Access to Science & Scholarship 2024

Building an evidence base to support the future of open research policy

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About the Workshop

About the Workshop

Scientific progress hinges on robust systems for curating, vetting, validating, and sharing research. Funder policies are increasingly driving openness and transparency of research results, with varying degrees of success. As the January 2026 implementation date for the new public access requirements from the U.S. White House Office of Science and Technology Policy (OSTP) approaches, how can we ensure that current and future policies lead to the most effective and trustworthy ways to share research? Can the research community develop and fund a research agenda to understand how these changes will impact the research process, leading to an understanding of how to most effectively further the open science agenda?

A solutions-focused workshop targeted to these questions, organized by the MIT Press and funded by the National Science Foundation, was held on September 20, 2024. It convened a diverse group of experts for intensive discussion on the open questions provoked by changes in the research communications enterprise. The workshop's goal was to advance a research agenda that can inform the development of new policies and practices in open science communications. This document summarizes the workshop and the key research questions emerging from each session.

Workshop facilitation and report coordination were provided by Clarke & Esposito.

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Executive Summary

Executive Summary

The following research questions resulted from **Access to Science & Scholarship 2024: Building an evidence base to support the future of open research policy**, a workshop organized by the MIT Press and funded by the National Science Foundation. The workshop was held on September 20, 2024, in Washington, DC. Presentations and panel–audience engagement throughout the workshop generated many interesting discussion points and potential research questions (which were captured in the workshop summary report). Below, those questions have been consolidated and prioritized to focus on those that are both critical and most actionable in terms of building the evidence base to support open research policy going forward.

1. How can scenario modeling be used to better model and anticipate the outcomes (including unintended consequences) of science communication policy, whether as the result of new policies or changes to existing policies (e.g., what are the potential impacts of immediate Green open access policies on subscription revenues for publishers and subscription spend for universities)? Through what mechanisms can stakeholders (e.g., policy-setting bodies like governments and funders, researchers, publishers, librarians) come together for productive scenario modeling?
2. What standardized measures are needed to evaluate the impact and effectiveness of open science policies and practices?
3. What are the challenges and benefits of peer review, and how do they differ across disciplines, models of peer review, and types of scientific output? What evaluations are needed to assess the impact of current models of peer review, as well as new and emerging models? How effective are peer review badges (or other indicators of the level of peer review) at signaling trust for readers? What are current incentives and barriers for individual scholars to engage in peer review activities, and how might they be adjusted to better encourage and reward productive peer review?

4. What will the impact of current open science policies be on university presses and research associations/societies? For societies/associations that rely on subscription revenues to fund other activities, what new funding/business models are emerging, and how can they be assessed? Likewise, should the funding models for university presses be revisited?
5. What are the costs to researchers and their institutions of open data policies under different implementation scenarios? How can funders and institutions ensure these costs are covered for their funded researchers?
6. How are research data reused, what is required to make them reusable, and how does that vary from field to field? What is the differential value of data sharing and archiving depending on field of research, data types, and repurposing use cases? What policy interventions are likely to be most effective across disciplines and data types?
7. What are the administrative burdens of open science policy (including both access to research papers and open data) compliance for researchers, and how does that differ across disciplines, output types, institutional support, etc.? What opportunities exist to mitigate and/or lower the administrative burden for individual researchers?
8. How does the community, the general public, and the media use preprint servers? Is there trend data or other indicators that would help us predict the growth and role of preprint services over the next five years? How might the preprint publishing model evolve to meet global research dissemination demands during emergent, high-impact challenges to knowledge creation and access? What are the broader implications of decoupling dissemination from validation?
9. What models can be developed to support the long-term maintenance, development, and innovation of scholarly communications infrastructure such as preprint servers, metadata standards, persistent identifiers, data repositories, etc.? What elements are critical to designing the shared infrastructure that will underpin scholarly communications (e.g., governance models, proprietary vs. open models)? How can we ensure that such infrastructure is financially supported such that it can continue to evolve to support science?

