Learned Publishing

LEARNED PUBLISHING Open Access

ORIGINAL ARTICLE OPEN ACCESS

Collaborating With Early Career Researchers to Enhance the Future of Scholarly Publication: A Guide for Publishers

Friederike E. Kohrs[1] | Vartan Kazezian[1] | Robin K. Bagley[2] | Matthieu P. Boisgontier[3] | Samuel Brod[4] | Clarissa F. D. Carneiro[1] | Maria Isabel Casas[5] | Deep Chakrabarti[6] | Roger J. Colbran[7] | Humberto Debat[8] | Vahid Delshad[9] | Natascha I. Drude[1] | Scott C. Edmunds[10] | Felix Fischer[11] | Delwen L. Franzen[1] | Laurent Gatto[12] | Małgorzata Anna Gazda[13] | Biljana Gjoneska[14] | Toivo Glatz[15] | Stefanie Haase[16] | Kaitlyn Hair[17] | Hannah L. Harrison[18] | Johanna Havemann[19] | Friederike Hillemann[20] | Andrew N. Holding[21] | Vinodh Ilangovan[22] | Amelya Keles[23,24] | Anton Kutlin[25] | Cilene Lino-de-Oliveira[26] | Gary S. McDowell[27,28,29] | Honglan Mi[30] | Anne Neumann[24,31] | Daniel Nüst[32] | Nicholas Outa[33] | Iratxe Puebla[34] | Amin Rahmatali-Khazaee[9] | Roland G. Roberts[35] | Jessica L. Rohmann[15] | Maia Salholz-Hillel[1] | Raul Sanchez-Lopez[28] | Alexander Schniedermann[36] | Robert Schulz[1] | Bianca M. Trovò[37] | Amy E. Vincent[38] | Tracey L. Weissgerber[1,39,40]

Correspondence: Friederike E. Kohrs (friederike-elisabeth.kohrs@charite.de) | Tracey L. Weissgerber (tracey.weissgerber@uc.pt)

Received: 19 December 2024 | **Revised:** 13 August 2025 | **Accepted:** 10 October 2025

Funding: FK and TLW were funded via the SPOKES Subproject of the Wellcome Trust Translational Partnership at Charité and Berlin Institutes of Health (The Wellcome Trust, 218358/Z/19/Z, https://wellcome.org). TLW also recieved support from Portuguese national funds via Fundação para a Ciência e a Tecnologia (FCT) under projects UIDB/04539/2020 and LA/P/0058/2020, and project EXCELScIOR, funded by the EU's Horizon Europe under Grant Agreement No. 101087416. The funders had no role in the study design, data collection and analysis, decision to publish or the preparation of the manuscript.

Keywords: advisory boards | change implementation | collaboration | editors | peer review | publishing | scholarly publication

ABSTRACT

The scholarly publishing system is adapting to many changes, including open access and open data mandates, artificial intelligence, and other new technologies. Members of the research and publishing communities are working to establish a more equitable, fair, and rigorous system that serves researchers' evolving needs. Early career researchers (ECRs) are drivers of change, and publishers may wonder why and how they should involve ECRs in shaping the future of scholarly publishing. We held a virtual unconference to explore this issue with publishers and ECRs who were working to improve publishing. Some participants sought to improve peer reviewer or editor performance, whereas others sought to improve the publishing system itself through iterative or transformative change. Strategies for collaborating with ECRs to shape the future of scholarly publishing included peer review programmes, editorial programmes, ECR-led journals, ECR boards and committee representatives, and other ECR-initiated activities. ECRs particularly wanted to see three things improved: (1) Sharing research outputs other than publications, (2) addressing technological limitations to create systems that meet the research community's needs and facilitate knowledge advancement, and (3) fostering diversity, equity, inclusion, and accessibility. We offer tips for publishers on how to collaborate with ECRs to enhance scholarly publishing, appeal to and learn from younger researchers, and better meet researchers' needs.

For affiliations refer to page 10.

Summary

- Scholarly publishing is evolving to address many challenges.
- Early career researchers are crucial to ongoing efforts to establish a more equitable, fair, and rigorous system. They have fresh skills for conducting and disseminating research and can provide concrete advice on proposed solutions. As the largest and most diverse cohort of researchers, they are major research producers and consumers.
- Researchers and publishing professionals explored strategies for collaborating with early career researchers to enhance scholarly publishing at a virtual unconference.
- Some researchers and publishers seek to improve the performance of reviewers or editors within the publishing process, while others want to change the publishing system.
- Early career researchers identified three priorities for change, specifically (1) sharing of diverse research outputs, (2) overcoming technological limitations, and (3) fostering diversity, equity, inclusion, and accessibility.
- Co-creating solutions with early career researchers, who are the future of research, may give publishers a competitive advantage.
- We provide practical recommendations for publishers who want to effectively collaborate with early career researchers to enhance scholarly publishing.

2 | Introduction

Publishers are facing a number of challenges, including funder open access mandates (Else 2021; Tollefson and Van Noorden 2022, https://www.coalition-s.org/why-plan-s/ https://www.whitehouse.gov/wp-content/uploads/2022/08/08-2022-OSTP-Public-Access-Memo.pdf), the proliferation of paper mills (https://www.science.org/content/article/fake-scientific-papers-are-alarmingly-common), and increasing use of artificial intelligence (Carobene et al. 2024). Research assessment reform initiatives (https://coara.eu/) and new infrastructures and approaches are also changing the types of outputs that researchers share, and where, when, and how they choose to share them. The use of preprints, for example, has grown exponentially over the last 30 years (Xie et al. 2021). Requirements (https://grants.nih.gov/grants/guide/notice-files/NOT-OD-21-013.html, https://www.dfg.de/resource/blob/172098/b08fcad16f1ff5ddca967f1ebde3a8c3/guidelines-research-data-data.pdf) and recommendations (https://www.go-fair.org/fair-principles/, Batista Leite et al. 2024) that encourage sharing of other research outputs, like protocols, data, and code, are raising questions about when and how these outputs should be assessed.

While the scholarly publishing system (Box 1) plays a vital role in evaluating and disseminating research, many researchers and other stakeholders are concerned that this system does not meet the research community's evolving needs. Common concerns include high article processing charges (APCs) despite the low cost of online publishing (Borrego 2023; Jain et al. 2021; The Lancet Planetary Health 2022), subscription (https://opusproject.eu/openscience-news/the-hidden-cost-of-subscriptions-a-barrier-to-open-access-for-researchers-and-the-public/; Gorelick and Li 2021) or author payment models that limit access, the deleterious impact of systemic biases (Rouan et al. 2021), and the need to incorporate new technologies and strategies to improve research dissemination. Researchers have also highlighted problems with peer review, including inconsistencies in reviews (Bornmann et al. 2010) and reliance on volunteer labour (Aczel et al. 2021). This is not a comprehensive list, and we encourage further reading on additional concerns which are not addressed in detail here, such as scientific gatekeeping (Siler et al. 2015; 'The Problems With Science Journals Trying to Be Gatekeepers—and Some Solutions—The Wire Science' 2020), inclusion in global indexing databases (Sayab 2025; Stern 2024), or quality control systems (Fatone et al. 2020; Wright 2024).

BOX 1 | Definitions.

Scholarly publishing process: The process that papers undergo to be published in a peer-reviewed journal, including manuscript submission, editorial checks, peer review, editorial decision, revision and rejection or publication. This may also include optional steps like posting a preprint or sharing important outputs such as protocols, data, and code in public repositories.
Publishing infrastructure: The technical systems used to implement the publication process and index research outputs. This includes software used to handle all aspects of the scholarly publishing process, websites or platforms containing published papers, repositories containing other research products that may be cited in papers (e.g., protocols, data, code), systems to assign and manage persistent identifiers, and search engines used to discover published research outputs.
Scholarly publishing system: The combination of the scholarly publishing process, publishing infrastructure, and the people and organisations involved in scholarly publishing. People include authors, peer reviewers, editors, and publishing staff. Organisations include for-profit and non-profit scholarly publishers, repositories, publishing infrastructure providers, and indexing services.

