

Dr. Nichols,

Thank you for the opportunity to comment on “Public Access to Peer-Reviewed Scholarly Publications, Data and Code Resulting From Federally Funded Research.” These comments are submitted on behalf of the University of Minnesota (UMN) Libraries. UMN is a leading public research institution in the United States, and a key contributor to the entrepreneurial economy of the state of Minnesota, as well as to scholarship both nationally and internationally. The Libraries are responsible for our collections budget, our publishing and data management services, and our support services around public access policies. Based on our expertise, we strongly advocate for a policy that ensures immediate open access (OA) to publications, data, and code resulting from federally funded scientific research. We believe that such a policy would provide immeasurable public benefits.

Question 1: Limitations and barriers and opportunities for change.

- The costs to access literature (typically through subscriptions, but also through purchase of individual articles not affiliated with a subscribing institution) mean that researchers and the public are not able to access all of the information they need. This leads to duplication of efforts and hinders scientific progress. Current estimates are that only around 30% of all journal articles are openly available.¹
- Publisher business models create a significant barrier to effective communication of results. We recognize, as noted by the Association of American Publishers (AAP), that “[p]eer-reviewed articles are not free to produce” and that publishers play an important role in the distribution and stewardship of articles. However, their claim that their investments are made at no cost to taxpayers is false.² The US taxpayer pays several times for access to scholarly publications, including for: 1) research funded by federal grants, 2) exorbitant subscriptions to journals that state-funded academic research institutions must manage, and 3) access to individual articles (pay for view) where they do not have a subscription. Article processing charges (APCs) paid directly from authors, on top of the subscription payments their institutions already make, adds a fourth layer of payment to publishers. Publishers are making significant profits from this system (over 30% for in 2018 for one³).
- Some large, commercial publishers have advocated for the use of APCs as the most effective mechanism to facilitate OA.⁴ However, there are alternative channels to making scholarship openly available that do not require payment. Average APCs for European nations increased 40% between 2012 and 2018, and are currently over \$1700 US.⁵ Such costs limit opportunities for emerging researchers and those without significant grant funding from sharing their research outputs. Furthermore, use of federal funding to pay APCs reduces the amount of funding available for conducting research. Faculty at UMN have expressed that APC payments are not “a good use of taxpayer money.”⁶

¹ <https://doi.org/10.1101/795310>

² <https://newsroom.publishers.org/researchers-and-publishers-oppose-immediate-free-distribution-of-peer-reviewed-journal-articles/>

³ <https://www.relx.com/~media/Files/R/RELX-Group/documents/reports/annual-reports/2018-annual-report.pdf>

⁴ <https://www.springernature.com/gp/advancing-discovery/blog/blogposts/of-mythical-beasts-and-zero-embargo-man-dates/17750710>

⁵ <https://doi.org/10.4119/UNIBI/UB.2014.18>

⁶ <https://doi.org/10.5195/jmla.2018.316>

- The current requirements for public access to federally funded research results allow for a 12-month embargo.⁷ This delay hampers the speed at which science progresses.
- Some scholarly societies have expressed concern that modifications to the current business model may impede their ability to effectively function.⁸ We recognize that adjustments to the marketplace will require changes to societies’ business models, but the subsidizing of society activities with publishing is a recent phenomenon and unsustainable.⁹ The Association for Computing Machinery, originally a signatory of the AAP letter, subsequently revised their statement to express that full OA would benefit the field and that “...if done correctly a zero embargo mandate could benefit the scientific community without becoming an existential threat for societies or publishers.”¹⁰
- Currently, there are few incentives for researchers to make their data openly available and data is not shared openly on a wide scale. For example, we estimate that there are at least 45 petabytes of research data stored on UMN servers, but only 3.3 terabytes (roughly 0.007%) of data are openly shared through the Data Repository for UMN.

There are a myriad of opportunities for change. Shared research is a critical asset for the development of new technologies such as artificial intelligence, per the 2019 Executive Order.¹¹ Overall, open sharing of research findings spurs innovation that stimulates economic growth and addresses societal challenges. .

Question 2: What Federal agencies can do

- **Require immediate OA to publications.** cOALition S, a group of national funding bodies primarily based in Europe plus charitable foundations, released Plan S in 2018.¹² The plan requires immediate OA to publications beginning in 2021. The implementation guidance offers multiple paths to immediate OA, including zero-month embargos for subscription-based publications.
- **Follow a recharge model for federal grant funding expenditures** if publishing charges remain an allowable cost. In this model, authors cannot be charged to support associated business practices (e.g., authors pay only for publishing the article, not to pay for conferences or shareholder profits). APCs should reflect “rates to recover the actual direct costs of the good or service.” We refer to UMN’s Selling Goods and Services to University Departments¹³ policy and Approval for Internal Sales Activity procedure as an example of how a non-profit cost-recovery model could be designed.
- **Require transparency in APCs.** Journals charging APCs should disclose all costs and services. The differences in APC prices indicate that they may not be representative of the true cost of publishing. Large, commercial publishers routinely charge \$2500 or more per article; yet, the average APC globally is approximately \$1000 US, the average APC for a fully OA journal is \$300, and more than 80% of fully OA journals have an APC of \$1000 or

