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PUBLIC ACCESS TO FEDERALLY-FUNDED RESEARCH

HEARING

BEFORE THE

SUBCOMMITTEE ON INFORMATION POLICY, CENSUS, AND NATIONAL ARCHIVES

OF THE

COMMITTEE ON OVERSIGHT AND GOVERNMENT REFORM

HOUSE OF REPRESENTATIVES

ONE HUNDRED ELEVENTH CONGRESS

SECOND SESSION

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PUBLIC ACCESS TO FEDERALLY–FUNDED RESEARCH

THURSDAY, JULY 29, 2010

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON INFORMATION POLICY, CENSUS, AND NATIONAL ARCHIVES,
COMMITTEE ON OVERSIGHT AND GOVERNMENT REFORM,
Washington, DC.

The subcommittee met, pursuant to notice, at 3 p.m., in room 2154, Rayburn House Office Building, Hon. Wm. Lacy Clay (chairman of the subcommittee) presiding.

Present: Representatives Clay, Maloney, Chu, and Chaffetz.

Staff present: Darryl Piggee, staff director/counsel; Yvette Cravins, counsel; Frank Davis and Anthony Clark, professional staff members; Charisma Williams, staff assistant; Marc Johnson, assistant clerk—full committee; Adam Hodge, press secretary—full committee; Justin LoFranco, minority press assistant and clerk; and Mark Marin, minority senior professional staff member.

Mr. CLAY. The subcommittee will come to order.

Good afternoon, and welcome to today's hearing entitled, "Public Access to Federally-Funded Research." Without objection, the chairman and ranking minority member will have 5 minutes to make opening statements, followed by opening statements not to exceed 3 minutes by any other Member who seeks recognition. And without objection, Members and witnesses may have 5 legislative days to submit a written statement or extraneous materials for the record.

The purpose of today's hearing is to examine the current state of public access to federally funded research and to discuss the potential implications of increased access. Every year, the Federal Government, using taxpayer dollars, funds tens of billions of dollars in basic and applied research. Most of the funding is concentrated within 11 Federal departments and/or agencies.

So while this is not a legislative hearing attached to any particular bill, there has been much interest, deservedly so, surrounding this topic on both sides of the issue of how much access should the public have to federally funded research, how would increased access affect grantees, researchers and scholars.

To that end, I determined that the subcommittee should allow an atmosphere for dialog and discussion of public access to federally funded research. It is relevant, current and within the purview of this subcommittee. So today we will hear testimony from stakeholders in the areas of publishing, science research, education and patient advocacy.

This hearing will also examine the operational processes utilized by the National Institutes of Heath in its open access program, including but not limited to the submission process, data usage, embargo time period and compliance information. We will examine how the National Institutes of Health has been affected by the congressional mandate to ensure that the public has access to the published results of NIH-funded research no later than 12 months after publication. What have been the results and ramifications, positive and negative, of that policy to the stakeholders?

I thank all of our witnesses for appearing today and look forward to their testimony. I now recognize the distinguished ranking minority member, Mr. Chaffetz of Utah. Mr. Chaffetz.

[The prepared statement of Hon. Wm. Lacy Clay follows:]

Statement
Of
Chairman Wm. Lacy Clay
Information Policy, Census, and National Archives
Subcommittee
Oversight and Government Reform Committee
Thursday, July 29, 2010
2154 Rayburn House Office Building
2:00 p.m.

"Public Access to Federally-Funded Research"

The purpose of today's hearing is to examine the current state of public access to federally –funded research and to discuss the potential implications of increased access. Every year, the federal government- using taxpayer dollars, funds tens of billions of dollars in basic and applied research. Most of the funding is concentrated within 11 federal departments and/or agencies. So while this is not a legislative hearing- attached

to any particular bill, there has been much interest, deservedly so, surrounding this topic- on both sides of the issue. How much access should the public have to federally-funded research? How would increased access affect grantees, researchers, and scholars? To that end, I determined that the Subcommittee should allow an atmosphere for dialogue and discussion of public access to federally-funded research. It is relevant, current and within the purview of this Subcommittee.

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science, research, education and patient advocacy. This hearing will also examine the operational processes utilized by the National Institutes of Health in its open access program, including but not limited to the submission process, data usage, embargo time period and compliance information. We will examine how the National Institutes of Health (NIH) has been affected by the congressional mandate to ensure that the public has access to the published results of NIH funded research, no later 12 months after publication. What have been the results and ramifications, positive and negative,

of that policy to the stakeholders? I thank all of our witnesses for appearing today and look forward to their testimonies.

Mr. CHAFFETZ. Thank you, and thanks to the various witnesses that are here today. We appreciate your flexibility and understanding with all the votes and other hearings and things that are going on here prior to the recess. I appreciate your patience.

And I appreciate your holding this hearing.

I am looking forward to hearing the exchange from our witnesses. The extraordinary expansion of access to digital information over the past decade has caused heated debate to arise over the issue of public access to federally funded research results. The Federal Government funds billions of dollars in research every year, much of it in the form of grants to researchers.

Typically, researchers write one or more manuscripts detailing the findings of the research in hopes of having them published as articles in scientific journals. Journal publishers subject these submitted manuscripts to a vigorous peer-reviewed process to ensure that the scientific results and conclusions are valid prior to selection for publication.

