being more prevalent in those fields (Wolfram et al. 2020).

The benefits of adopting OPR include improving transparency in the scientific publishing process. By publicly sharing reviews, OPR enhances the visibility of scientific discourse. It also promotes accountability, resulting in more valuable feedback. Furthermore, reviewers gain enhanced acknowledgment for their input, contrasting with conventional peer review systems, where their identities are kept confidential.

This transparency can lead to more fair assessments, as reviewers are held accountable for their comments (Holst, Eggleton, and Harris 2022) and discourage non-constructive or even harmful feedback. By making reviewers accountable for their comments, OPR can promote a more respectful and professional peer review process. In some cases, OPR has been shown to result in longer and more detailed reviews, as reviewers may feel a greater sense of responsibility when their identities are known (Wolfram, Wang, and Park 2019).

In traditional peer review models, reviewers often remain anonymous, which ultimately leads to not receiving recognition for their contributions. OPR addresses this limitation by publicly acknowledging reviewers' efforts, thereby promoting greater transparency and credit within the scholarly community (Henriquez 2023).

While OPR offers a variety of benefits, it also introduces particular challenges that need to be considered. Reviewers can be hesitant to provide negative feedback to authors they have a personal or professional relationship with (Vidal and Leaver 2015). In addition, research has indicated that reviewers are more inclined to offer favourable evaluations to authors from their own country; this tendency has been statistically significant in certain instances, suggesting a possible bias related to national affiliation (Thelwall et al. 2019). Addressing these biases requires careful consideration and the implementation of strategies to ensure fairness and neutrality in the peer review process.

In spite of these obstacles, open peer review has the potential to enhance the quality and transparency of scientific publishing. The ongoing transition toward OPR signifies a larger trend in academia aimed at enhancing openness, accountability, and accessibility in scholarly publishing.

3 FAIRness and openness in ing.grid’s open peer review process

ing.grid aims at advancing transparency and openness in the scientific publishing process by following an OPR policy and the FAIR (findable, accessible, interoperable, reusable) principles as guidelines. Submissions are required to follow the FAIR principles, as these principles offer a framework to improve the transparency, accessibility, and reproducibility of scientific research while establishing a baseline standard for submissions to ing.grid.

For all categories of submissions – software, data, and manuscripts – ing.grid mandates that materials be *findable* by both humans and machines. This is primarily achieved through the assignment of a Digital Object Identifier (DOI) to each accepted and published submission, providing a unique and persistent global reference. In addition, software and data submitted as supplementary material to ing.grid’s submissions must be deposited in publicly accessible repositories that support persistent identification. Software repositories must be directly linked in the software descriptor and include a version ID. Likewise, datasets must be stored in repositories that assign DOIs, which must be cited in the metadata of the data descriptor. For manuscripts, any supplementary software or datasets must be made discoverable through clearly referenced DOIs or permanent links. While formal descriptors for supplementary materials are not mandatory, authors are required to clearly reference all used tools or data.

For *accessibility*, all resources must be retrievable via standardised protocols. Software repositories must facilitate anonymous browsing, cloning, and viewing, guaranteeing that access is not restricted by any registration or barriers. Datasets need to be openly available and with an option for reviewers to access it anonymously. In manuscripts, authors are

responsible for ensuring that any supplementary software or data is publicly accessible and properly cited with URLs or DOIs.

Interoperability requires that software and data can effectively communicate with other tools, systems, and workflows. For software, this includes the implementation of standardised APIs, metadata, and the incorporation of dependency and environment management systems like requirements.txt, package.json, CMakeList.txt, or Docker. For datasets, metadata should be articulated in commonly accepted formats, and the data itself must be stored in non-proprietary, community-standard formats. Manuscript submissions, especially those that feature additional software or datasets, are encouraged to follow the same principles, facilitating the integration of the material into broader research. If possible, (meta)data should use standardised vocabularies.

To achieve *reusability*, licensing, documentation, and transparency are essential. Software must be released under an Open Source Initiative-recognised license and include comprehensive README files, installation guides, usage instructions, and examples. The documentation should outline contribution rules and testing procedures. Software submissions need to refer to executable code and describe how users can use and integrate the code in other projects. Data should also be open-licensed, typically CC-BY 4.0, and come with thorough documentation on creation, validation, and uncertainty measures. Manuscripts must cite additional software or datasets, clarifying their definitions, licenses, and providing basic usage examples or tutorials.