Some members of the research and publishing communities have been working to create a more equitable and rigorous system that aligns with researchers' needs. Co-creating solutions with researchers, including early career researchers (ECRs), may give publishers a competitive advantage. The definition of ECRs differs across fields, institutions, and countries, but may include graduate students, post-doctoral researchers, and investigators who have recently started their own research groups. ECRs are important drivers of change, having founded, led, evaluated and contributed to initiatives to improve various aspects of scholarly publishing. ECR-led activities include establishing hands-on peer review training courses that are integrated into the journal peer review process (e.g., Rohmann et al. 2025), developing new publishing platforms that allow researchers to share and connect outputs created throughout the research process (e.g., https://www.researchequals.com), and establishing new societies,

open access journals, and preprint servers (e.g., Society for Transparency, Openness, and Replication in Kinesiology, STORK). ECRs have also collaborated with journals to reform activities (e.g., eLife's Early Career Advisory Group—Mehta et al. 2020; Urban et al. 2022). Activities like these showcase ECRs' contributions to improving or reforming scholarly publishing while illustrating the potential impact of collaborations between ECRs and publishers.

In this guide for publishers, we explain why it is important to integrate ECRs into the publishing process in roles beyond authorship and to engage ECRs in improving and reforming scholarly publishing. We also highlight three aspects of the publishing system that ECRs would particularly like to see improved. Finally, we offer tips for publishers who wish to collaborate with ECRs to improve scholarly publishing. This guide emerged from a global virtual unconference where ECRs, academic editors, and publishing professionals explored opportunities to improve and reform scholarly publishing (Box 2).

BOX 2 | Virtual Unconference.

Event format: In January 2023, 94 participants across 10 time zones (Figure S1) participated in a virtual unconference (Appendix S1). Two-thirds of participants were researchers. Most were ECRs, mainly from the life sciences, who were working to improve publishing or engaged in publishing in roles beyond authorship and peer review. This included ECRs who were editors or members of early career advisory groups, who led student-run journals, created publishing platforms or peer review training programmes, or participated in preprint review programmes. Some mid-career or senior researchers who were academic editors also participated. The remaining participants represented publishers. Publishing representatives were affiliated with large and small academic publishers, society-led publishers, student-led journals, and independent platforms for sharing research outputs other than papers. The unconference consisted of 2 days of intensive discussions through virtual networking events, virtual meetings, webinars, and asynchronous written conversations on an online discussion board. This unconference format (Holman et al. 2021; Kohrs and Weissgerber 2025) and strategies for writing papers to share insights gained from these events (Kohrs et al. 2025; Weissgerber et al. 2025) have been introduced previously. These discussions continued during the in-person Academic Publishing in Europe 2023 conference and its satellite event 'At the Crossroads: Early Career Researchers and Scholarly Publishers' (Appendix S1).
Limitations: The virtual unconference that led to this paper has several limitations. Many experiences and ideas shared during the event are based on practices and roles from the life sciences. Discussion generally focused on research papers, rather than books or monographs. Many participants were based in Western Europe and North America. Most participants were invited by organisers; however, a broad search strategy was applied to identify ECRs and publishers with ECR-focused programmes outside of the organisers' networks (Appendix S1). The unconference format brings together researchers and other stakeholders who approach a topic from many different perspectives to exchange knowledge, address major problems, and offer new insights through collaborative synthesis. As these events are not designed to be a qualitative research methodology, we do not collect data on participants or present insights gained from these events as research studies.

3 | Why Should Publishers Collaborate With ECRs When Shaping the Future of Scholarly Publishing?

There are several reasons why it is crucial to collaborate with ECRs in shaping the future of scholarly publishing. First, ECRs have valuable expertise. ECRs are in their formative years of building research skills, and therefore are more likely to have fresh skills, hands-on experience, and awareness of implementation challenges than more experienced academics who no longer routinely collect and analyse data. This includes training and experience in good scientific practices, data-driven research, new scholarly publishing practices, such as preprints or Open Science (Sarabipour et al. 2019; Wolf et al. 2021), and interactive digital communication formats throughout the research lifecycle (e.g., reproducible workflows, videos, podcasts). Publishers that only engage mid-career and senior researchers place themselves at a competitive disadvantage. ECRs can provide crucial insights into new developments that are shaping the research community's evolving needs, while creating opportunities to enhance the future of publishing.

Second, given ECRs' expertise in new methods for research and scholarly communication, ECRs can provide concrete advice on how to implement changes to meet the needs of the wider research community. ECRs can provide publishers with experience-based guidance on developing and evaluating inclusive, practical programmes and policies, in addition to highlighting problems with existing practices. Co-designing solutions with early input from ECRs benefits both parties. Publishers get valuable advice on how to meet the research community's needs. ECRs learn about the limitations of the complex publishing system and the feasibility of proposed solutions.

Third, as the largest and most diverse group of researchers (https://scholarlykitchen.sspnet.org/2014/10/06/guest-post-phill-jones-on-the-changing-role-of-the-postdoc-and-why-publishers-should-care/, https://www.interacademies.org/sites/default/files/publication/gya-glosys-report-webversion.pdf), ECRs are major producers and consumers of research outputs, including publications. As future research leaders, ECRs should shape the system that they will inherit. ECRs' expertise is also invaluable in levelling the playing field to create a scholarly publishing system that works for everyone. ECRs are more diverse than senior investigators with respect to the social constructs of ethnicity and race, gender identity, socioeconomic status, sexual orientation, language and nationality (Heggeness et al. 2017; Nikaj et al. 2018). They may experience systemic bias due to these factors and their career stage (Huber et al. 2022; Receveur et al. 2024). Co-creating solutions with ECRs can help publishers reach broader communities, connect with the next generation of authors, reviewers, and editors, and remain competitive in the scholarly publishing system of the future.

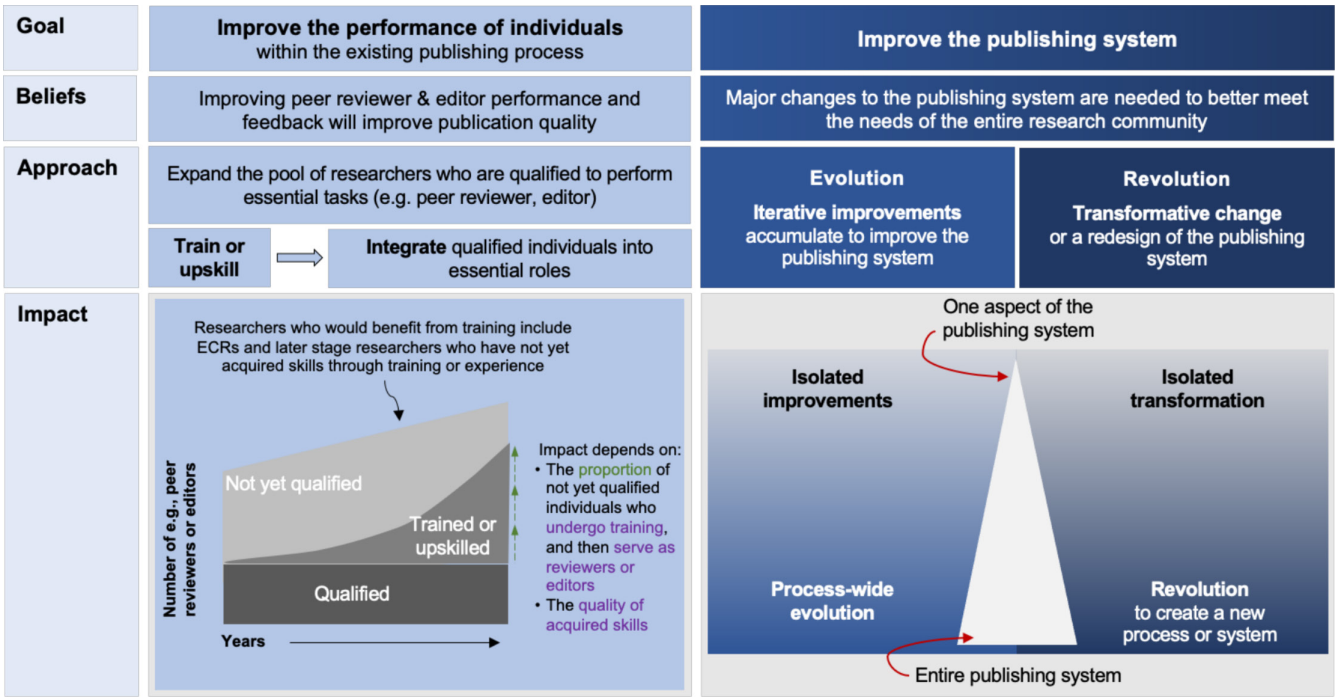

FIGURE 1 | Approaches to improve scholarly publishing. The figure highlights differences in belief, approach, and the potential impact of approaches that seek to improve the performance of individuals within the existing publishing process, versus those that seek to improve the scholarly publishing system. Activities that focus on improving the performance of individuals typically seek to improve the quality of reviewer and editor feedback.