In exchange for the costs associated with peer review, editing, publication of the manuscript, the researcher typically assigns his or her copyright to the journal publisher. Historically, Congress has directed that federally funded researchers retain expansive intellectual property rights, to encourage the advancement and distribution of scientific knowledge as widely as possible. This system has proven highly successful in allowing researchers from universities in the United States and across the world access to new and constantly evolving scientific information from which they can pursue new discoveries and innovations.

There are now more than 25,000 peer-reviewed journals worldwide, produced by more than 2,000 publishers, ranging from the well-known, such as Nature or the New England Journal of Medicine to one of my own personal favorites, and I know something that all good Americans subscribe to, the Journal on Matrix Analysis and Applications, which publishes articles of interest to the numerical linear algebra community. You subscribe, don't you, Mr. Chairman? [Laughter.]

I will share my copy with you.

In the United States, the scholarly publishing enterprise provides direct employment for roughly 33,000 people.

I am sympathetic to the arguments that proponents of the increased public and free access to federally funded research make regarding the rights of taxpayers to the results of that research. They paid for it, and they should be able to access the fruits of that research.

However, journal publishers invest a significant amount of money and provide a valuable service to the scientific community and the Nation in peer-reviewed editing, publication and dissemination of researched articles. According to estimates made by the publishing community, the National Institutes of Health funded research results in approximately 85,000 journal published articles annually. By the time a final peer-reviewed manuscript is completed, the point at which NIH requires submission under their current rules, publishers estimate that they have invested in excess of $1,400 per article, or roughly $126 million annually.

I am concerned about the Federal Government mandating free access policies, such as the current one at NIH, that diminished copyright protections for private sector journal articles, also particularly with regard to some of the smaller non-profit professional organizations that publish only one or two journals. I am concerned about their ability to stay in the publishing game, and their willingness to invest in the vigorous peer-review process that currently makes our scientific enterprise so vibrant without strong copyright incentives.

One thing I hope we all keep in mind, there are many alternatives to the type of policy currently employed at the National Institutes of Heath in which H.R. 5037, which has been referred to this subcommittee, would expand to other Federal research funding agencies. These alternatives policies would strike an appropriate balance between the taxpayer access to the results of federally funded research and the copyright incentives and protections of the publishers.

For example, in the 2007 America Competes Act, Congress directed the National Science Foundation to develop a system whereby research reports, including readily accessible summary of the outcomes of the NSF-sponsored research, are disseminated instead of copyrighted materials for the publishers. Again, it is a complex issue. There are a variety of directions in which we can go.

And thus, I think the hearing is very appropriate and I look forward to hearing from all of the witnesses today. I appreciate your preparation. And I assure you, given the schedule, all of the information will be properly reviewed.

Thank you, Mr. Chairman, and I yield back.

Mr. CLAY. Thank you, Mr. Chaffetz.

If there are no more opening statements, I will now introduce our first panel. On this panel, we will hear from Mr. Allan Adler. Mr. Adler is the vice president of Legal and Government Affairs with the Association of American Publishers. Welcome.

Our next witness will be Dr. Steven Breckler. Dr. Breckler is a graduate of the University of California at San Diego and received his masters and Ph.D. from Ohio State University. He is the author of numerous publications and articles in the area of psychology. He has served as an assistant professor at Johns Hopkins and as program director of the National Science Foundation. He is currently the executive director at the American Psychology Association. Thank you for being here.

Our third witness will be Professor Ralph Oman. Mr. Oman teaches copyright law at the George Washington University Law School. He also serves as a fellow on the faculty of the Law School's Creative and Innovative Economy Center. Mr. Oman served as chief counsel for the U.S. Senate Judiciary Subcommittee on Patents, Copyrights and Trademarks. He is a graduate of Hamilton College in Georgetown University Law Center.

I want to welcome all of you and thank you for being here today. It is the policy of the subcommittee to swear in all witnesses before they testify. Would you all please stand and raise your right hands?

[Witnesses sworn.]

Mr. CLAY. Thank you . You may be seated. Let the record reflect the witnesses answered in the affirmative.

Each witness will have 5 minutes to make opening statements. Your complete written testimony will be included in the hearing record. The lighting system in front of you will indicate how much time you have left. When it turns red, we would like for you to cease and desist.

Mr. Adler, you may begin.

STATEMENTS OF ALLAN ADLER, VICE PRESIDENT, GOVERNMENT AND LEGAL AFFAIRS, ASSOCIATION OF AMERICAN PUBLISHERS; STEVEN J. BRECKLER, PH.D., EXECUTIVE DIRECTOR FOR SCIENCE, AMERICAN PSYCHOLOGICAL ASSOCIATION; RALPH OMAN, PRAVEL PROFESSORIAL LECTURER IN INTELLECTUAL PROPERTY LAW AND FELLOW, THE CREATIVE AND INNOVATIVE ECONOMY CENTER, GEORGE WASHINGTON UNIVERSITY LAW SCHOOL

STATEMENT OF ALLAN ADLER

Mr. ADLER. Thank you, Mr. Chairman, members of the subcommittee. Thank you for inviting me to participate in this hearing on behalf of the Association of American Publishers, principal trade association of the U.S. book publishing industry, whose for-profit and non-profit members publish books, journals and other literary works in every field of human interest, both in print and digital formats.

Relative to today's hearing, AAP's membership includes some 50 for-profit companies and non-profit organizations that publish scientific, technical and medical journals in both print and digital formats. Because I have submitted a written statement for the record, let me just briefly identify a few key points.