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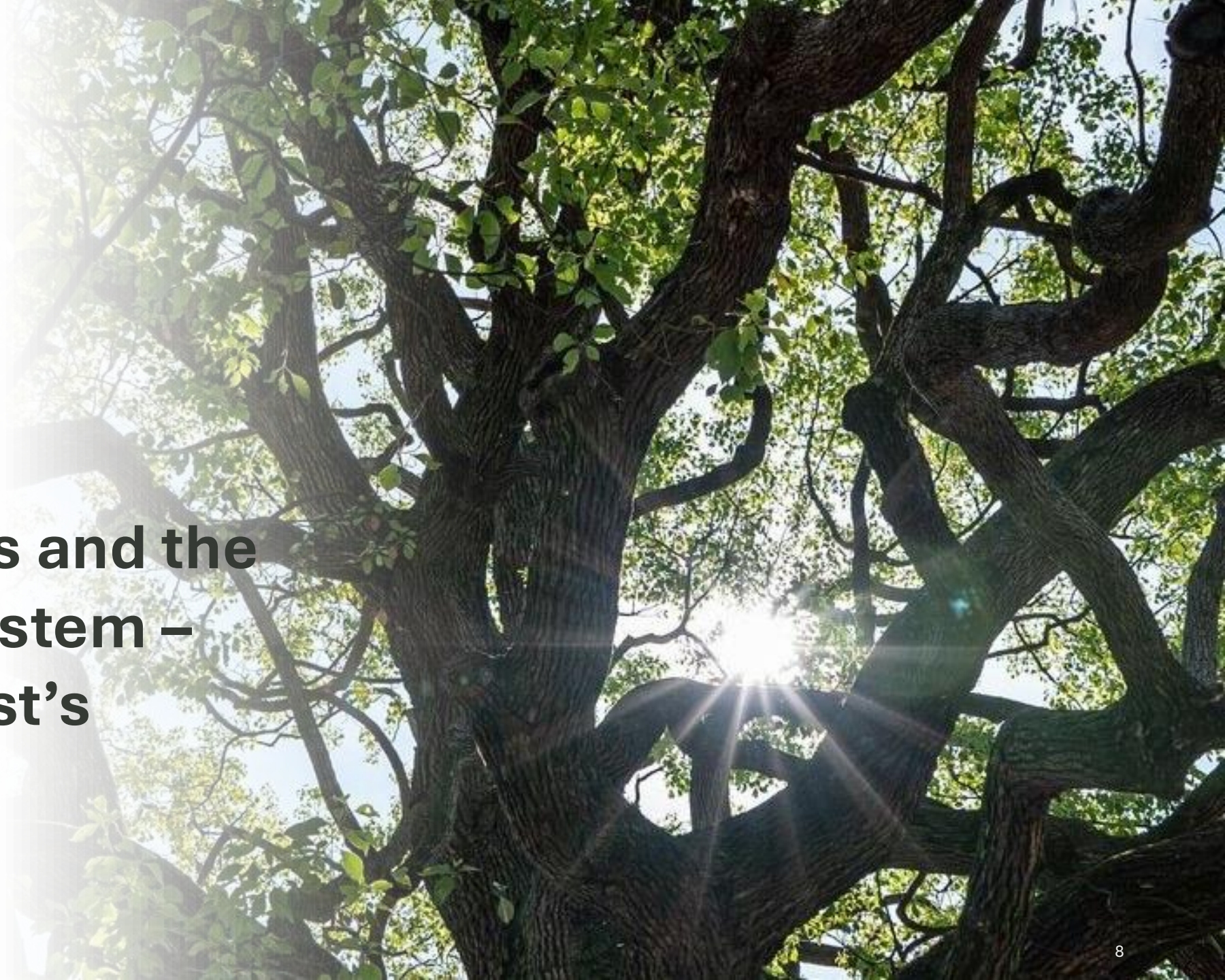
Keynote Address

Open Access and the Research System – An Economist's Provocation



Keynote Address: Open Access and the Research System – An Economist's Provocation

The scholarly communication system we have now is not what we would choose if starting over. Is the transition to open science an opportunity to move beyond it?