4 | The Spectrum of Approaches to Change

Before engaging in activities to improve scholarly publishing, researchers and publishing professionals should understand the different ways in which ECRs, editors, and publishing professionals approach change (Figure 1). Recognising these different approaches will help ECRs and publishers to engage in activities and programmes that align with their values, and prioritize and work with others who approach change differently.

Some individuals seek to refine the existing publishing process by training and integrating ECRs into essential roles, such as peer reviewer or editor. Others seek to reform the system itself through evolutionary or revolutionary approaches. When using evolutionary approaches, iterative changes gradually accumulate to improve the publishing system. Revolutionary approaches seek transformative change or a complete redesign of the publishing system. Evolutionary and revolutionary approaches can be applied to improve a single aspect of the publishing system, such as peer review or diversity, equity, and inclusiveness, of the entire system.

Each approach has strengths and weaknesses. Proponents of refinement through training and integrating ECRs argue that expanding the pool of qualified researchers will improve the quality of feedback provided by reviewers and editors within the existing publishing process. However, these programmes will only lead to widespread change if they deliver effective skill development on a very large scale. This includes reaching the subset of mid-career and senior researchers who were never formally trained and may lack important skills. Those who favour evolutionary approaches may argue that improvements to the existing system are more feasible than revolutionary approaches, given the complexity and constraints of the publishing system. Furthermore, iterative improvements to many aspects of the publishing system may ultimately lead to transformative change. In contrast, those who favour revolution might argue that iterative changes are slow, fail to consider how different parts of the system interact, and will not address crucial limitations of the current system. Co-creating solutions with ECRs and other stakeholders from across the spectrum of approaches, summarised in Figure 1, may lead to a more comprehensive and nuanced understanding of the limitations of the current system, leading to innovative, feasible solutions.

5 | How Can ECRs Shape the Future of Scholarly Publishing?

Programmes and activities that facilitate collaboration between publishers and ECRs fall into five categories: peer review, editorial roles, ECR-led journals or special issues, boards or committees, and other ECR-led initiatives (Table 1). The feasibility, costs, and other resource requirements for these programmes and activities will depend on the implementation strategy. Costs for advisory boards, for example, will depend on the size of the board, the required time commitment for board members and staff, whether board members receive compensation, and the use of in-person meetings. Publishers differ greatly in characteristics such as size, revenue, priorities, and the amount of revenue that they reinvest in the research community. Publishers should consider the programme design and resource requirements needed to achieve the desired goals when assessing the feasibility of the programmes and activities.

TABLE 1 | ECR-focused programmes and activities to improve publishing.

		Improve the performance of individuals within the existing publishing process		Reform the publishing system	
Category	**Programme or activity**	**Train**	**Integrate**	**Evolution (iterative change)**	**Revolution (transformative change)**
Peer review	Training programmes—theoretical	✓			
	Training programmes—hands on experience	✓	✓		
	(ECR) peer reviewer programmes[a]		✓		
	Crowd preprint review	✓	✓		
	Preprint recommendation programmes	✓	✓		
Editors	Editorial assistant internship	✓	✓		
	ECR editor programme	✓	✓		
	ECR editors		✓		
ECR-led journals or issues	ECR-led journals	✓	✓	✓	✓
	Mentored ECR-led issues	✓	✓		
Boards and committees	ECR representatives on committees	✓		✓	✓
	ECR advisory boards	✓		✓	✓
	Innovations advisor programmes		✓	✓	✓
Other ECR-led activities	Partner with or support ECRs leading innovative initiatives to improve publishing			✓	✓

Abbreviation: ECR, early career researcher.
[a]Peer reviewer programmes refer to programmes that invite new reviewers to review papers.

5.1 | Peer Review

Peer review programmes may provide an entry point for ECRs and others who want to start reviewing papers, while preparing ECRs for more substantive roles. Publishers should not limit ECR engagement to peer review, as ECRs have a much greater potential to improve publishing. Often publishers don't use this potential effectively.

5.1.1 | Eliminating Ghost Reviewing

Some publishers have implemented measures to limit unacknowledged 'ghost-reviewing', where a more senior scientist submits a review that was entirely or partially prepared by someone else, who is often an ECR (McDowell et al. 2021, 2019). Reviewers are asked to name other individuals, including ECRs, who contributed to the review. Editors can invite these experienced ECRs to review future papers.

5.1.2 | Hands-On Peer Review Training

While many organisations offer peer review courses (e.g., Willis et al. 2022), these programmes are often theoretical. ECRs were particularly interested in programmes that combine theory with real-life experience. In the Peerspectives course (Rohmann et al. 2025), for example, ECRs work with an editor as a mentor to complete collaborative group peer reviews for papers submitted to partner journals. These open reviews are used in the peer review process. The group discusses the other reviewers' reports and the editors' decisions, and listens to an editorial board meeting to hear how reviewers' comments inform editorial decision-making. Group training allows ECRs to focus on parts of the paper that are most relevant to their expertise, while learning from others' comments. In undergraduate programmes, group training helps participants to understand the peer review process, improves peer review quality and boosts a sense of belonging in the scientific community (Otto et al. 2023).

5.1.3 | ECR Peer Reviewer Programmes

Peer review training programmes may serve as an entry point for programmes that invite ECRs to review papers. Programme organisers must ensure that editors know about and invite ECRs to review papers in the ECRs' area of expertise. ECR reviewers can provide specialised practical and technical skills (e.g., Nüst and Eglen 2021).

5.1.4 | Crowd Preprint Review

Many researchers collaboratively review a preprint, then publicly share their review. Participants gain hands-on experience while learning from others with different expertise. Locally organised preprint journal clubs and larger organisations (e.g., preLights, PREreview, ASAPbio Crowd Preprint Review initiative) use this model.

5.1.5 | Preprint Recommendation Programmes

At Proceedings B, ECRs can recommend preprints that they think should be invited to submit to the journal (Neiman et al. 2021). A senior editor reviews these suggestions, decides whether to invite the preprint authors to submit the paper, and provides ECRs with feedback on their suggestions.

5.2 | Editor Roles and Programmes

Academic editors are typically mid-career and senior researchers who have published peer-reviewed papers, have peer review expertise, and a broad knowledge of their field. Training and mentorship programmes may prepare ECRs to enter these roles earlier in their careers.

5.2.1 | Editor Programmes

These programmes offer training for editors who are ECRs. Some programmes pair new editors with an established editor as a mentor (https://www.ersnet.org/news-and-features/news/meet-the-editors-early-career-editor-mentoring-programme/, https://academic.oup.com/ijcoms/article/2/1/lyac007/6612939, https://www.ices.dk/news-and-events/news-archive/news/Pages/IJMSmentor.aspx). Training or mentorship should address common situations that editors may encounter and share tips, tricks, and lessons learned. Technical training on how to use the manuscript submission system is necessary, but not sufficient.

5.2.2 | Editorial Assistant Positions

ECRs working in editorial assistant positions obtain training and mentorship from editors while providing editorial support (e.g., https://cdnsciencepub.com/do/10.1139/news.2022.10.11/abs/).