First, as we discuss federally funded research, you will hear references to peer-reviewed journal articles and scholarly publications as well as characterizations of those items as the results or products of federally funded research. Such characterizations, however, are not accurate, and they are particularly misleading in the context of today's discussion. It is critical that you keep in mind the distinction between federally funded research and the private sector journal articles that are written by the funded researchers to report and document that research.

The peer-reviewed articles published in scholarly journals are not themselves funded researchers. Nor are they deliverables required under the terms of the funding grant, as are, for example, the annual progress reports that the research grantees typically require to submit to the funding agency.

Instead, they are separate reports on the funded research, written with the express intention of publication in relevant peer-reviewed journals to describe and explain the process, findings and significance of the funded research that has been conducted by the authoring researchers. These are prepared for publication and ultimately published by peer-reviewed journals without funding from the Government.

Second, the articles that are published in peer-reviewed journals are ultimately collaborative products of the researcher and the

journal publisher, which devotes a substantial amount of its editorial and other publishing resources to ensuring that the final published version of the researcher's account is accurate and that its significance is understood within the context of other research in the same field or related fields.

Journal publishers invest hundreds of millions of dollars in peer review, editing and publishing processes, including for sophisticated communications technologies and electronic resources, support personnel and many part and full-time editors. Publishers manage all stages of the peer-review process from the time the journal publisher receives a new manuscript until the final version is accepted for publication as a journal article. Each manuscript undergoes rigorous review by editors and technical experts prior to publication in a resource-intensive process that helps ensure the quality and integrity of these published accounts of scientific research.

Government mandates, like the NIH Public Access Policy, which requires free online access to the author's final peer-reviewed manuscript after acceptance for journal publication, expropriate, or in simpler terms, take without consideration the substantial investments that the publisher makes in providing added value to the researcher's original manuscript.

And by doing so, they substantially weaken an area of our economy where the United States has a distinct comparative advantage over its competitors in global markets. Science and technology publishers based in North America account for some 45 percent of all peer-reviewed scientific research papers published annually worldwide. For many U.S. journal publishers, over 50 percent of their revenues come from subscriptions delivered outside U.S. borders.

But through mandates like the NIH policy, the government intervenes to become the de facto publisher of the articles and compete directly with the journal publisher in making them available for public access and distribution. Even worse, this unwarranted competition from the Government can lead to further harm to the publishers by facilitating digital piracy, as we have discovered with respect to evidence showing that companies in China are reselling and distributing these journal articles as downloaded from NIH's PubMed central data base without authorization from the publisher.

While some may think such piracy is not the Government's fault, the simple reality is that in today's digitally networked world, the Government cannot presume to make these copyrighted works freely available online to the U.S. taxpayer without also giving them away free to the rest of the world, including competing National governments, public and private institutions, corporations and yes, pirates, all of whom, with the exception of the pirates, would otherwise probably acquire these works from the journal publisher by subscription.

If someone can get these articles for free on a Government Web site, why would they pay to subscribe to journals? Surveys have shown that a significant number of librarians would be likely to cancel their institutional subscriptions to journals if the articles contained in them were accessible online for free, even if the arti-

cles were not available for a year, and even if not all the articles in the journal were available online.

Thus, mandates like the NIH policy also undermine copyright protection for journal articles, and diminish incentives for publishers to continue making substantial investments in managing the peer review process and otherwise improving scientific communications and providing and maintaining non-Government public filtered records of federally funded research. Mr. Chairman, there are better approaches to enhancing public access to the results of federally funded research.

[The prepared statement of Mr. Adler follows:]

Testimony of Allan Adler
Vice President, Government and Legal Affairs
Association of American Publishers

before the

Subcommittee on Information Policy, Census, and National Archives

of the

House Committee on Oversight and Government Reform

concerning

"Public Access to Federally Funded Research"

July 29, 2010

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aap

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Introduction

Chairman Clay, Ranking Member McHenry, Members of the Subcommittee, thank you for holding this hearing. My name is Allan Adler. I am the Vice President for Legal and Governmental Affairs for the Association of American Publishers, the principal trade association representing the American book publishing industry. Our members publish fiction and nonfiction books, educational materials for students of all ages and grades, and most importantly for today's hearing, a wide variety of professional, and scholarly journals. We represent over 50 commercial entities and non-profit organizations that publish scientific, technical and medical journals. I appreciate the opportunity to be here today to share our views on the important issue of public access to federally-funded research.

Unlike the many other challenges our country faces and problems policymakers must solve, there is no crisis in the world of scholarly publishing or in the dissemination of scientific materials. Taking the time to conduct a full, impartial, evidence-based assessment will help ensure that in trying to solve a problem that doesn't exist, unintended consequences do not lead to a crisis in the future.

Publishers strongly believe that American taxpayers are entitled to the research they've paid for. As taxpayers ourselves, collectively and individually, everyone in this room has paid for government-funded research, as well as the data and summary reports that result from this research. But taxpayers have not paid for the private sector, peer-reviewed journal articles reporting on that research.

For over a century, non-profit and commercial publishers have served as the government's partner in fueling scientific discovery and innovation. The presumption now that taxpayers should have free access to peer-reviewed journal articles seriously discounts the considerable contributions of our industry and highly-skilled workforce of some 50,000 who are driving the U.S. knowledge economy and supporting our leadership in science. Our $10 billion industry is a critical part of the U.S. export economy and U.S. global competitiveness.