Access the full session >

Speaker

Adam B. Jaffe, Professor Emeritus and Research Professor of Economics, Brandeis University

Keynote Address: An Economist's Provocation

Key Session Discussion Points

- The system of research communication we have now involves institutions outsourcing professional evaluation of their employees to publishers. Overreliance on bibliometrics in academic evaluation is problematic and excludes qualitative understanding of what researchers are doing for their employers.
- Moving to open access for research outputs could provide a similar evaluation process for academics if funding agencies provide adequate resources (including a cross-subsidy from funded to unfunded researchers).
- But doing so is a wasted opportunity to move beyond the World War II era conception of the relationship between government and the research enterprise.
- A potential solution is to separate *dissemination* of research results from *evaluation* of those results. This would require reorganizing existing funding and processes. Research institutions still need a way to evaluate their employees.

Keynote Address: An Economist's Provocation

Key Research Questions and Potential Trials for Further Exploration

1. What do journals really do and how much do they improve things?
2. How does the community use preprint servers? What was the experience during the Covid pandemic in dealing with a wave of uncurated publications?
3. What is the correlation between what journals and referees do with what universities care about?
4. If preprints are mandated for dissemination, what models would work for curation and evaluation? How can those preprints be edited, curated, and improved, and how would that be paid for?
5. What is the potential for AI to play a role in researcher evaluation?
6. Do these science-focused methods work for the humanities or social sciences?

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Access and Evolving Business Models

Access and Evolving Business Models

This session looked at how access paradigms and evolving business models have reshaped the landscape of scholarly communication. Subscription-based models are being supplanted by various open access frameworks – how do these models affect the availability and dissemination of research, and what new models are emerging at the intersection of academic and commercial interests? Are any of these models sustainable over the long term? How does each model shift market dynamics and the balance between larger commercial publishers, research societies, and independent/university presses?

[Access the full session >]

Speakers

MODERATOR

Rachel Burley, Chief Publications Officer, American Physical Society

PANELISTS

Collette Bean, Chief Publishing Officer, American Physiological Society

Curtis Brundy, Associate University Librarian for Scholarly Communications and Collections, Iowa State University

Susan King, Executive Director, Rockefeller University Press

Penelope Lewis, Chief Publishing Officer, American Institute of Physics

Access and Evolving Business Models

Key Session Discussion Points (1)

- We are more than a decade into the strong push into open access and can see what the impact has been. Publishing is incentivized to shift to a volume-based system, rather than a highly selective process that focuses on quality.
- There is no global consensus on the optimal business model for scholarly communication. Because of this, we are in a mixed-model economy and are likely to be in one for at least the next decade. Supporting many models is complex and expensive for publishers and institutions. This is especially true for society and university press publishers who do not have the scale to support multiple models robustly.
- Digital and online publishing is significantly *more* expensive than print publishing. Printing and shipping are a small fraction of publisher costs. Online systems require constant development and maintenance, and new requirements are regularly added. Costs increase every year. The heaviest cost areas are in the peer review process and the related infrastructure, including new requirements for research integrity checks that have increased in number and frequency with the increase in research output.

Access and Evolving Business Models

Key Session Discussion Points (2)

- Smaller and nonprofit publishers are in a more precarious situation than larger, well-funded publishers. Smaller publishers need to experiment more, but have limited resources. Very little funder engagement has been seen around supporting these experiments.
- Sharing of information and reporting on experimentation are essential to learning from experiments and building improved models.
- Growth is needed for sustainability – growth in articles, reviewers needed, services that are provided (particularly around research integrity). Most models don't build in the financial growth needed for sustainability.
- Nonprofit organizations serve the community well but are struggling as money is being shifted out of the system.
- Much still depends on the reward and evaluation systems of academia, which are dictating current practices.

Access and Evolving Business Models

Key Research Questions and Potential Trials for Further Exploration (1)

1. How can funders better support experimentation with new models of publishing?
2. What are the added costs to libraries, publishers, funders, and researchers of supporting a diverse and mixed-model publishing economy?
3. How can governments and funders perform scenario modeling for any policy? The large commercial publishers thrive because they do long-term scenario modeling; can this be adapted for policy planning?
4. How well does open access progress match with the community's goals? What specifically are those goals, and what are the right metrics to measure them? Counting numbers of papers or numbers of agreements creates perverse incentives. What are meaningful measurements?