5.3 | ECR-Led Journals and Mentored Issues

5.3.1 | ECR-Led Journals

ECR-led journals provide ECRs with hands-on experience running journals, while allowing students to publish peer-reviewed papers presenting their thesis research. ECRs gain experience reviewing, editing, and coordinating the publication process. ECR-led journals can also experiment with new forms of publication and peer review. Examples include the *Journal of the Student Network for Open Science* (https://s-nos.org/journal/) and the *Journal of European Psychology Students* (https://jeps.efpsa.org/).

5.3.2 | Mentored ECR-Led Issues

ECRs gain experience with editorial responsibilities and all phases of the publishing process by producing a special issue, with mentorship from experienced editors and journal staff. These should not be confused with non-mentored special issues that use ECRs and other researchers to attract content, thereby increasing publisher profits. Concerns have been raised about publishers that rely heavily on guest-edited special issues (https://scholarlykitchen.sspnet.org/2023/03/30/guest-post-of-special-issues-and-journal-purges/). Non-mentored special issues may damage the guest editors' reputation if content quality or publisher editorial practice is poor. Mentored ECR-led issues may be more appealing to some ECRs than editor positions, as ECRs make a short-term commitment to develop skills without assuming long-term responsibility.

5.4 | Boards and Committees

5.4.1 | Advisory Boards and Committees

Some publishers have ECR advisory boards to provide input on policy or operational changes, new or existing programmes, or other topics related to improving scholarly publishing. ECR advisory boards must be integrated into decision-making processes and regularly interact with senior editors and publishing staff. Alternatively, publishers may add ECR representatives to committees. Previous work addresses the trade-offs between advisory boards and committees (Kent et al. 2022) and shares best practices (Holman et al. 2022).

5.4.2 | Innovations Advisor Programme

Most editors are mid-career or senior researchers; yet, ECRs often have more expertise with new techniques, digital and interactive dissemination formats, and Open Science practices. Innovations advisor programmes would allow ECRs to provide publishers with advice on how to implement new practices within the publications process. Activities might include introducing changes suggested by ECRs or seeking expert input on planned changes or emerging topics (e.g., whether

or how to adjust reviewing practices for papers that share open data).

5.4.3 | Other ECR-Led Initiatives to Improve Publishing

ECRs have also initiated activities beyond the categories described above. Examples include developing publishing platforms that allow researchers to share and connect various research outputs (e.g., https://www.researchequals.com), creating automated tools to screen preprints for rainbow colormaps, which aren't colour-blind safe or perceptually uniform (https://elifesciences.org/labs/c2292989/jetfighter-towards-figure-accuracy-and-accessibility), and developing a podcast format for sharing abridged and annotated audiobook-style recordings of research papers (Harrison and Loring 2023). Publishers may seek out ECRs working on topics aligned with the publishers' priorities for change.

6 | Strategies for Collaborating With ECRs

We recommend that publishers use the strategies outlined below when developing new programmes or refining existing programmes to improve the publishing system. These recommendations are designed to increase the likelihood that the programme will have the desired impact and be mutually beneficial for publishers, ECRs, and the research community, while avoiding common problems and criticisms.

6.1 | Getting Started

- *Align programme structure with goals*: Existing formats have been described above, and new formats may be developed to address unmet needs. Box 3 briefly outlines three major priorities for ECRs who attended the unconference. Publishers should consult ECRs within their community to learn what types of opportunities they would like, and how to structure programmes or opportunities to facilitate co-creation, which benefits ECRs and publishers. Ask those leading programmes that one might like to emulate to share tips, lessons learned, and materials.
- *Offer ECRs career development opportunities*: ECRs face pressure to meet career milestones, leaving limited time for career development. Implement programmes that allow ECRs to progress to independent roles within the publishing system at an earlier career stage. Specify how participating will benefit ECRs and provide evidence to support these claims.
- *Engage ECRs with diverse perspectives, experiences, and knowledge*: ECRs are diverse in many ways, including the field of research, geographic location, career stage, gender, socioeconomic status, and the social constructs of race and ethnicity. Engage groups of ECRs to learn from these diverse perspectives.
- *Consider scalability*: Choose solutions that can be implemented at scale. While potential solutions may be developed and tested on a small scale, they must be dramatically scaled up to have a meaningful impact across the publisher's portfolio, or the entire publishing system. Solutions that aren't scalable are unlikely to lead to systemic change.

6.2 | Engaging ECRs

- *Clearly specify programme goals, deliverables, and expected impact*: ECRs who dedicate time to an activity want to know that their work will have a meaningful impact. Clearly articulate the programme's goals and ensure that ECRs are provided with the resources and decision-making power needed to achieve these goals. Explain how specific programmes can lead to changes in publishing practices and how ECR's engagement will be publicly documented. For existing programmes, provide examples of improvements introduced as a result of the programme. Be flexible when thinking about specific deliverables and expected impact. Both publishers' and ECRs' perspectives on the prespecified goals will evolve through collaborative discussion, and this may alter the programme's trajectory.

  Programme advertisements should also provide specific information, such as the estimated time commitment, programme duration, level of expertise sought, and monetary or other types of compensation. This allows ECRs to select programmes or initiatives that are relevant to them and align with their interests, motivation, schedules, and needs. When specifying the level of expertise, focus on the necessary skills, rather than career stage. ECRs at the same career stage have different skills due to experiences prior to or outside of academia, training opportunities, participation in activities to improve scholarly publishing, or variations between fields, programmes, and countries.
- *Inform ECRs about readiness for change*: This includes whether there is readiness to improve the performance of individuals within the existing system or improve the publishing system itself. Specify which aspects of the publishing system you seek to improve. This will help ECRs identify publishers whose interests align with theirs and assess the likelihood that participating will have a meaningful impact.
- *Use open applications, instead of recruiting through established networks*: Advertise events, programmes, and open positions through different channels to reach as many ECRs as possible. Strategies include partnering with student organisations, scientific societies, organisations supporting underrepresented minorities, contacting authors, and using various social media outlets. Avoid recruiting ECRs through editors or contacts, as this may amplify existing inequalities by engaging ECRs from well-funded research groups whose principal investigators are already well connected in the publishing system.
- *Advertise that positions are open and welcoming to ECRs when soliciting applications*: ECRs may otherwise assume that they are not eligible for positions typically held by senior or mid-career researchers.
- *Invite expert ECRs*: Search online to identify ECRs who are working on the topic that you wish to develop. Look for

BOX 3 | Priorities for Change.

During the event, ECRs highlighted three things that they would particularly like to see improved. These themes are briefly presented below; however, we encourage publishers to consult with their own ECR communities to identify priorities, explore solutions, or evaluate the impact and limitations of existing practices. Consulting with ECRs can help publishers gain a competitive advantage by meeting the research community's needs.

Facilitate sharing, reviewing, and publishing of different types of research outputs

Participants wanted to share more than traditional publications. Preregistrations, registered reports, study protocols, reusable step-by-step protocols (Batista Leite et al. 2024), data (Wilkinson et al. 2016), code (Baker et al. 2024), software (Chue Hong et al. 2021), and tools are essential for reproducibility, reuse, and knowledge advancement. Reform initiatives such as CoARA emphasise the importance of considering all outputs in research assessment (https://coara.eu), and some funders consider other outputs when assessing researchers (https://www.dfg.de/en/news/news-topics/announcements-proposals/2022/info-wissenschaft-22-61). As other outputs are integrated into research assessment, researchers will increasingly seek opportunities to share and link these other outputs in publications.

The research community needs a publishing system that facilitates sharing of different types of outputs, builds openly accessible connections between related outputs, and facilitates reuse. Publishers can support these needs by making it easy for researchers to cite and link out to outputs that are shared in repositories and include links to cited outputs in open article metadata (https://barcelona-declaration.org/). This is essential to make interconnected outputs findable (Weissgerber et al. 2024). Publishers can also mandate the use of persistent identifiers and standard citation formats, developed by the research community, for non-traditional research outputs so that the research community can track reuse. Additionally, publishers can require cited materials to be shared with persistent identifiers on repositories that have long-term preservation plans to ensure future accessibility.