Sweeping government mandates like the Federal Research Public Access Act would undermine the country's most urgent effort—that is to grow employment while, at the same time, maintaining – indeed, enhancing – U.S. leadership in science. Government mandates requiring free access to private sector products will stifle innovation in what is now a rapidly changing

environment, both by decreasing the amount that publishers are able to invest and reducing their incentive to explore new approaches.

Here are some important numbers:

- 50,000: Number of employees in publishing
- 3 million: Average number of manuscripts submitted to publishers annually[1]
- 1.5 million: Average number of journal articles published annually[2]
- 50-85: Percent an journal article's value that remains after one year of publication
- 90: Percent of publisher revenue attributed to subscriptions
- 44: Percent of librarians, according to a 2006 study, who would opt for free content over a paid subscription, with a twelve-month access delay, assuming only 40% of a journal's content would be available for free,
- $100 million: U.S. publishers annual losses in China due to online piracy of journals, now including downloads from the NIH website
- 19: Percent growth in China's annual science budget, currently totaling over $100 billion
- 1.3 billion: Number of Chinese citizens who can potentially access U.S. journal articles for free from the NIH website

Recognizing the complex array of issues and economic interests, your colleagues on the House Science Committee have developed a framework under the soon-to-be-passed America COMPETES Act reauthorization that will bring together every stakeholder in this room and the research community to discuss specific public access needs and respond appropriately.

Specifically, the COMPETES legislation distinguishes between digital data and scholarly publications and directs policymakers to take into account the role that scientific publishers play in the peer review process, including the investments and added value that they make. COMPETES also requires that the government assess the impact any proposed policies will have on the science, engineering, and the stakeholders, including any financial impact on research budgets. The COMPETES legislation seeks to fully consider policy needs, responses, and consequences.

The House Judiciary Committee has also examined this issue and has raised concerns about the copyright implications of government mandates requiring free access to these copyrighted works. By undermining copyright protections for private sector journal articles, the government diminishes incentives for publishers to continue to make substantial investments in the peer review, editing, and publishing of these important information products.

[1] Ulrich's Periodicals Directory, 16 March 2009, http://www.ulrichsweb.com/ulrichsweb

[2] Ulrich's Periodicals Directory, 16 March 2009, http://www.ulrichsweb.com/ulrichsweb

This is a complex issue that will have far-reaching implications on scientific communication, U.S. jobs, and the peer review system. Government mandates requiring free access to private sector journal articles will have serious unintended consequences for U.S. scholarly publishers, international competitiveness, and intellectual property protection.

The Role and Value Added Contributions of Publishers

The contributions of the publishing industry all too often get lost in debates focused on taxpayer access. Looking more closely at the investments and significant value-added contributions that publishers make highlights more clearly the distinction between federally-funded research and the private sector journal articles that report on that research. Peer-reviewed articles published in scholarly journals are not research, federally-funded or otherwise. They describe and explain the process, findings and significance of research. They require substantial amounts of the publisher's resources to ensure that their content is accurate, new, and important.

Non-profit and commercial journal publishers invest hundreds of millions of dollars every year in the peer review, editing, disseminating, and archiving of scholarly and scientific articles, as well as in creating unique journal brands and identities on which researchers and funders rely to make critically important personal and professional judgments. Journals typically support a specific discipline and serve as a central point of contact and information exchange for the members of that community, who are frequently spread around the world. The reputation of each journal, cultivated by its publisher, is also used as an indicator of the importance of the work in a particular field.

This is the critical infrastructure that has supported scholarly communication and spurred scientific and technological innovation for decades through numerous changes in media and publisher production and delivery mechanisms. Some 2,000 publishers produce over 25,000 peer-reviewed scientific, technical and medical journals, and recent statistics indicate that these journals alone publish more than 1.5 million articles annually.[3] To facilitate this scholarly output, these journal publishers identify appropriate contributors and editors for each journal, ensuring that research results are reported and shared in a way that encourages further research. Most of the 2 to 3 million articles submitted each year do not pass publishers' quality standards on first reading. For example, *The Lancet*, the world's leading general medical journal and specialty journals in Oncology, Neurology and Infectious Diseases, rejects 95% of articles submitted for publication.

More importantly, substantially all submitted papers that are not rejected outright are returned to authors with requests for specific revisions. These requests are the result of refereeing, also known as peer review. The requested changes must be addressed and vetted by the journal's editor, and sometimes the revised manuscript is sent out for another round of refereeing. In practical terms, this means that publishers of these journals finance the collection and review of several times as many manuscripts as they will actually publish to effectively serve as quality guardians of the scientific record. The peer review process is an essential quality-control mechanism that helps to ensure the veracity of the published research and to facilitate their communication through enhanced readability. In a recent international survey of over 3000

[3] Ulrich's Periodicals Directory, 16 March 2009, http://www.ulrichsweb.com/ulrichsweb

scientists, 83% agreed that, without peer review, there would be no control over the integrity of science research.[4]

Journal publishers have established sophisticated online manuscript submission systems to manage the processing of some 2 to 3 million manuscripts submitted annually by researchers around the world. Journal publishers also prepare the 1.5 million manuscripts that are accepted for publication by copyediting, proofing, formatting, branding, paginating, adding metadata and identifiers, checking and enhancing artwork quality, converting accepted manuscripts, data and artwork to XML, and adding links to ensure interoperability.