Access and Evolving Business Models

Key Research Questions and Potential Trials for Further Exploration (2)

5. What changes are needed in the funding, hiring, and career advancement systems to better encourage open science and open access? What will it take to implement these changes?
6. How can we model the impact of long-term use of the zero-embargo Green open access repository deposition model on the scholarly publishing ecosystem?
7. If scholarly communications business models of the future are designed with no profit incentive, what impact will this have on innovation, research integrity, and author service? If there is no (or very little) reward for excelling, and no (or very little) surplus to reinvest in technological development, staff, preservation, and the maintenance of standards set by the industry, how will that impact progress?
8. If research societies and university presses must sacrifice publishing earnings to more effectively support open science, what can be done to build financial support for the work they do on behalf of the community?

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Research Data Access, Curation, and Storage

Research Data Access, Curation, and Storage

Research data are a cornerstone of the scientific method. This session scrutinized current practices and policies around data access, curation, and storage, assessing their adequacy in the face of escalating data complexity and volumes. Is data truly its own research product? Why do researchers struggle with using discipline repositories that help with curation and reuse? What are the real costs of such policies? Topics discussed included the need for robust, scalable infrastructures to support data sharing, the challenges of ensuring trusted data, and the role of data in enhancing the transparency and utility of scientific findings.

Access the full session >

Speakers

MODERATOR

Shelley Stall, Vice President, Open Science Leadership Program, American Geophysical Union

PANELISTS

Cynthia Hudson Vitale, Associate Dean, Technology Strategy and Digital Services, Johns Hopkins University

Danie Kinkade, Biological and Chemical Oceanography Data Management Office, Woods Hole Oceanographic Institution

John Wilbanks, Independent Consultant

Research Data Access, Curation, and Storage

Key Session Discussion Points (1)

- Open data will make open access to research literature look easy. Readying data for reuse and long-term storage will be much more expensive and much more complex.
- The RADS (Realities of Academic Data Sharing) Initiative looked at costs of public access to research data. Researchers spend around 6% of their grants on this, averaging $30K per grant. Institutional expenses ran from $800K to $6M per year, averaging $2.5M. These are likely underestimates, and the project is now in a second phase to improve the data.
- Significant investments are needed in research data infrastructure and in training researchers. High-quality, curated data repositories are expensive. Researchers have not been trained in how to manage data, and few understand best practices or their options.

Research Data Access, Curation, and Storage

Key Session Discussion Points (2)

- Generic solutions that work across all sciences will not be feasible. Customizable resources are needed.
- Currently there are few incentives for researchers related to open data, just penalties. Similarly, systems for measuring the value of data sharing are lacking.

Research Data Access, Curation, and Storage

Key Research Questions and Potential Trials for Further Exploration

1. What are the costs to researchers and their institutions of open data policies? How can funders ensure these costs are covered for their funded researchers?
2. How is data reused over time, and how does that vary from field to field?
3. Where are data type–specific and field-specific repositories feasible? How can funding be secured, not just for initial building, but for long-term maintenance?
4. Is there a future "data steward" personnel position to manage data curation for an institution? What expertise would be needed for such a role?
5. What does a successful data hygiene training program look like, and how can such programs be funded?
6. What is needed to better track the value offered by data sharing?

6
Future of Peer Review

Future of Peer Review

Peer review stands as the gatekeeper of quality in scholarly publishing and the research community overwhelmingly values the improvements it brings to the literature. As science is both growing and moving toward more transparent, open practices, how is this affecting the peer review process? This session looked at new models that are arising, particularly around the use of preprints, which both accelerate the pace of research dissemination but also raise questions about quality control. The discussion considered alternative models of peer review, the potential for crowd-sourced and post-publication review, and the integration of technology to streamline the review process.

Access the full session >

Speakers

MODERATOR

Daniela Saderi, Cofounder and Executive Director, PREreview

PANELISTS

A.J. Boston, Scholarly Communication Librarian, Murray State University

Lisa Cuevas Shaw, Chief Operating Officer and Managing Director, Center for Open Science

John Inglis, Executive Director, Cold Spring Harbor Laboratory Press and Cofounder, bioRxiv and medRxiv

Ashley Moses, Chief Executive Officer, *The Civilian,* and Stanford University

Future of Peer Review

Key Session Discussion Points (1)