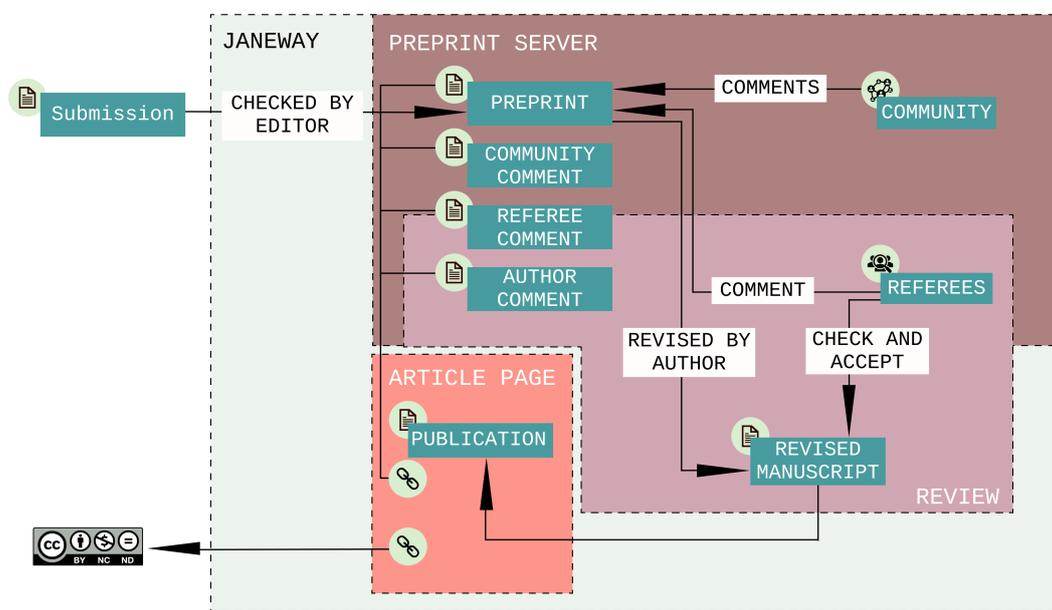


Figure 1: Open Peer Review Process at ing.grid.

The publishing and review process for ing.grid (Figure 1) involves several stages: First, authors submit their work to ing.grid as a preprint – the submission will be immediately

released on ing.grid's preprint server. During the review process, the authors' identities are known to the reviewers. Conversely, ing.grid strongly encourages reviewers to publish their identities together with their feedback, yet allows them the choice of remaining anonymous, temporarily or permanently.

However, the decision-making process is carried out with complete transparency – the reviews and the final editorial decisions and justifications are made available to both authors and the research community as comments below the submission on the preprint server. Authors must answer reviewer feedback in detailed comments, usually within four weeks. The comments are also published as part of the review discussion beneath the preprint. This open process ensures that all parties in the review process understand the reasoning behind acceptance, revision, or rejection, and thereby strengthening accountability and trust within the publication and research system. In addition, ing.grid also invites the broader community to actively engage with the discussion by providing their feedback and insights directly below the submission on the preprint server. This approach guarantees that knowledge is not restricted to a limited cohort of reviewers but rather aims upon drawing a heterogeneous spectrum of perspectives and increasing the visibility of the scholarly work.

Once a submission is accepted, the final version of the submission is published on ing.grid's journal and permanently linked to the preprint version, including the entire review discussion. In order to honor the scientific work behind reviews, reviewers can publish their reviews optionally linked with their ORCID, and receive formal review certificates, granting them academic acknowledgment for their work.

4 Insights and challenges in ing.grid's open peer review process

Our experience with ing.grid's OPR process has yielded significant insights regarding its advantages and limitations. A key characteristic is the transparency of review reports, which has got positive feedback from all participating parties. The authors appreciate the openness of the review process due to the public availability of review comments on the preprint server, while reviewers and the broader scientific community acknowledge the accessibility and transparency of the entire review process.

Although reviewers have the choice to remain anonymous during the review process, our results indicate that the identities of reviewers are often disclosed. With 52 % percent of reviewers choosing to reveal their identities, a considerable portion of reviewers operates with transparent identities.

While ing.grid promotes and allows open engagement from the broader scientific community, this feature has hardly been used so far. Even though the comment section beneath the articles on the preprint server is openly accessible to the community (provided an account is registered), contributions from researchers or the public beyond the reviewers, authors and editors have not been submitted so far. This implies that while the opportunity to contribute is intended to be inclusive and open, additional initiatives may be necessary to actively encourage involvement.

A significant challenge we have identified is the comparatively lengthy duration of the OPR process. Nevertheless, it remains uncertain whether this is inherently linked to the transparency of the method. As previously stated, we provide reviewers with the choice to stay anonymous, and around half opt for this. Typically, the duration of ing.grid's review process can reach up to 41 weeks, from the initial submission to the final publication in the ing.grid journal.

5 Future directions and conclusion

ing.grid's OPR process has illustrated significant advantages in transparency and openness towards authors, reviewers and the scientific community. To further enhance its efficiency and encourage broader adoption, there remain areas for further improvement.

An objective for the future is to simplify the connection between the preprint server and the journal platform. A more seamless workflow would reduce the administrative efforts between both websites and reduce the potential for confusion of the users. The most pressing area for improvement, is the duration of the review process. The current average review duration takes is 41 weeks – nonetheless, if researchers seeking a timely publication of their submission, the preprint article is published immediately. Lastly, broadening the acceptance criteria to incorporate preprints from other platforms would create the opportunity for researchers who have previously shared their work elsewhere.

Looking ahead, ing.grid aims to enhance the reach, accessibility and speed of scientific publishing, and thereby further empowering researchers, reviewers and the broader scientific community.

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- Agnes Kleinhans – Conceptualisation, Project Administration, Writing (original draft, review, editing)
- Michaela Leštáková – Conceptualisation, Project Administration, Writing (original draft, review, editing)
- Kevin Logan – Conceptualisation, Project Administration, Writing (original draft, review, editing)
- Peter F. Pelz – Conceptualisation, Funding acquisition, Project Administration, Supervision

Conflict of Interest

The authors declare that they have no conflict of interests.

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