Journal publishers incur substantial expenses by supporting their editors in conducting peer review. These costs include (1) the highly skilled people required to manage the process, (2) purchasing, maintaining and updating the technology to streamline the process, (3) tracking reviewers and journal articles, (4) locating and maintaining relationships with possible reviewers, (5) sending journal articles out to appropriate reviewers and following up with them to make sure the reviews are completed, and (6) reviewing the responses and communicating those responses to authors.

These steps are typically managed with the help of specialized software systems that are internally developed, licensed commercially or supported by open source software. In addition to the software system, the necessary hardware must be acquired and maintained. Although software is very useful in organizing and managing the peer review process, live editors must evaluate the reviews and determine how to respond. Software cannot substitute for editorial skill and judgment. In addition to the peer review process, the journal publisher's determination to accept or reject a researcher's submitted manuscript, based on the publisher's own quality standards and expertise developed through years of building the brand reputation of the journal, is a hugely important part of the process for maintaining the integrity of the published record of scientific research.

Journal publishers continually invest in new journals to support the needs of scholarly communities and to ensure that intellectual communication keeps pace with new and expanding areas of science and scholarship. New journal titles grow at a rate of about 3% per year,[5] consistent with increases both in the number of researchers and in funding for research and development.

In sum, publishers make significant capital investments and incur significant operating expenses in maintaining their journals. This investment is not paid for by taxpayer dollars. Government mandates requiring free access to private sector journal articles will diminish incentives for publishers to continue to make the significant investments necessary to ensure the publication of the highest quality scientific journal articles.

Impact on Jobs and Economic Growth

The U.S. science publishing market represents some $10 billion in revenue. Over 1000 U.S.-based science journal publishers (including both commercial publishers and many society publishers) employ over 30,000 staff and indirectly support an additional 20,000 workers. North

[4] http://www.publishingresearch.net/documents/PRCsummary4Warefinal.pdf

[5] Ware, Mark and Michael Mabe, The STM Report: An Overview of Scientific and Scholarly Journals Publishing, September 2009, http://www.stm-assoc.org/news.php?id= 255&PHPSESSID=3c5575d0663c0e04a4600d7f04afe91f

American-based science journal publishers account for 45% of all peer-reviewed research papers published annually for researchers worldwide. [6]

Ill-conceived policy initiatives that would undermine publisher copyright protection and thus investment incentive will harm U.S. economic imperatives– reducing unemployment, improving the competitiveness of U.S. companies, and spurring long-term economic growth. We should not allow the political expediencies of the short□term to jeopardize our ability to partner with government to create policies that foster growth. Now more than ever we need to work as business and government partners to preserve the economic leadership of the United States.

Government policies that mandate free online availability of private sector journal articles will have the same effect on the journal publishing industry as free online news and advertising content have had on the newspaper industry: bankruptcy, closure, and job cuts. If anyone can get these journal articles for free on a government website, why would they pay to subscribe to journals? The consequent declining subscription revenue threatens the viability of an industry that has helped stimulate American scientific and technological leadership for decades.

Subscriptions account for approximately 90% of journal publisher revenue.[7] That revenue underwrites the critically important publishing functions discussed earlier. For non-profit societies, subscription revenues provide the means for symposia and member education, internships, research and other critical activities that advance science. The Publishing Research Consortium (PRC) recently commissioned a study of how decision-making factors such as price, embargo period, article version and reliability of access affect librarians' subscription or cancellation behavior. The survey suggests that a significant number of librarians are likely to cancel subscriptions even when just some of a journal's peer-reviewed manuscripts are available freely through open access.[8]

With a twelve-month access delay, assuming only 40% of a journal's content would be available for free, a large proportion (44%) of librarians in the study said they would opt for free content to portions of the journal over a paid subscription. When more than 40% of a journal's manuscripts are available freely on open access, the librarians' expressed an even greater preference for the free option over journal subscriptions. Librarians are unlikely to continue to subscribe to journals if some or all of the content was freely available on government websites. The study counters the proposition that scientific publishers—and the scientific endeavor itself—will not be harmed by an indiscriminate move towards free access that does not take into account such unintended consequences. Further, the results of this study strongly indicate that embargoes will not prevent harm.

Research conducted by the American Psychological Association found that only 15% of the eventual "lifetime" usage of its journal articles – in the form of downloads – occurs within the first year after publication. The graph below demonstrates that articles published in the APA's 37 journals have a long half-life and lifetime usage of about 4.5 and 19.5 years, respectively.