- Peer review of research outputs is essential. It can be immensely helpful to authors and greatly improve the quality of those outputs. It can provide trust markers and help readers prioritize the increasing mass of information emerging worldwide. However, peer review does not need to be done as it is currently done.
- The current system of peer review is increasingly unsustainable and can seem obstructive rather than constructive. It is often slow and inefficient, and sometimes requires additional (but unnecessary) experimental work. Researchers put up with it to receive career reward and recognition.
- The reviewer pool needs to be significantly expanded to meet the increasing levels of publication.
- Uncoupling dissemination from evaluation offers potential solutions and improvements. The use of preprints addresses the slow pace of peer review, as well as potentially reducing inequity in open access by providing free and discoverable research outputs.

Future of Peer Review

Key Session Discussion Points (2)

- Cultural change is needed to bring about change in peer review. Much of a researcher's activities are dictated by the current rewards and incentive systems. Improving peer review will come from making it normative, rewarding, and required.
- Signs of change are being seen in some institutions and by some funders. New models allow as much scientific output as possible into the world, and then a process of evaluation can take place through a variety of ways. Preprints are not the only route, nor are papers the only important research output.
- Peer review could be useful throughout the research lifecycle (e.g., through Registered Reports) rather than waiting until the late stages as we do now.
- AI has potential to automate some signals of trust.

Future of Peer Review

Key Research Questions and Potential Trials for Further Exploration

1. What models can be developed for long-term sustainability of preprint servers?
2. How can peer review activity be better tracked and rewarded?
3. Does every scientific output need to be peer reviewed? Should all fields be reviewed the same way? Should different types of review be performed for different audiences?
4. Support is needed for testing the effectiveness of technology in assessing research outputs, and how they compare to human assessment.
5. How can the pool of high-quality peer reviewers be expanded? What sorts of training programs are needed and how can they be supported?

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Communications Infrastructure

Communications Infrastructure

As we venture deeper into the digital era, the infrastructure underpinning scientific communication becomes increasingly vital. This session investigated the current state of this infrastructure, including digital repositories, scholarly databases, and communication networks. The requirements for a robust, secure, and flexible infrastructure that can support the diverse open science needs of researchers, librarians, and publishers were discussed.

[Access the full session >]

Speakers

MODERATOR

Roger Schonfeld, Vice President, Organizational Strategy and Libraries, Scholarly Communication, and Museums, Ithaka S+R

PANELISTS

Sami Benchekroun, Co-founder and Chief Executive Officer, Morressier

Promita Chatterji, Director of Journals, Elsevier

Lisa Janicke Hinchliffe, Professor/Coordinator for Research Professional Development, University of Illinois at Urbana-Champaign Library

Communications Infrastructure

Key Session Discussion Points (1)

- Infrastructure is essential for open science. Every session at this workshop touched directly on the infrastructure needed for success.
- Scholarly communication is increasingly complex, but relies on outdated infrastructure that may be holding back progress.
- There are enormous benefits to shared infrastructure. Sharing provides economies of scale and enables smaller organizations like society publishers and university presses to participate.
- There are tradeoffs between nonprofit and commercial infrastructure. Shared infrastructure is most valuable as a public good, but commercial dynamics are often key to driving innovation. Capital investment is needed to build and maintain infrastructure. Large shared infrastructure is unlikely to be agile or flexible.

Communications Infrastructure

Key Session Discussion Points (2)

- Competition can drive innovation, but often one tool emerges and there is value in everyone standardizing around the same infrastructure.
- There is a difference between open infrastructure for science, and infrastructure for open science.

Communications Infrastructure

Key Research Questions and Potential Trials for Further Exploration

1. What models are ideal for shared infrastructure? Is it possible to build infrastructure that is open and community-owned/governed that still allows for commercial development (e.g., Linux)?
2. Are different models of governance and funding needed for different types of infrastructure?
3. Are funders willing to support ongoing maintenance of infrastructure rather than just initial grants for building new tools?
4. How can communications infrastructure provide trust signals for research integrity?

8

Opportunities for Furthering Open Science

Opportunities for Furthering Open Science

The final panel of the day reflected back on the information and suggestions presented and discussed during each session to explore the horizon for open science. What opportunities are available for broadening the reach of open science practices? What are the next steps – what can be done to support better, data-driven policies and practices to improve the value, speed, and reliability of scientific research? The panel considered the policy implications, funding mechanisms, and international collaborations needed to support a sustainable and inclusive open science ecosystem.