⁷ <https://obamawhitehouse.archives.gov/blog/2013/02/22/expanding-public-access-results-federally-funded-research>
⁸ <https://presspage-production-content.s3.amazonaws.com/uploads/1508/coalitionletteropposinglowerembargoes12.18.2019-581369.pdf?21461>

⁹ Untangling Academic Publishing. Fyfe, A. et al. May 2017. DOI: [10.5281/zenodo.546100](https://doi.org/10.5281/zenodo.546100)

¹⁰ Letter to Dr. Droegemeier. <https://www.acm.org/binaries/content/assets/about/acm-letter-to-ostp.pdf>

¹¹ <https://www.whitehouse.gov/ai/>

¹² <https://www.coalition-s.org/>

¹³ <https://policy.umn.edu/finance/internalsales>

less.¹⁴ Moreover, APC prices continue to grow, creating a system in which more researchers will be unable to disseminate their findings due to financial limitations.

- **Establish caps on article processing charges.** Caps should be established based on financial transparency through which publishers must justify how and why their costs are reasonable for the services performed. There is no evidence to support the argument that if authors are involved in paying APCs, they will make their decisions based on traditional market competition and thus prices will be kept in check.¹⁵ Without establishing caps, authors with limited funding to pay APCs could be prevented from publishing altogether.
- **Improve access and discoverability** by creating a single entry point for public access or at a minimum provide a federated search across repositories. Leveraging and coordinating existing infrastructure (i.e., existing repositories) will limit overhead for agencies and for institutions assisting researchers who may otherwise need to engage with multiple tools. NIH has established partnerships with both federal funding agencies and private funding agencies (<https://www.ncbi.nlm.nih.gov/pmc/about/public-access/>). This model could be investigated to determine if it is feasible for a broader application.
- **Encourage publishers to deposit articles immediately upon publication,** into OA repositories or require publishers to allow researchers to deposit articles. NIH already does this.¹⁶ Doing so will reduce burden on authors. Additionally, publishers should do so without authors incurring additional costs.
- **Provide the necessary technologies to support the creation and distribution of full-text, machine-readable formats for research.** Currently, NIH through PMC is the only federal agency to provide some articles in JATS XML. Machine-readable formats can be captured fully by indexes like Google/Google Scholar, enabling greater discoverability. Machine-readable formats can also be used for text mining, an artificial intelligence technology. The federal government is in a position to be able to support systems to distribute machine-readable, full-text research across all agencies.
- **Require data sharing beyond the results underlying published articles.** Many journals, including the fully OA Public Library of Science titles, require the publication of data underlying articles concurrently with manuscript submission. However, the broader sharing of research data, including data that is not directly associated with publications should be encouraged. This idea is reflected in the definition of scientific data in the article Draft NIH Policy for Data Management and Sharing, “The recorded factual material commonly accepted in the scientific community as necessary to validate and replicate research findings, regardless of whether the data are used to support scholarly publications.”
- **Apply the Federal Data Strategy¹⁷ to research data resulting from research funded by federal agencies.** Federal agencies can apply the same set of standards to research results as they do for federal data.
- **Enforce OA requirements associated with receiving federal research funding.** NIH has been successful in enforcing compliance with their public access policy for scholarly articles

¹⁴ <https://sustainingknowledgecommons.files.wordpress.com/2019/11/oa-apc-main-2019-dataset-documentation.pdf>

¹⁵ <https://doi.org/10.18352/lq.10280>

¹⁶ https://publicaccess.nih.gov/testsite/submit_process.htm

¹⁷ <https://strategy.data.gov/overview/>

through integrating compliance with their annual reporting process and delaying release of funding for non-compliance. This activity is further enabled by the integration of NIH's article repository, PubMed Central, with their Grants and Reporting System, eRA Commons.

- **Evaluate proposals based on the openness of research outputs.** Beyond sanctioning non-compliance with existing policies post-grant award, federal agencies can influence researcher practices by changing the system of evaluation to emphasize openness as a core value. For example, grant applicants could be required to demonstrate their commitment by indicating how open their past research has been. This could positively influence researchers to make their work open in order to be more competitive in their grant proposals.
- **Develop an interoperable model and/or approach for the sharing of articles, code and data.** Similar to HHS's Common Approach to Enhancing Public Access,¹⁸ federal agencies should consider how existing infrastructure, such as the NIH Manuscript Submission System and PubMed Central, could be more broadly utilized to create a centralized access point for articles while minimizing burden for researchers. Multiple government agencies share federal article repositories (e.g., NASA, DHS and EPA use NIH's PubMed Central and the National Science Foundation collaborates with the DoE Office of Scientific and Technical Information on the Public Access Repository) but there is no single entry point for researchers to access the results of all federally funded research.