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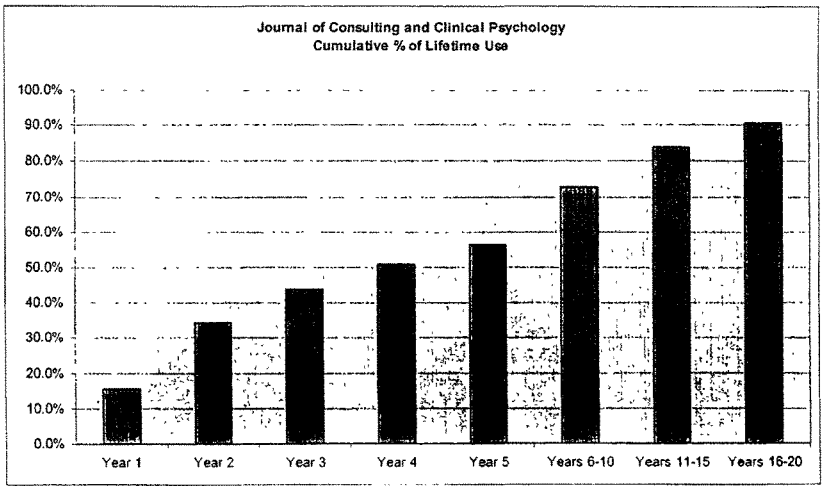
[6] Scholarly Publishing Practice Third Survey, ALPSP

[7] Ware, Mark and Michael Mabe, The STM Report: An Overview of Scientific and Scholarly Journals Publishing, September 2009, http://www.stm-assoc.org/news.php?id= 255&PHPSESSID=3c5575d0663c0e04a4600d7f04afe91f

[8] Publishing Research Consortium Report "Self-Archiving and Journal Subscriptions: Co-existence or Competition" (July 2006). Accessible at http://www.publishingresearch.org.uk/documents/Self-archiving_report.pdf.

Because life-time utilization of APA journal articles occurs over a long period of time (much longer than the first 12 months), government mandates like the NIH public access policy will have a significant, negative impact on APA journals and all other journals with similar usage patterns.



The statistics I just discussed are important, given that subscriptions are critical to sustaining journal publishing and, in turn, journal publishing's essential role in ensuring the integrity, dissemination and preservation of the world's scientific, technical and medical information.

The application of government public access mandates like the Federal Research Public Access Act are indistinguishable from the imposition of an extraordinary and unprecedented exception to the most fundamental of rights under copyright—the exclusive right to distribute the copyrighted work – which, in turn, would diminish the incentive for publishers to continue to make substantial investments in managing the peer review process. Government mandates requiring free access to private sector journal articles will weaken an area of our economy where the United States has a comparative advantage.

Protecting Intellectual Property

Copyright protections have served as the catalyst for publisher investment in the infrastructure needed to sustain a rigorous pre-publication peer review process. Government mandates that make private sector journal articles freely available will undermine copyright protections for journal articles and will diminish incentives for publishers to continue to make the substantial investments in the peer review process.

Government mandates like those adopted by NIH would, effectively, reduce copyright protections to private sector journal articles to 12 months. As discussed above, only 15-50 percent a scholarly journal article's value is realized in the first year of publication. What that means is that a significant value of the journal article is lost by 12 month government mandates.

This type of government intrusion into the private sector poses a direct threat to our free market system. If the government is allowed to diminish copyright protections and expropriate private sector intellectual property, what is to stop this type of government policy from being expanded to other private sector products in other sectors of the economy?

More directly, government mandates that undermine copyright protection for journal articles send the wrong message to our trading partners about the importance of protecting intellectual property rights globally. Such policies are already making it more difficult for our government to advocate strong intellectual property protection and enforcement abroad.

Implications for U.S. Economic Leadership and International Competitiveness

We urged lawmakers to consider the international implications such mandates would have for U.S. intellectual property protection and competitiveness before the NIH Public Access Policy became—unfortunately—law. Mandatory free access represented an unnecessary and unjustifiable dilution of U.S. intellectual property rights protection that would make it increasingly difficult for our trade agencies to prevent intellectual property violations by our global trading partners. For many U.S. professional and scholarly publishers, over 50% of our revenues come from subscriptions delivered outside our borders. This would also threaten other IP industries that contribute significantly to U.S. exports, jobs and economic growth.

Our worst fears are coming true, with dangerous implications not only for U.S. jobs and exports but, critically, for our national security.

In China, domestic companies have been acquiring electronic copies of copyrighted U.S. scientific journal articles from government and university libraries and reselling them through online websites to legitimate producers' primary customers. U.S. publishers and scientific societies are facing annual losses of $80-100 million as a result of this expanding theft. We have been working closely with U.S. trade agencies to address this egregious problem. However, in recent months, we have found evidence that companies in China are reselling and distributing, without authorization, journal articles downloaded from NIH's PubMed Central database – material produced by U.S. publishers at their own expense. The NIH policy is thus contributing to digital piracy.

In the Chinese blogosphere, there are also thousands of links to NIH PubMed Central, which is now routinely accessed by university students, hospitals and, of course, copyright infringers. Making peer reviewed journal articles freely available online will contribute directly to piracy of copyrighted U.S. biomedical journals and journal articles while also diminishing export opportunities in one of the fastest growing markets for U.S. companies.

In a speech earlier this month, President Obama noted that "Boosting America's exports strengthens our economic growth and supports millions of good, high-paying American jobs. That's why I set a goal during my State of the Union address to double our exports over the next five years. Since then, my Administration has worked to improve advocacy for our exporters, remove trade barriers, and enforce trade rules in an effort to ensure that the benefits of global trade are broadly shared." Free-access government mandates directly undermine these critical priorities.

In terms of taxpayer access, some 1.3 billion people in China now have free access to U.S. journal articles via NIH. Longer-term, this has extremely worrisome implications for U.S. scientific leadership and national security. In its 11th Five Year Plan, the Chinese government outlined its plan to become a world leader in science and innovation. China has invested billions in improving its scientific standing. Almost every Chinese ministry has some sort of program to gain a technological edge in everything from missiles to medicine. The People's Liberation Army is supporting one of the pirate companies linking to NIH. U.S. Government mandates requiring free online access to peer-reviewed journal articles funds China's research instead of our own. The U.S. government's failure to protect our intellectual property has emboldened foreign competitors while hurting our economy, global competitiveness and job creation.

