

# Publish, Don't Perish: Recommendations for Mitigating Impacts of the New Federal Open Access Policy

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**Executive Summary:** In August, the White House Office of Science and Technology Policy issued a new policy requiring that all federally funded scholarly research be accessible to the public immediately upon publication. While this open access policy will ultimately benefit society by increasing the availability of data and research outputs, it could place a heavy burden on researchers due to the relatively high cost of open access alongside an academic culture that tends to favor publishing in high impact subscription journals. We examine the complexities of the traditional publishing landscape and offer recommendations for agencies, universities, and publishers to mitigate the impacts on researchers. Specifically, we recommend a short-term increase in funding to cover higher publishing costs, but contributions from all stakeholders are needed to facilitate a long-term solution.

## I. Background

Recently the White House Office of Science and Technology Policy (OSTP) announced that by 2026, all federally funded research, including data, must be made available to the public immediately upon publication ("OSTP Issues Guidance to Make Federally Funded Research Freely Available without Delay." 2022; Nelson 2022). This is a change from a 2013 memo which stipulated that all federally funded research must be freely available 12 months after initial publication. (Holdren 2013). While this change has elicited strong opinions from publishers and academics (e.g. Parikh 2022, Tollefson and Van Noorden 2022), conflicting priorities among the various stakeholders (researchers, funding institutions, and publishers) could thwart this progress without additional details to support the implementation of this policy.

Currently, academic publishing is torn between two competing paradigms: traditional subscription-based and open access (OA) journals. Traditional publishing uses a pay-to-play model wherein the published articles are behind a paywall and academic institutions or individuals pay subscription fees for immediate access to the publications. This system disadvantages poorly funded institutions and individuals, especially in the developing nations, who cannot afford the subscription fee. In OA journals, researchers submitting results must pay significant article processing charges (APCs) but the published articles are freely available immediately after publication. Open access journals are categorized into several different business models, the most popular being gold OA, where the final published version is freely available and the authors retain copyright. There are other models that allow varying forms of archiving and copyrights. In addition, researchers provide free

labor in the form of peer review, regardless of the type of journal. Researchers are the producers, consumers, and uncompensated labor force in a captive marketplace.

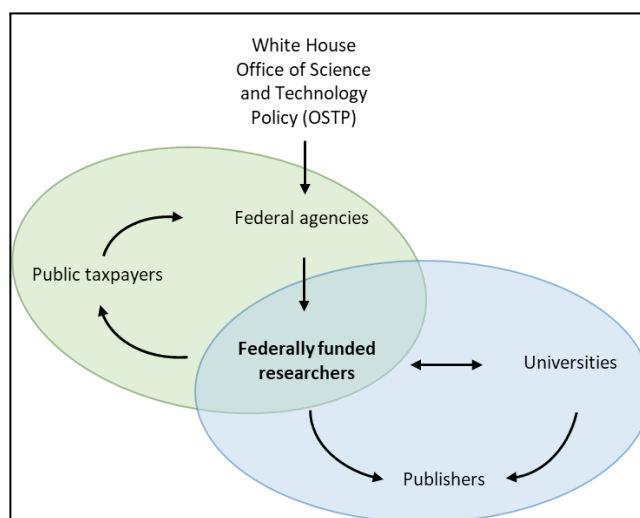
Globally there has been a movement towards OA. The European Union requires that projects funded by the Horizon Europe program publish their results and data open access (European Commission, n.d.). Large philanthropic organizations, such as the Bill and Melinda Gates Foundation, also embrace open science (“Open Access Policy” 2021). However, both OA and traditional paradigms are alive and well due to conflicting priorities among the stakeholders, which are often in tension with each other. Many researchers want their findings to be available to the public. But with limited resources and pressure to publish in high impact journals for career advancement, researchers are left with an impossible choice. The constraints imposed by limited budgets, academic prestige, and a desire for open science contribute to the tug-of-war when researchers decide between traditional and OA publishing. With this federal policy change, the choice is being made for researchers and they must navigate this intricate ecosystem (Figure 1).