Access the full session >

Speakers

MODERATOR

Amy Brand, Director and Publisher, The MIT Press; Cofounder, Knowledge Futures Group

PANELISTS

Brian Hitson, Director, U.S. Department of Energy, Office of Scientific and Technical Information (OSTI)

Lisa Janicke Hinchliffe, Professor/Coordinator for Research Professional Development, University of Illinois at Urbana-Champaign Library

Véronique Kiermer, Chief Scientific Officer, PLOS

Sudip Parikh, Chief Executive Officer and Executive Publisher, Science Family of Journals

Phillip Sharp, Institute Professor and Professor of Biology Emeritus, Intramural Faculty, Koch Institute, Massachusetts Institute of Technology

Opportunities for Furthering Open Science

Key Session Discussion Points (1)

- US public access policy is meant to be model agnostic. In reality, it is likely to drive a shift toward APC-based Gold open access. But agencies see high APCs as not sustainable and taking money away from research.
- Open science should reach beyond the research community itself and provide useful information that is situationally important for every audience. But this is an expensive process.
- Transparency is an essential component of open science. But making research more transparent comes with costs.
- There is value in separating dissemination of research outputs from the evaluation of those outputs. This will speed progress.

Opportunities for Furthering Open Science

Key Session Discussion Points (2)

- Tensions emerge because our research systems are serving multiple purposes, some of which are oppositional. Recognizing those tensions can help lead to better decision-making.
- One tension that concerns governments is between openness and research security. However, history shows us that open exchange in science has benefitted the US and other countries. At the same time, in lots of fields research is no longer taking place in the academy and instead happens behind closed doors.
- Generative AI offers the potential for significant disruption. We are feeding information into a system that generates results without the accompanying trust markers.
- A common thread throughout the workshop was a need for changing the organizational and labor models for science. These are at the root of many of the issues plaguing science communication.

Opportunities for Furthering Open Science

Key Research Questions and Potential Trials for Further Exploration (1)

1. How can we better model and anticipate the consequences of science communication policy? Policies so far have resulted in significant unintended consequences, so how can we at least make them unexpected? What sorts of programs would allow for modeling different consequences with different outcomes?
2. Is there some form of Green open access that would be immediately accessible that publishers would find sustainable?
3. Is Diamond open access scalable?
4. We know the costs to authors for Gold open access. What are the "costs" to readers of Green open access, such as no access to the Version of Record, and encumbered discovery?
5. How can research funders support experimentation with new and more equitable business models for scientific publishing?

Opportunities for Furthering Open Science

Key Research Questions and Potential Trials for Further Exploration (2)

6. Peer review remains essential. If dissemination is decoupled from evaluation, who is best suited to perform that evaluation, and how is that process managed and funded?
7. Are we investing in research to understand what happened during the Covid pandemic? Research results came out more rapidly, but much of it was not helpful. What are the lessons we should learn from this?
8. How can research outputs be translated into different forms that serve different audiences? How would that be funded?
9. Increased regulation of science communication is building a significant compliance burden for researchers. What are the opportunities to lower the administrative burden? How can we better communicate new requirements to researchers, or, better yet, build systems where they don't need to spend time/thought on compliance issues?

Opportunities for Furthering Open Science

Key Research Questions and Potential Trials for Further Exploration (3)

10. Where we see informed pockets of dissent against policy, can we better understand their reasoning and what can we learn from them?
11. How can stakeholders at all levels improve the career and funding incentive structure of the academy?

Conclusion

It is imperative that we align various perspectives and interests to arrive at a shared vision for how best to design and build a durable and vibrant scholarly communications system that is better fit for purpose.

Our policy decisions must be evidenced-based. We urgently need a scientific approach to crafting the future of research publishing. We call for the community, and especially scholarly communications researchers in partnership with public and private funders, to develop an agenda — and make the necessary rational and transparent financial commitments — that will have a significant and sustainable impact on the evolution of a viable open science framework.

Please visit the Access to Science & Scholarship 2024 website for more information. Send feedback to:access-to-science@mit.edu