Balanced Solutions

We believe there are better approaches to ensuring public access to federally-funded research. It makes the most sense—and is most cost effective—for the government to take advantage of investments already being made by publishers and to work cooperatively in partnership with publishers.

Since the mid 1990s, the journal publishing industry has been a key player in the dramatic digital revolution in the sciences, investing heavily to drive the shift of published research from print-only to "e-only." According to a recent survey by the Association of Learned and Professional Society Publishers, 96% of science, technical and medical journals are available online.[9] That number continues to grow.

The results of the end-to-end digitization of publishing systems are robust digital platforms with the latest Web 2.0 capabilities that can support the Federal Government's effort to link policymakers, researchers and the public. Rapid innovation in the journal publishing industry has dramatically improved functionality and efficiency for doctors and researchers, who can now perform complex searches of journals, immediately retrieve and print full text journal articles, link instantly to other cited journal articles, export text to other databases and programs, and receive e-mail alerts when new journal issues are released. Voluntary cross-publisher initiatives, such as CrossRef, developed with non-government funds, have broadened the impact of these benefits for researchers.

The result of these productivity benefits has been documented. The portion of their time scientific researchers spent analyzing (vs. gathering) information increased dramatically from 2001-2005. Compared to the print-only era, scientists now read 25% more journal articles per year from almost twice as many journals, and they do so using a smaller portion of their time.[10] This dynamic yields major benefits in research and funding effectiveness.

To make it easier to locate and use research information, journal publishers continue to make substantial investments in:

- Creating and maintaining robust hardware and software infrastructures to distribute and archive science research literature, and updating those tools as the needs and expectations of authors and users of journal literature change over time.

[9] Scholarly Publishing Practice Third Survey, ALPSP
[10] Outsell's Buyer Market Database, Dr. Carol Tenopir (2008)

- Verifying references and creating, managing and maintaining online links, providing coding for digital dissemination, integrating machine-readable tags, supporting reference linking and indexing, and otherwise enriching the content, design and functionality of online publications.
- Encouraging and supporting the development of interoperable, industry-standard tools for citation and other purposes, such as "persistent identifiers" (that is, the journal articles' unique identifiers for researchers to ensure that they are using and citing the authoritative version of the journal article).
- Creating visibility of research results through arrangements with third-party vendors that push relevant research information to the appropriate research communities through a combination of traditional tools and emerging technologies, such as abstracting and indexing services, citation databases, table-of-contents alerting services, podcasts, RSS feeds, press communications and sponsorship of scientific and technical conferences, seminars and symposia.

Over the last decade, there has been a dramatic increase in access levels for both researchers and the public. Researchers now have extremely widespread access to journals: a recent study showed that 94% of university and college-based respondents found access to information to be easy, and access to journals is very low on their list of concerns—13th out of 16th (lack of funding is number one; too much paperwork is number 5 on their list).[11] Researchers have access to significantly more content than they did in the print-only era: researchers now read from 25% more journals than in the mid-1990s and university faculty are reading 34% more journal articles.[12]

Public access has also expanded dramatically due to initiatives that publishers have led to broaden access for researchers in developing countries, patients, the public and disabled persons.

For example:

- In 2006, publishers created patientINFORM, an online service developed in cooperation with publishers and patient groups. PatientINFORM, provides patients and their caregivers access at no cost to some of the most up-to-date, reliable research about the diagnosis and treatment of specific diseases. PatientINFORM also helps interpret the research and provides access to additional materials.
- Since the 1990s, publishers have been working with the United Nations to provide developing countries with free or low cost access to important life sciences information. Sponsored by the World Health Organization, Health InterNetwork Access to Research Initiative (HINARI). (www.who.int/hinari/about/en/) provides free or very low-cost online access to the major journals in biomedical and related social sciences to not-for-profit institutions in developing countries. HINARI includes over 2000 journals from 70 publishers.
- *Research4Life* consists of three public-private partnerships that make health, agricultural and environmental research from over 7000 journals available to institutions in the developing world. Many publishers have programs for providing access to patients. They also have "walk-in" clauses in their licenses that enable libraries to give any

[11] Access by UK Small and Medium-Sized Enterprises to Professional and Academic Information, Mark Ware Consulting Ltd for Publishers Research Consortium (April 2009)
[12] Scholarly Publishing Practice Third Survey, ALPSP

member of the public free electronic on-site access to journal articles. Access for visually impaired persons (VIP) has also been increased as publishers have voluntarily implemented the distribution of new formats for those with disabilities. It makes no sense for the government to enter the publishing business by wasting valuable tax funds to duplicate what publishers are doing, particularly when no study has ever been done on what access gaps such government policies are meant to address.

We believe that initiatives like those discussed above are good models that government and publishers can work from to enhance public access to federally-funded research without undermining the scientific enterprise.

Publishers support approaches suggested by the House Science Committee to increase public access to the results of federally-funded research, consistent with the America COMPETES Act of 2007. The COMPETES Act established a public access policy for research funded by the National Science Foundation (NSF). Under the NSF model, such federal agencies would provide in a timely manner on their websites: (a) final project reports; (b) citations of published research documents resulting from research funded by the agency; and (c) readily accessible summaries of the outcomes of agency-funded research projects. Publishers are ready to explore public-private partnership opportunities based on such a model.