Address technological limitations to create submission, publishing, and indexing systems that meet the research community's needs

Updating proprietary, legacy submission, publishing, and indexing systems is critical for modern science. Researchers participating in the event shared several cases where technical limitations prevented publishers from meeting the research community's needs (Appendix S1). These include an inability to integrate code reviewers into editorial submission software to allow rapid, anonymous discussion between code reviewers and authors, and an inability to adapt article websites to display abstracts and article contents in different languages (e.g., Amano, Ramírez-Castañeda, et al. 2023; Amano, Berdejo-Espinola, et al. 2023; Kent et al. 2022). Publishers and organisations are enabling authors to submit papers in their native language in addition to, or instead of, the same article in English (Edmunds 2022, AfricArXiv). Further, the XML-based source of a rendered article can display article translations if journals' own publishing platforms cannot technically support this option. Researchers also noted the prohibitively high cost and technical challenges of integrating new features into online submission systems, such as automated tools to screen submitted papers for common problems or beneficial practices (Schulz et al. 2022). Furthermore, many articles are only offered as PDFs. This makes it difficult to search for or access machine actionable information, especially in tables and figures. By using different formats (e.g., vector-based graphics, html, XML) and enabling multi-format publication (e.g., Heidt 2024), publishers can lower this technical barrier. Further, open research information, semantic structuring, and machine actionable interoperability (e.g., via Open Research Knowledge Graph, OpenCitations, DataCite, and Crossref) could enhance discoverability and provide context. Solving the problems described above requires modern systems that can be easily, sustainably, and inexpensively adapted to the research community's needs. The Supplemental text (Appendix S1) provides further information on problems and potential solutions.

Foster diversity, equity, inclusion, and accessibility

Researchers, and especially ECRs, who are a diverse cohort, need a publishing system that fosters diversity, equity, and inclusion (DEI), instead of exacerbating existing inequalities. Recent discussions have expanded DEI to include accessibility (DEIA) (Wells Ajinkya et al. 2023), which is crucial to scholarly publishing. The Supplemental text (Appendix S1) highlights some of the many actions that publishers could take to address DEIA. Publishers should consult with ECRs and other researchers to identify community priorities and explore solutions. Many publishers are already taking action on aspects of DEIA, including expanding the diversity of editorial boards, and reducing subscription costs for researchers in countries with comparatively limited research funding, supporting the posting of preprints before submission to their journals, fostering multilingualism (http://gigasciencejournal.com/blog/how-to-publish-multilingual-articles/, https://info.africarxiv.org/fostering-multilingualism-in-african-scholarship-through-digital-tools/), and introducing policies to stop parachute science (Odeny and Bosurgi 2022). Consulting with ECRs will help publishers to identify the strengths and limitations of existing approaches and explore novel solutions.

relevant publications, blog posts, and social media posts. Send personalised invitations to invite expert ECRs to apply or participate.

- *Involve ECRs in the selection process and take measures to reduce systemic bias*: These measures are important to capture diverse perspectives and reduce existing inequalities. Access to opportunities varies with factors such as gender, nationality, ethnicity, and funding available for research in the researcher's country, institution, and research group. Many factors that are traditionally interpreted as indicators of merit are also markers of privilege (e.g., the ability to pay high APCs to publish in high-impact journals). Level the playing field by co-developing a selection system that reduces bias with ECRs.

6.3 | Implementation

- *Reduce barriers to participation*: Identify barriers that may prevent ECRs from participating. Explore hybrid formats

and different forms of online interactions (e.g., live, synchronous vs. written, asynchronous), provide travel funding and don't charge participation fees. Record meetings or events and make them freely available afterwards to enable engagement across time zones. Implement protected time programmes to support ECRs actively engaged in enhancing the future of scholarly publishing.

- *Provide compensation*: ECRs typically have very limited funding. Providing monetary compensation for their time and expertise recognises the value of ECRs' contributions to programmes such as advisory boards, while creating opportunities for those with limited resources who could not participate otherwise. If mid-career and senior researchers are compensated for performing similar tasks, ECRs must also be compensated. Programmes that rely on volunteerism may lead to criticisms that publishers are extracting free labour from young researchers who are struggling with low salaries and employment precarity, and that these programmes are inequitable for those who cannot afford to work for free.
- *Create an inclusive and safe environment*: Don't rely on ECRs to increase diversity. Diversity should be reflected at all levels and in all roles in scholarly publishing. Include more than one ECR on committees to ensure a range of perspectives while providing peer support. Provide an ombudsperson who is aware of ECR-related issues and who can provide support if issues arise.
- *Avoid including ECR designations in role titles*: Titles such as 'ECR Editor' may suggest that the work done by ECRs is less valuable than that of more senior researchers and that ECRs lack the expertise and experience needed for the position. This may cause others to underestimate ECRs' contributions.
- *Offer ECRs engaged in programmes a visible platform to share their perspectives and activities*: This may include writing perspectives articles, commentaries or blog posts, offering webinars or organising workshops. Offer ECRs the same platforms as editors and mid-career or senior researchers.
- *Give ECRs decision-making power*: Counteract established power dynamics and integrate ECRs into the decision-making process. Trained ECRs should have the same responsibilities and authority (e.g., voting rights) as more senior researchers. Programmes where ECRs aren't integrated into the decision-making process or lack the resources and authority to contribute to substantive change may lead to criticisms that the programme is designed to enhance the publisher's reputation by creating the illusion of community engagement.
- *Provide certificates or reference letters*: This helps ECRs to establish their expertise and contributions when applying for future positions.
- *Provide training and mentorship when needed*: Mentorship and training are useful for many roles, such as peer reviewer or editor.
- *Measure impact*: Publishers and ECRs should collaboratively define criteria for programme success and monitor these criteria once the programme is running. Impacts can take time to materialise, so the criteria for success will change over time. Early criteria might include the number and diversity of participants, whereas criteria for later stages may include concrete improvements that align with the goals of the activity or programme. Early criteria for an ECR editor programme, for example, may focus on the number and diversity of participating ECRs, including the proportion of ECRs who come from research groups that are not part of the publisher's established community. Later measures may include the proportion of participants who subsequently become editors, along with indicators of the longer-term retention of these editors and the quality of their work. Reflective reports, blog posts, or papers outlining lessons learned, including successes, failures, unanticipated challenges, and mitigation strategies or solutions, will help others to develop more impactful programmes. Empirical studies examining the outcomes of these programmes are currently lacking but are urgently needed.

6.4 | Learn and Adapt

- *Solicit regular feedback*: Seek feedback from ECRs who are involved in publisher activities to collaboratively evaluate effective practices, identify challenges, and explore opportunities for improvement.
- *Adapt by incorporating feedback*: This might include adjusting programme goals in accordance with changing circumstances and the needs of the ECRs and publishers or taking steps to improve the existing programme.

7 | Conclusions

The scholarly publishing system is adapting to many changes, including open access mandates, the need to share additional outputs such as protocols, data and code, and new technologies such as artificial intelligence. Members of the research and publishing communities are working to establish a more equitable, fair, and rigorous system that serves researchers' evolving needs. Co-creating solutions with researchers, including ECRs, may give publishers a competitive advantage. ECRs can be drivers of change, having founded, led, or been actively engaged in programmes and activities to improve or reform publishing. Some ECRs and publishers want to refine the existing system by improving peer reviewer or editor performance. Others may seek to improve the publishing system itself through iterative or transformative change. Strategies for collaborating with ECRs to shape the future of scholarly publishing included peer review programmes, editorial programmes, ECR-led journals, ECR boards and committee representatives, and other ECR-initiated activities. When working with ECRs to shape the future of scholarly publishing, publishers should create an inclusive environment, remove barriers to participation to reduce existing inequalities, ensure that programmes are designed to have a meaningful impact on scholarly publishing, and provide ECRs with the resources, support, and decision-making power needed to achieve programme goals. The recommendations outlined in this paper will foster meaningful collaborations between publishers and ECRs while avoiding common problems.