While the new OSTP policy will allow more equitable access to published research, the details of how it will be implemented within the complex scholarly publishing landscape are still being developed. While there are countless intricacies that could be addressed, we outline the scope of the problem and the relationships among affected stakeholders. We make specific recommendations for federal agencies, universities, and publishers to mitigate impacts on researchers in the short-term and envision a future where open science is not hampered by affordability or academic culture.

## II. The complex web of scholarly publishing

While one might assume that researchers are at the center of the academic sphere, publishers are the true kingpins when it comes to disseminating the results. Traditional journals charge researchers and institutions to both publish and consume manuscripts, while also utilizing researchers as free labor for manuscript reviews. The University of California system infamously paid roughly \$11 million in subscription fees annually to Elsevier, one of the major publishers (Resnick 2019). Most

publishers refuse to disclose their finances, but decade-old profit margin estimates range from 40-50% for large publishing groups such as Wiley and Elsevier (Van Noorden 2013). It was estimated that unpaid peer review of submitted research would account for about 30-45% of estimated publishing costs if reviewers were compensated for their time (Houghton et al. 2009). With the change to OA, the business model of publishing is expected to change. In OA, where there are no subscription fees, the costs to publish are further increased. For example, choosing to publish open access in *Nature*, one of the highest impact journals, requires researchers to pay an eye-watering APC of \$11,390 (€9,500) (“Costs of Publishing in Springer Nature Journal” n.d.; Else 2020).



**Figure 1.** The scholarly publishing landscape is complex, with many interrelated stakeholders. A solid arrow indicates a relationship between two entities, with the direction of the arrow indicating the flow of services, oversight, or funds. A dashed arrow indicates an indirect relationship. Federally funded researchers are caught within two feedback loops: a) researchers are funded by federal agencies, and both parties ultimately work on behalf of taxpayers (green circle), and b) researchers are often employed by universities, which expect frequent high-impact publications, and both researchers and universities pay publishers with time and money to produce and consume journal publications (blue circle).

While publishers provide some services like facilitating peer review, checking for plagiarism, proofreading, typesetting, indexing, and printing or online hosting (Van Noorden 2013), it is unlikely that the services are commensurate with these sums. For federally funded researchers, this means that an

unnecessarily large portion of taxpayer money gets diverted from research to administrative publishing fees.

The culture of academia keeps researchers in a seemingly unwinnable position. Researchers, especially those early in their careers, are driven by the idea that one must “publish or perish” since universities tend to view researchers’ academic success based on their publication record (McKiernan et al. 2019). This leads to a feedback loop where researchers must publish frequently to be considered productive; they must demonstrate high productivity to get funding; and they must obtain funding to execute research. A sustained track record of productivity, as demonstrated through publishing and obtaining funding, is necessary for early career researchers who want to eventually become tenured. As a result, two situations occur: 1) the same researchers continue to receive grants as funding begets more funding and, 2) researchers perform lower risk, incremental research. These phenomena can explain an increase in the median age of NIH grant recipients from 40 years old in 1980 to 50-years- old in 2010, which prompted the NIH to implement its Next Generation Researchers’ Initiative to increase funding for early career researchers (Lauer 2021). This has led to a perceived stagnation of scientific achievement despite a large workforce and larger funding (Collison & Nielsen 2018; Chu & Evans 2021; Bloom et al. 2020). There is a fear that the barrier imposed by APCs could lead to fewer papers being submitted, which would slow scientific progress rather than accelerate it. This is a problem for federally funded research because a disproportionate amount is spent on disseminating results. The system as-is stifles innovation by discouraging big, bold ideas that could be transformative.

Without thoughtful implementation, the new OSTP policy could unintentionally exacerbate the costs of publishing. The leaders of the House Science Committee have raised this issue by asking how to “ensure that the costs of publishing are not shifted entirely to research grants, cutting into funding intended for cutting-edge research and development?” (Johnson & Lucas 2022). This also raises the question of whether extra appropriations are needed. While applauding the “greater transparency” that would be achieved by this policy,

a “robust dialogue” is needed (Johnson & Lucas 2022). Because the government is beholden to taxpayers, the changes made to implement this policy must lead to the most efficient use of limited funds.