Question 3: Promoting American science leadership and American competitiveness

- Groups in the European Union and Australia have explored the economic impact of providing immediate access to research results and have found significant benefits. The Australian National Data Service conducted a study to quantify the value of data created during the research process, along with an estimate of the benefits of curating and openly sharing public research data.¹⁹ They found that research data curation and sharing may be worth up to \$4.9 billion (AUD) annually. Additionally, the European Union estimated that the direct economic value of public sector information (produced, collected, or paid for by the government), was currently €52 million. Projections for the value in 2028 ranged from €150 billion to €215 billion, depending on the specific policy implemented.²⁰
- Scholarly publishers have argued that an embargo of less than 12 months would require the federal government to provide additional financial support to publishers.²¹ Yet, the commercialized publishing system creates barriers to American science leadership and competitiveness. Maintaining the status quo protects the commercial publishing industry's bottom lines, to the detriment of other economic sectors and American science leadership.
- NASA has provided an annual update of the technology inspired by their research in their *Spinoff* report since 1976. As of 2019, over 2000 inventions, products, and businesses have

¹⁸ <https://www.hhs.gov/open/public-access-guiding-principles/index.html>

¹⁹ Open Research Data: Report to the Australian National Data Service. November 2014.

https://www.andis.org.au/_data/assets/pdf_file/0019/393022/open-research-data-report.pdf

²⁰ Study to support the review of Directive 2003/98/EC on the re-use of public sector information.

<https://ec.europa.eu/digital-single-market/en/news/impact-assessment-support-study-revision-public-sector-information-directive>

²¹

<https://presspage-production-content.s3.amazonaws.com/uploads/1508/lettertothepresidentfrom140researchandpublicshingorg2.pdf?10000>

been profiled in these reports.²² These advances would not have been achieved had the research NASA conducted not been openly shared.

- It is estimated that the United States produces nearly 18% of all English-language science and engineering publications.²³ Federal funding supports nearly 42% of basic and 34% of applied research.²⁴ Basic and applied research provides the foundation for innovation and access to federally funded research is essential to American competitiveness. As Director Droegemeier wrote in 2019, “[o]ur Nation leads global scientific progress by example, promoting core principles of freedom of inquiry, scientific integrity, collaboration, and openness.”²⁵ However, the National Science Board’s 2018 Science and Engineering Indicators report noted that, although the U.S. is currently the global leader in science and technology, our global share is decreasing.²⁶
- Entrepreneurship is critical to this country’s competitiveness in the global business environment, and entrepreneurs rely on open access to information.²⁷ Minnesota’s “Medical Alley” leads the world in medical device innovation.²⁸ Medical device inventors rely on scientific research to point to unsolved health challenges, surface previously tested solutions, understand optimal outcomes, and more.²⁹ Many entrepreneurs are not institutionally affiliated and therefore lack affordable access to the literature.³⁰ Barriers to scientific research discovery directly impedes medical device innovation, negatively affecting America’s public health and scientific leadership.

²² <https://spinoff.nasa.gov/Spinoff2019/pdf/Spinoff2019.pdf>

²³ Science and Engineering Indicators 2018. National Science Board.

<https://www.nsf.gov/statistics/2018/nsb20181/report/sections/academic-research-and-development/outputs-of-s-e-research-publications>

²⁴ U.S. Research and Development Funding and Performance: Fact Sheet. January 24, 2020. Congressional Research Service. <https://fas.org/sgp/crs/misc/R44307.pdf>

²⁵ <https://www.whitehouse.gov/articles/america-leading-world-science-technology/>

²⁶ Science & Engineering Indicators 2018. www.nsf.gov/statistics/2018/nsb20181/

²⁷ United States Congress Joint Economic Committee, “The State of Entrepreneurship,” July 20, 2016.

<https://www.jec.senate.gov/public/index.cfm/republicans/2016/7/the-state-of-entrepreneurship>; Charlie Wapner, “The People’s Incubator: Libraries Propel Entrepreneurship,” American Library Association, OITP Perspectives, 2016.

http://www.ala.org/advocacy/sites/ala.org.advocacy/files/content/ALA_Entrepreneurship_White_Paper_Final.pdf

²⁸ State of Minnesota, “Innovation Engine,” Thriving in the North 2018,

<https://siterelection.com/cc/minnesota/2018/medical-technology-and-bioscience-innovation-engine.cfm>

²⁹ Gelijns AC, Thier SO. “Medical Innovation and Institutional Interdependence: Rethinking University-Industry Connections.” *JAMA*. 2002;287(1):72–77. doi:10.1001/jama.287.1.72

³⁰ <https://doi.org/10.4000/rfsic.3271>