Author Contributions

Friederike E. Kohrs, **Vartan Kazezian**, **Tracey L. Weissgerber:** conceptualization. **Friederike E. Kohrs**, **Vartan Kazezian**, **Robin K. Bagley**, **Matthieu P. Boisgontier**, **Samuel Brod**, **Clarissa F. D. Carneiro**, **Maria Isabel Casas**, **Deep Chakrabarti**, **Roger J. Colbran**, **Humberto Debat**, **Vahid Delshad**, **Natascha I. Drude**, **Scott C. Edmunds**, **Felix Fischer**, **Delwen L. Franzen**, **Laurent Gatto**, **Małgorzata Anna Gazda**, **Biljana Gjoneska**, **Toivo Glatz**, **Stefanie Haase**, **Kaitlyn Hair**, **Hannah L. Harrison**, **Johanna Havemann**, **Friederike Hillemann**, **Andrew N. Holding**, **Vinodh Ilangovan**, **Amelya Keles**, **Anton Kutlin**, **Cilene Lino-de-Oliveira**, **Gary S. McDowell**, **Honglan Mi**, **Anne Neumann**, **Daniel Nüst**, **Nicholas Outa**, **Iratxe Puebla**, **Amin Rahmatali-Khazaee**, **Roland G. Roberts**, **Jessica L. Rohmann**, **Maia Salholz-Hillel**, **Raul Sanchez-Lopez**, **Alexander Schniedermann**, **Robert Schulz**, **Bianca M. Trovò**, **Amy E. Vincent**, **Tracey L. Weissgerber:** investigation. **Friederike E. Kohrs**, **Vartan Kazezian**, **Tracey L. Weissgerber:** methodology. **Friederike E. Kohrs**, **Tracey L. Weissgerber:** visualisation. **Friederike E. Kohrs**, **Tracey L. Weissgerber:** writing – original draft. **Friederike E. Kohrs**, **Vartan Kazezian**, **Robin K. Bagley**, **Matthieu P. Boisgontier**, **Samuel Brod**, **Clarissa F. D. Carneiro**, **Maria Isabel Casas**, **Deep Chakrabarti**, **Roger J. Colbran**, **Humberto Debat**, **Vahid Delshad**, **Natascha I. Drude**, **Scott C. Edmunds**, **Felix Fischer**, **Delwen L. Franzen**, **Laurent Gatto**, **Małgorzata Anna Gazda**, **Biljana Gjoneska**, **Toivo Glatz**, **Stefanie Haase**, **Kaitlyn Hair**, **Hannah L. Harrison**, **Johanna Havemann**, **Friederike Hillemann**, **Andrew N. Holding**, **Vinodh Ilangovan**, **Amelya Keles**, **Anton Kutlin**, **Cilene Lino-de-Oliveira**, **Gary S. McDowell**, **Honglan Mi**, **Anne Neumann**, **Daniel Nüst**, **Nicholas Outa**, **Iratxe Puebla**, **Amin Rahmatali-Khazaee**, **Roland G. Roberts**, **Jessica L. Rohmann**, **Maia Salholz-Hillel**, **Raul Sanchez-Lopez**, **Alexander Schniedermann**, **Robert Schulz**, **Bianca M. Trovò**, **Amy E. Vincent**, **Tracey L. Weissgerber:** writing – review and editing. **Friederike E. Kohrs**, **Vartan Kazezian**, **Tracey L. Weissgerber:** project administration.

Affiliations

[1]QUEST Center for Responsible Research, Berlin Institute of Health at Charité, Universitätsmedizin Berlin, Berlin, Germany | [2]Department of Evolution, Ecology, and Organismal Biology, The Ohio State University at Lima, Lima, Ohio, USA | [3]School of Rehabilitation Sciences, Faculty of Health Sciences, University of Ottawa, Ottawa, Canada | [4]BioMed Central, Springer Nature, London, UK | [5]American Society for Biochemistry and Molecular Biology, Rockville, Maryland, USA | [6]Academic Urology Unit, The Royal Marsden NHS Foundation Trust, Sutton, Surrey, UK | [7]School of Medicine—Basic Sciences, Vanderbilt University, Nashville, Tennessee, USA | [8]National Institute of Agricultural Technology, Argentina | [9]Health in Emergency and Disaster Research Center, Social Health Research Institute, University of Social Welfare and Rehabilitation Sciences, Tehran, Iran | [10]GigaScience Press, BGI Hong Kong, Hong Kong Science Park, New Territories, Hong Kong | [11]Universitätsmedizin Berlin, Freie Universität Berlin and Humboldt Universität zu Berlin, Medizinische Klinik mit Schwerpunkt für Psychosomatik, Center for Patient-Centered Outcomes Research, Berlin, Germany | [12]Computational Biology and Bioinformatics Unit, de Duve Institute, UCLouvain, Brussels, Belgium | [13]Department of Biological Sciences, University of Montréal, Montréal, Québec, Canada | [14]Macedonian Academy of Sciences and Arts, Skopje, North Macedonia | [15]Institute of Public Health, Charité, Universitätsmedizin Berlin, Berlin, Germany | [16]Thünen Institute of Baltic Sea Fisheries, Rostock, Germany | [17]Centre for Clinical Brain Sciences, University of Edinburgh, Edinburgh, UK | [18]Marine Affairs Program, Life Sciences Centre, Halifax, Canada | [19]Access 2 Perspectives, Berlin, Germany | [20]Department of Human Behavior, Ecology and Culture, MPI for Evolutionary Anthropology, Leipzig, Germany | [21]Department of Biology, University of York, York, UK | [22]TIB—Leibniz Information Centre for Science and Technology, Hannover, Germany | [23]Universitätsmedizin Berlin, Berlin, Germany | [24]Student Network for Open Science e.V., Berlin, Germany | [25]The Abdus Salam International Centre for Theoretical Physics, Trieste, Italy | [26]Physiological Sciences Dept, Biological Sciences Center, Federal University of Santa Catarina (UFSC), Florianopolis, Brazil | [27]Lightoller LLC, Chicago, Illinois, USA | [28]Institute of Globally Distributed Open Research and Education (IGDORE), Chicago, Illinois, USA | [29]School of the Art Institute of Chicago, Chicago, Illinois, USA | [30]Institute of Radiology, Charité Universitätsmedizin Berlin, Berlin, Germany | [31]Charité, Universitätsmedizin Berlin, Berlin, Germany | [32]Geoinformatics, Department of Geosciences, Technische Universität Dresden, Dresden, Germany | [33]Department of Animal and Fisheries Sciences, Maseno University, Kenya | [34]DataCite—International Data Citation Initiative e. V., Hannover, Germany | [35]PLOS Biology, Public Library of Science, Cambridge, UK | [36]German Centre for Higher Education Research and Science Studies, Berlin, Germany | [37]Independent Researcher and Founder, DeSci Movement, Paris, France | [38]Translational and Clinical Research Institute, Faculty of Medical Sciences, Newcastle University, Newcastle-upon-Tyne, UK | [39]CIBB, Center for Innovative Biomedicine and Biotechnology, University of Coimbra, Coimbra, Portugal | [40]CNC-UC, Center for Neuroscience and Cell Biology, University of Coimbra, Coimbra, Portugal

Acknowledgements

Open Access funding enabled and organized by Projekt DEAL.