During the Covid-19 pandemic, preprint manuscripts and open access became the norm in the medical community, showing that a transition to OA is possible by all stakeholders (Carr 2020). We believe that the open sharing of data and results can improve the quality of science and increase the rate of progress. The realm of academic publishing is multi-faceted, so the solution must involve all stakeholders. Below, we present specific recommendations that could solve this problem in the short term and long term.

### III. Recommendations

#### *i. Funding agencies*

The immediate way agencies can encourage open access publishing is through greater allocation of grant budgets to offset the higher fees associated with open access publishing. By allocating additional portions of grant budgets towards such fees, agencies can provide a temporary, if expensive, solution that would meet the current demands of publishers. Similarly, agencies could also stimulate OA publication of groundbreaking research through the creation of OA-specific publishing funds. These funds would allow researchers to apply for supplemental funding for the publication of high impact research to help ensure that the research gets deserved attention *and* remains openly accessible.

Increased scrutiny of publication costs in proposed research budgets could also help ensure that researchers are accounting for the higher OA publishing fees. The OSTP memorandum says federal agencies should “allow researchers to include reasonable publication costs” in grant proposals, but the definition of reasonable costs and the degree to which publication budgets are considered in the grant selection process are often poorly defined (OSTP 2022).

In the long term, the capping of grant allocations for publishing fees by large federal agencies may be an effective means of preventing further increase in the cost of publishing. The cap could be based on impact

factor or set at a single maximum fee. It is likely that publishers would adjust their fees in response to a budget cap if they saw a significant reduction in submissions.

Finally, we recommend that agencies openly endorse non-profit OA journals and platforms with minimal or no fees for researchers, such as the nonprofit *Open Research Europe* (Article Processing Charges | Open Research Europe 2022). Government-backed platforms, like *Open Research Europe*, that share breakdowns of how their publishing fees are spent encourage OA publishing, create an expectation of cost transparency, and may drive the reduction of fees by competitor private publishers. A main challenge for any new, alternative journal is establishing an impact factor and reputation that attracts enough high-quality submissions.

#### *ii. Universities*

We recommend that universities take action to facilitate a culture of OA publishing in the scientific community. If universities were to unsubscribe from the major publishers, they could use those funds instead to cover APCs for researchers who publish OA. We propose that universities consider ending their subscriptions with major publishers and instead fund their researchers and develop data repositories and consortiums for peer reviewed work. In 2019, the University of California system cancelled its subscription with Elsevier, leading the push away from traditional, subscription-based publishing (Resnick 2013). The UC system has since signed a new open access agreement with Elsevier that saves them 7% for both publishing and accessing articles (Kell 2021). Most institutions are not as large as the UC system, and thus do not have the same leverage to negotiate with publishers. However, additional universities adopting this change collectively would send a clear message that publishers cannot ignore: the scientific community will pursue openly accessible publishing whether traditional publishers are involved or not.

Additionally, we propose that universities reevaluate the weight that journal impact factor carries in the tenure and promotion review process. In a survey of review, promotion, and tenure documents for universities in the United States and Canada, the majority support using journal impact factor and correlate the metric with research quality, despite a

lack of evidence (McKiernan et al. 2019). More representative, qualitative metrics have been proposed, including commitment to open science; transparent disclosure of insignificant or negative results; service to the community and engagement in peer review; and willingness to share data, software, and methodology (Moher et al. 2018). A shift towards these parameters would reduce the burden on early career researchers stuck in the middle of the competing priorities of the current landscape. Specifically, this change would relieve researchers of the decision between publishing in newer OA journals versus more established, expensive, higher impact journals. This cultural shift would reward researchers for making their work publicly accessible and addresses equity issues in scientific career development that historically favors established, well-funded researchers at affluent universities. Researchers should not have to choose between career stability and scientific integrity or accessibility. While universities may be hesitant to adopt such large financial and cultural changes, these institutions, publicly funded ones in particular, should reflect on their responsibility to the public regarding accessibility to cutting-edge research.

#### *iii. Publishers*

Publishers have expressed mixed feelings about the new policy. In response to the rumored policy change in 2019, industry groups sent a letter to the president and openly opposed immediate open access (Subbaraman 2019). When the new policy was officially issued in 2022, publishers claimed to actively support OA (Tollefson and Van Noorden 2022). Publishers have made a habit of reticence regarding their finances, and they stand to lose a lot with deviations from the status quo. We recommend that publishers improve transparency regarding the operating costs of their journals. We acknowledge that as for-profit entities, publishers are under no obligation to disclose financial information. However, we implore them to participate in this conversation out of the same sense of responsibility that motivates the services they provide: The importance of clear and accurate dissemination of scientific information. A clear breakdown of what services publishers provide and how APCs are used could help agencies and universities make more informed decisions about providing financial support to researchers, resulting in a more efficient use of funding for scientific research. Additionally,

offering a wider range of OA publishing and subscription options, including a proportional sliding price scale, could incentivize researchers and institutions to continue using a traditional publisher's OA services instead of pursuing novel OA journals, databases, and consortiums. While the government cannot mandate changes to publishers, agencies could invite publishers to participate in this transition to OA publishing, which would hopefully ease the process for all participants.

#### IV. Conclusions

Without additional mitigating actions from federal agencies, universities, and publishers, researchers

will be fighting an uphill battle in pursuit of open access science. While the OSTP policy change is a major step forward, the process remains unclear and potentially burdensome. The transition to an open access status quo is possible if all stakeholders are willing to modify their existing cultures and procedures. We hope that our recommendations can help facilitate a transition to open access knowledge sharing and a more equitable and integrous future for scientific publishing.

#### References

- "Article Processing Charges | Open Research Europe." n.d. Accessed October 25, 2022. <https://open-research-europe.ec.europa.eu/for-authors/article-processing-charges>.
- Bloom, Nicholas, Charles I. Jones, John Van Reenen, and Michael Webb. 2020. "Are Ideas Getting Harder to Find?" *American Economic Review* 110 (4): 1104-44. <https://doi.org/10.1257/aer.20180338>.
- Carr, David. 2020. "Coronavirus (COVID-19): Sharing Research Data." Wellcome. January 31, 2020. <https://wellcome.org/press-release/sharing-research-data-and-findings-relevant-novel-coronavirus-ncov-outbreak>.
- Chu, Johan S. G., and James A. Evans. 2021. "Slowed Canonical Progress in Large Fields of Science." *Proceedings of the National Academy of Sciences* 118 (41): e2021636118. <https://doi.org/10.1073/pnas.2021636118>.
- Collison, Patrick, and Michael Nielsen. 2018. "Is Science Stagnant?" *The Atlantic*, November 16, 2018. <https://www.theatlantic.com/science/archive/2018/11/diminishing-returns-science/575665/>.
- "Costs of Publishing in Springer Nature Journal." n.d. *Nature Support*, Accessed October 25, 2022. <https://support.nature.com/en/support/solutions/articles/6000084580-costs-of-publishing-in-springer-nature-journal>.
- Else, Holly. 2020. "Nature Journals Reveal Terms of Landmark Open-Access Option." *Nature* 588 (7836): 19-20. <https://doi.org/10.1038/d41586-020-03324-y>.
- European Commission. n.d. "Horizon Europe." Research and Innovation. Accessed October 25, 2022. [https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe\\_en](https://research-and-innovation.ec.europa.eu/funding/funding-opportunities/funding-programmes-and-open-calls/horizon-europe_en).
- Holdren, John. 2013. "Memorandum for the Heads of Executive Departments and Agencies: Increasing Access to the Results of Federally Funded Scientific Research." February 22, 2013. [https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/ostp\\_public\\_access\\_memo\\_2013.pdf](https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/ostp_public_access_memo_2013.pdf).
- Houghton, John, Bruce Rasmussen, Peter Sheehan, Charles Oppenheim, Anne Morris, Claire Creaser, Helen Greenwood, et al. 2009. "Economic Implications of Alternative Scholarly Publishing Models: Exploring the Costs and Benefits a Report to the Joint Information Systems Committee." Report to the Joint Information Systems Committee. January 2009. [https://vuir.vu.edu.au/15222/1/EI-ASPM\\_Report.pdf](https://vuir.vu.edu.au/15222/1/EI-ASPM_Report.pdf).
- Johnson, Eddie Bernice, and Frank Lucas. Letter to Dr. Arati Prabhakar. 2022, October 18, 2022.
- Kell, Gretchen. 2021. "UC's deal with Elsevier: What it took, what it means, why it matters." 2021. University of California. March 18, 2021. <https://www.universityofcalifornia.edu/news/uc-s-deal-elsevier-what-it-took-what-it-means-why-it-matters>.