Conflicts of Interest

Robin K. Bagley is an associate editor for the *Proceedings B* Preprint Editorial Team. Matthieu P. Boisgontier is a member of the Society for Transparency, Openness, and Replication in Kinesiology (STORK), editor for *Communications in Kinesiology* (CiK), and manager for Peer Community in (PCI) Health & Movement Sciences. Samuel Brod is a Senior Editor at BioMed Central. Clarissa F. D. Carneiro is a member of the editorial board of the *Open Access Journals* Toolkit. Roger J. Colbran is an associate editor at the *Journal of Biological Chemistry.* Natascha I. Drude is an external consultant and animal welfare officer at Medizinisches Kompetenzzentrum c/o HCx Consulting, Brandenburg, Germany. Scott C. Edmunds is Editor in Chief of GigaScience Press and is employed by BGI Hong Kong. Małgorzata Anna Gazda is an associate editor for the *Proceedings B* Preprint Editorial Team and a Dryad Scientific Advisory Committee member. Biljana Gjoneska is a member of the editorial board in *PloS One*, *Zeitschrift für Psychologie*, *Journal of Behavioural Addictions*, *BMC Psychology*, and *Discover Psychology*, as well as a member of the *Journal Editors Discussion Interface (JEDI).* Toivo Glatz received funding from the Volkswagen Foundation to further develop a peer-review training course for early career researchers and open-source train-the-trainer materials. Through the initiative, they (Toivo Glatz and Jessica Rohmann) partner with *The BMJ* and *BMJ Medicine*, whose editors provide manuscripts for group peer review as a part of the training activities. He is a member of the editorial board for methodology and statistics at Neurology. Stefanie Haase is an associate editor at the *Canadian Journal* of Fisheries and Aquatic Sciences. Hannah L. Harrison is an associate editor with the *Canadian Journal* for Fisheries and Aquatic Sciences. Johanna Havemann is an independent (self-employed) trainer and consultant for *Open Science Communication*. Friederike Hillemann is an associate editor for the *Proceedings B* Preprint Editorial Team. Cilene Lino-de-Oliveira received funds from the Alexander von Humboldt Foundation to develop the CAMARADES Brazil website, a member of the editorial board of *Acta Neuropsychiatrica*, *Scientific Reports* (Registered reports), and *PLOS Biology* (Academic Editor). Gary S. McDowell is an independent consultant working on issues pertaining to early career researchers and scholarly publication. Daniel Nüst is co-PI of CODECHECK, an initiative that seeks to work with journals and conferences to introduce reproducibility reviews into the peer review process. Iratxe Puebla is Director of Make Data Count, an initiative that drives development and adoption

of open data metrics, and is also a member of the Board of Directors of FORCE11, an organisation that supports innovation in the ways knowledge and scholarly outputs are created and shared. Affiliated with ASAPbio at the time at which the event took place. Roland G. Roberts is a senior editor at *PLOS Biology*. Jessica L. Rohmann received funding from the Volkswagen Foundation to further develop a peer-review training course for early career researchers and open-source train-the-trainer materials. Through the initiative, they (Jessica Rohmann and Toivo Glatz) partner with *The BMJ* and *BMJ Medicine*, whose editors provide manuscripts for group peer review as a part of the training activities. Bianca M. Trovò is the co-founder of Ants-Review, a blockchain-based protocol for incentivising open, privacy-preserving peer reviews on Ethereum. She also co-initiated the decentralised science (DeSci) movement to promote open and equitable scientific practices using decentralised technologies. She completed the ASAPbio 2022 Fellowship programme, contributing as an Ambassador to the Crowd Preprint Review and Publish Your Reviews initiatives. Tracey L. Weissgerber is a reviewing editor for *eLife* and a member of the *American Physiological Society* Publications Committee and *PLOS Scientific* Advisory Board.

Data Availability Statement

Data sharing is not applicable to this article as no datasets were generated or analysed during the current study.

References

Aczel, B., B. Szaszi, and A. O. Holcombe. 2021. "A Billion-Dollar Donation: Estimating the Cost of Researchers' Time Spent on Peer Review." *Research Integrity and Peer Review* 6, no. 1: 14. https://doi.org/10.1186/s41073-021-00118-2.

Amano, T., V. Berdejo-Espinola, M. Akasaka, et al. 2023. "The Role of Non-English-Language Science in Informing National Biodiversity Assessments." *Nature Sustainability* 6, no. 7: 845–854. https://doi.org/10.1038/s41893-023-01087-8.

Amano, T., V. Ramírez-Castañeda, V. Berdejo-Espinola, et al. 2023. "The Manifold Costs of Being a Non-Native English Speaker in Science." *PLoS Biology* 21, no. 7: e3002184. https://doi.org/10.1371/journal.pbio.3002184.

Baker, J. W., H. Crowley, D. Wald, et al. 2024. "Sharing Data and Code Facilitates Reproducible and Impactful Research." *Earthquake Spectra* 40, no. 3: 2210–2218. https://doi.org/10.1177/87552930241259397.

Batista Leite, S., M. Brooke, A. Carusi, et al. 2024. "*Promoting Reusable and Open Methods and Protocols (PRO-MaP): Recommendations to Improve Methodological Clarity in Life Sciences Publications.*" JRC138064. Publications Office of the European Union. https://doi.org/10.2760/58321.

Bornmann, L., R. Mutz, and H.-D. Daniel. 2010. "A Reliability-Generalization Study of Journal Peer Reviews: A Multilevel Meta-Analysis of Inter-Rater Reliability and Its Determinants." *PLoS One* 5, no. 12: e14331. https://doi.org/10.1371/journal.pone.0014331.

Borrego, Á. 2023. "Article Processing Charges for Open Access Journal Publishing: A Review." *Learned Publishing* 36, no. 3: 359–378. https://doi.org/10.1002/leap.1558.

Carobene, A., A. Padoan, F. Cabitza, G. Banfi, and M. Plebani. 2024. "Rising Adoption of Artificial Intelligence in Scientific Publishing: Evaluating the Role, Risks, and Ethical Implications in Paper Drafting and Review Process." *Clinical Chemistry and Laboratory Medicine (CCLM)* 62, no. 5: 835–843. https://doi.org/10.1515/cclm-2023-1136.

Chue Hong, N. P., D. S. Katz, M. Barker, et al. 2021. "FAIR Principles for Research Software (FAIR4RS Principles)." https://doi.org/10.15497/RDA00068.

Edmunds, S. 2022. "The First English-Spanish-Ukrainian Publication. How to Publish Multilingual Articles With GigaByte." GigaBlog. https://doi.org/10.59350/v4emk-5r363.

Else, H. 2021. "A Guide to Plan S: The Open-Access Initiative Shaking Up Science Publishing." *Nature*. https://doi.org/10.1038/d41586-021-00883-6.

Fatone, S., M. P. Dillon, B. J. Hafner, and N. Ramstrand. 2020. "The Challenges of Double-Blind Peer Review in an Era of Increasing Research Transparency." *Prosthetics and Orthotics International* 44: 189–191. https://doi.org/10.1177/0309364620937864.

Gorelick, D., and Y. Li. 2021. "Reducing Open Access Publication Costs for biomedical Researchers in the U.S.A." *MIT Science Policy Review* 2: 91–99. https://doi.org/10.38105/spr.4nu1qfjf3t.

Harrison, H. L., and P. A. Loring. 2023. "PubCasts: Putting Voice in Scholarly Work and Science Communication." *Science Communication* 45, no. 4: 555–563. https://doi.org/10.1177/10755470231186397.

Heggeness, M. L., K. T. W. Gunsalus, J. Pacas, and G. McDowell. 2017. "The New Face of US Science." *Nature* 541, no. 7635: 21–23. https://doi.org/10.1038/541021a.

Heidt, A. 2024. "A Publishing Platform That Places Code Front and Centre." *Nature*. https://doi.org/10.1038/d41586-024-02577-1.

Holman, C., B. A. Kent, and T. L. Weissgerber. 2021. "How to Connect Academics Around the Globe by Organizing an Asynchronous Virtual Unconference." *Wellcome Open Research* 6: 156. https://doi.org/10.12688/wellcomeopenres.16893.2.

Holman, C., T. Weissgerber, B. Kent, et al. 2022. "Tips & Tricks for ECR Initiatives Working to Improve Science." https://doi.org/10.17605/OSF.IO/AD57E.

Huber, J., S. Inoua, R. Kerschbamer, C. König-Kersting, S. Palan, and V. L. Smith. 2022. "Nobel and Novice: Author Prominence Affects Peer Review." *Proceedings of the National Academy of Sciences of the United States of America* 119, no. 41: e2205779119. https://doi.org/10.1073/pnas.2205779119.

Jain, V. K., K. P. Iyengar, and R. Vaishya. 2021. "Article Processing Charge May Be a Barrier to Publishing." *Journal of Clinical Orthopaedics and Trauma* 14: 14–16. https://doi.org/10.1016/j.jcot.2020.10.039.

Kent, B. A., C. Holman, E. Amoako, et al. 2022. "Recommendations for Empowering Early Career Researchers to Improve Research Culture and Practice." *PLoS Biology* 20, no. 7: e3001680. https://doi.org/10.1371/journal.pbio.3001680.

Kohrs, F. E., N. I. Drude, A. Bandrowski, and T. L. Weissgerber. 2025. "Ten Simple Rules for Being a Co-Author on a Many-Author Non-Empirical Paper." *PLoS Computational Biology* 21, no. 8: e1013317. https://doi.org/10.31219/osf.io/4mbt9.

Kohrs, F. E., and T. L. Weissgerber. 2025. "Engaging the Global Academic Community: Practical Strategies for Organizing Asynchronous Virtual Unconferences." https://doi.org/10.31219/osf.io/kcm7d_v1.

McDowell, G. S., J. D. Knutsen, J. M. Graham, S. K. Oelker, and R. S. Lijek. 2019. "Co-Reviewing and Ghostwriting by Early-Career Researchers in the Peer Review of Manuscripts." *eLife* 8: e48425. https://doi.org/10.7554/eLife.48425.

McDowell, G. S., C. A. Niziolek, and R. S. Lijek. 2021. "How to Bring Peer Review Ghostwriters Out of the Dark." *Molecular Biology of the Cell* 32, no. 6: 461–466. https://doi.org/10.1091/mbc.E20-10-0642.

Mehta, D., Y. Bediako, C. M. De Winde, et al. 2020. "Ways to Increase Equity, Diversity and Inclusion." *eLife* 9: e60438. https://doi.org/10.7554/eLife.60438.

Neiman, M., R. K. Bagley, D. Paczesniak, and S. Singh-Shepherd. 2021. "Development, Implementation and Impact of a New Preprint Solicitation Process at *Proceedings B*." *Proceedings of the Royal Society B: Biological Sciences* 288, no. 1954: 20211248. https://doi.org/10.1098/rspb.2021.1248.

Nikaj, S., D. Roychowdhury, P. K. Lund, M. Matthews, and K. Pearson. 2018. "Examining Trends in the Diversity of the U.S. National Institutes

of Health Participating and Funded Workforce." *FASEB Journal* 32, no. 12: 6410–6422. https://doi.org/10.1096/fj.201800639.

Nüst, D., and S. J. Eglen. 2021. "CODECHECK: An Open Science Initiative for the Independent Execution of Computations Underlying Research Articles During Peer Review to Improve Reproducibility." *F1000Research* 10: 253. https://doi.org/10.12688/f1000research.51738.2.

Odeny, B., and R. Bosurgi. 2022. "Time to End Parachute Science." *PLoS Medicine* 19, no. 9: e1004099. https://doi.org/10.1371/journal.pmed.1004099.

Otto, J. L., G. S. McDowell, M. M. Balgopal, and R. S. Lijek. 2023. "Preprint Peer Review Enhances Undergraduate Biology Students' Disciplinary Literacy and Sense of Belonging in STEM." *Journal of Microbiology & Biology Education* 24, no. 2: e00053-23. https://doi.org/10.1128/jmbe.00053-23.

Receveur, A., J. Bonfanti, S. D'Agata, et al. 2024. "David Versus Goliath: Early Career Researchers in an Unethical Publishing System." *Ecology Letters* 27, no. 3: e14395. https://doi.org/10.1111/ele.14395.

Rohmann, J. L., N. Wülk, K. Rubarth, et al. 2025. "Engaging Doctoral Students in Peer Review: A Pre-Post Study Evaluating the Effectiveness of the "Peerspectives" Course on Review Quality, Knowledge and Skills." *medRxiv*: 2025-02. https://doi.org/10.1101/2025.02.11.25322060.

Rouan, J., G. Velazquez, J. Freischlag, and M. R. Kibbe. 2021. "Publication Bias Is the Consequence of a Lack of Diversity, Equity, and Inclusion." *Journal of Vascular Surgery* 74, no. 2: 111S–117S. https://doi.org/10.1016/j.jvs.2021.03.049.

Sarabipour, S., H. J. Debat, E. Emmott, S. J. Burgess, B. Schwessinger, and Z. Hensel. 2019. "On the Value of Preprints: An Early Career Researcher Perspective." *PLoS Biology* 17, no. 2: e3000151. https://doi.org/10.1371/journal.pbio.3000151.

Sayab, M. 2025. "Guest Post—Invisible by Design? Rethinking Global Indexing to Include MENA Journals—The Scholarly Kitchen." https://scholarlykitchen.sspnet.org/2025/07/03/guest-post-invisible-by-design-rethinking-global-indexing-to-include-mena-journals/.

Schulz, R., A. Barnett, R. Bernard, et al. 2022. "Is the Future of Peer Review Automated?" *BMC Research Notes* 15, no. 1: 203. https://doi.org/10.1186/s13104-022-06080-6.

Siler, K., K. Lee, and L. Bero. 2015. "Measuring the Effectiveness of Scientific Gatekeeping." *Proceedings of the National Academy of Sciences of the United States of America* 112: 360–365. https://doi.org/10.1073/pnas.1418218112.

Stern, B. 2024. "How the Web of Science Takes a Step Back | Plan S." https://www.coalition-s.org/blog/how-the-web-of-science-takes-a-step-back/.

The Lancet Planetary Health. 2022. "Publishing at What Cost?" *Lancet Planetary Health* 6, no. 3: e180. https://doi.org/10.1016/S2542-5196(22)00048-1.

The Problems With Science Journals Trying to Be Gatekeepers – and Some Solutions – *Wire Science*. 2020. https://science.thewire.in/the-sciences/scientific-publishing-peer-review-open-access/.

Tollefson, J., and R. Van Noorden. 2022. "US Government Reveals Big Changes to Open-Access Policy." *Nature* 609, no. 7926: 234–235. https://doi.org/10.1038/d41586-022-02351-1.

Urban, L., M. De Niz, F. Fernández-Chiappe, et al. 2022. "Elife's New Model and Its Impact on Science Communication." *eLife* 11: e84816. https://doi.org/10.7554/eLife.84816.

Weissgerber, T. L., N. I. Drude, R. Rahal, and F. E. Kohrs. 2025. "Ten Simple Rules for Leading a Many-Author Non-Empirical Paper." *PLoS Computational Biology* 21, no. 8: e1013283. https://doi.org/10.31219/osf.io/q3azn.

Weissgerber, T. L., M. A. Gazda, G. Nilsonne, et al. 2024. "Understanding the Provenance and Quality of Methods Is Essential for Responsible Reuse of FAIR Data." *Nature Medicine* 30, no. 5: 1220–1221. https://doi.org/10.1038/s41591-024-02879-x.

Wells Ajinkya, A., K. Gladfelter Graham, A. Meadows, B. Mehmani, R. Mukhopadhyay, and M. Stanton. 2023. "Implementing a Diversity, Equity, Inclusion, and Accessibility Strategy: Lessons Learned at Five Scholarly Communications Organizations." *Learned Publishing* 36, no. 1: 119–123. https://doi.org/10.1002/leap.1534.

Wilkinson, M. D., M. Dumontier, I. J. Aalbersberg, et al. 2016. "The FAIR Guiding Principles for Scientific Data Management and Stewardship." *Scientific Data* 3, no. 1: 160018. https://doi.org/10.1038/sdata.2016.18.

Willis, J. V., K. D. Cobey, J. Ramos, et al. 2022. "Online Training in Manuscript Peer Review: A Systematic Review." *medRxiv*: 2022-09. https://doi.org/10.1101/2022.09.02.22279345.

Wolf, J. F., L. MacKay, S. E. Haworth, et al. 2021. "Preprinting Is Positively Associated With Early Career Researcher Status in Ecology and Evolution." *Ecology and Evolution* 11, no. 20: 13624–13632. https://doi.org/10.1002/ece3.8106.

Wright, D. E. 2024. "Five Problems Plaguing Publishing in the Life Sciences—and One Common Cause." *FEBS Letters* 598: 2227–2239. https://doi.org/10.1002/1873-3468.15018.

Xie, B., Z. Shen, and K. Wang. 2021. "Is Preprint the Future of Science? A Thirty Year Journey of Online Preprint Services (Version 1)." Preprint, arXiv, 2102.09066. https://doi.org/10.48550/ARXIV.2102.09066.

Supporting Information

Additional supporting information can be found online in the Supporting Information section. **Appendix S1:** leap2028-sup-0001-Supinfo.docx. **Figure S1:** Unconference participation.