- Lauer, Mike. 2021. "Long-Term Trends in the Age of Principal Investigators Supported for the First Time on NIH R01-Equivalent Awards – NIH Extramural Nexus." November 18, 2021. <https://nexus.od.nih.gov/all/2021/11/18/long-term-trends-in-the-age-of-principal-investigators-supported-for-the-first-time-on-nih-r01-awards/>.
- McKiernan, Erin C, Lesley A Schimanski, Carol Muñoz Nieves, Lisa Matthias, Meredith T Niles, and Juan P Alperin. 2019. "Meta-Research: Use of the Journal Impact Factor in Academic Review, Promotion, and Tenure Evaluations." *ELife* 8 (July): e47338. <https://doi.org/10.7554/eLife.47338>.
- Moher D, Naudet F, Cristea IA, Miedema F, Ioannidis JPA, Goodman SN. 2018. "Assessing scientists for hiring, promotion, and tenure." *PLoS Biol* 16(3): e2004089.
- Nelson, Alondra. 2022. "Memorandum For The Heads Of Executive Departments And Agencies: Ensuring Free, Immediate, and Equitable Access to Federally Funded Research." August 25, 2022. <https://www.whitehouse.gov/wp-content/uploads/2022/08/08-2022-OSTP-Public-Access-Memo.pdf>.
- "Open Access Policy." 2021. Bill & Melinda Gates Foundation. January 1, 2021. <https://www.gatesfoundation.org/about/policies-and-resources/open-access-policy>.
- "OSTP Issues Guidance to Make Federally Funded Research Freely Available without Delay." 2022. The White House. August 25, 2022. <https://www.whitehouse.gov/ostp/news-update/s/2022/08/25/ostp-issues-guidance-to-make-federally-funded-research-freely-available-without-delay/>.
- Parikh, Sudip. 2022. "AAAS Statement on OSTP Federally Funded Research Guidance." American Association for the Advancement of Science (AAAS), August 25, 2022. <https://www.aaas.org/news/aaas-statement-ostp-federally-funded-research-guidance>.
- Resnick, Brian. 2019. "The War to Free Science." *Vox*, June 3, 2019. <https://www.vox.com/the-highlight/2019/6/3/18271538/open-access-elsevier-california-sci-hub-academic-paywalls>.
- Subbaraman, Nidhi. 2019. "Rumours Fly about Changes to US Government Open-Access Policy." *Nature*, December 20, 2019. <https://www.nature.com/articles/d41586-019-03926-1>.
- Tollefson, Jeff, and Richard Van Noorden. 2022. "US Government Reveals Big Changes to Open-Access Policy." *Nature*, August 26, 2022. <https://www.nature.com/articles/d41586-022-02351-1>.
- Van Noorden, Richard. 2013. "Open Access: The True Cost of Science Publishing." *Nature* 495 (7442): 426–29. <https://doi.org/10.1038/495426a>.
- White House Office of Science and Technology Policy (OSTP). 2022. "Desirable Characteristics of Data Repositories for Federally Funded Research." Executive Office of the President of the United States. May 2022. <https://doi.org/10.5479/10088/113528>.
- Yirka, Bob. 2017. "NIH Initiatives to Overcome Age Bias in Grant Offerings Appear to Be Working." *Phys.org*. June 6, 2017. <https://phys.org/news/2017-06-nih-age-bias-grant.html>.

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