Government, through its funding agencies, supports the research enterprise that generates outputs such as experimental data, technical reports, grant reports, and conference papers. Consequently, government has an important role to play in ensuring that research data and technical reports are accessible to the public whose taxes funded their production.

But any development of federal public access policy in this area must be based on thorough assessment of the needs of all stakeholders. For example, the government could consider a pilot program similar to the EU's PEER (Publishing and the Ecology of European Research) initiative. PEER represents a three-year collaboration (2008 to 2011) between publishers, repositories and researchers that will investigate the effects of the large-scale, systematic depositing of authors' final peer-reviewed manuscripts on reader access, author visibility, and journal viability, as well as on the broader ecology of European research. Empirical results from this program will inform the EU's future policymaking on public access issues.

Conclusion

We urge members of Congress to view implementation of the NIH Public Access Policy as a case study in how not to proceed. The effort to solve a problem that didn't exist is threatening job creation, economic growth and scientific innovation in our country.

Journal publishers play a vital role in the advancement of science by managing the peer review process that helps ensure the quality and integrity of scientific research. Government mandates that undermine copyright protection for private sector journal articles will diminish American scientific leadership. We look forward to working with members of this Subcommittee to develop policies that will help increase U.S. jobs and exports in our dynamic industry.

Mr. CLAY. Thank you so much for your testimony.

Dr. Breckler, you are recognized for 5 minutes.

STATEMENT OF STEVEN J. BRECKLER

Dr. BRECKLER. Mr. Chairman, members of the subcommittee, I am Dr. Steve Breckler, executive director for Science of the American Psychological Association.

APA is the largest scientific and professional association of psychologists in the United States. We are the world's largest association of psychologists, with over 150,000 researchers, educators, clinicians, consultants and students as members. APA is also the largest publisher of behavioral science research, with 56 of the premier scholarly journals in the field of psychology.

The mission of APA is to advance the creation, communication and application of psychological knowledge to benefit society and to improve people's lives. APA strongly supports the goal of public access to federally funded research.

What is not clear, however, is the best way to accomplish the goal. The methods implemented to date, and the ones currently under most active consideration, do not necessarily represent the best possible methods. In fact, some carry substantial risk of harming scientific scholarship and actually impeding our ability to accomplish the ultimate goal of enhancing public access to federally funded research.

As a citizen and as a scientist, I take enormous pride in American science. I think we all do. We are the stewards of the world's strongest and most vibrant system of scientific research and scholarship. The last thing that any of us wants to do is to harm or otherwise weaken American science. Our Nation's most serious investments in science began over 60 years ago. It was recognized then that the Federal Government was in the best position to provide the financial resources to support science and research in this country. It was also recognized then that the private sector and the non-profit scholarly societies were in the best position to manage the publication and dissemination of research results in this country.

The Federal Government did not want to get into the scholarly publishing business, nor did society demand it. Indeed, it has always been the opposite, of maintaining a separation between the Government and the final production of scholarship, of protecting academic freedom and allowing scholars in this country to do their work without Government interference. The success of American science can be traced to this formula, to this division of responsibility and management of the scientific enterprise. It has served us extremely well.

And now for a variety of reasons that really have nothing to do with scientific achievement and advancement, some among us want to change the formula. Change can be a good thing. But it should be well-reasoned and thoroughly researched before wholesale implementation. A mistake could mean irreparable damage, an outcome that none of us wants.

I have provided detail in our written testimony about some of the potential risk of poorly developed public access policies. Scholarly publishers add tremendous value to the communication and dis-

semination of science. And we invest enormous resources in the process. Yet the current public misunderstanding is that those costs are either inconsequential or that the Government already bears those costs. Neither is true.

Alternative models for public access exist. NSF, for example, requires its investigators to submit their final project reports and citations to published research documents resulting from their research for posting on the NSF public Web site. This is consistent with the fact that taxpayers are paying for the research results, not for the publications.

APA suggests that the current situation offers the opportunity to conduct a natural experiment to evaluate the various public access models currently in place. This opportunity was recognized by OSTP when it noted in late 2009 that the NIH model has a variety of features that can be evaluated, and there are other ways to offer the public enhanced access to peer-reviewed scholarly publications.

Indeed, in its implementation of a public access policy, NIH assumes that 12 months provides a sufficient embargo period to allow publishers enough time to recoup their investment. Yet as the data we provided in our written testimony demonstrates, 12 months is clearly too short a time for many publishers, especially those in the social and behavioral sciences, to recover even a fraction of their investments. In APA's experience, less than 16 percent of the ultimate usage of a journal article occurs within the first 12 months of publication.

We can do better. We need to bring all stakeholders to the table to develop a viable system of public access, one that makes federally funded research accessible to the public, but without sacrificing or harming the various scientific infrastructure supported by the Federal Government and desired by the public. This was the recommendation of the OSTP scholarly publishing roundtable, and it is the basis for the provision of the COMPETES bill currently working its way through Congress to establish an interagency working group on public access.

APA supports these recommendations, but we emphasize the need to include the perspective of scientific societies that publish social and behavioral science research. When it comes to policies surrounding public access to federally funded research, we must be thoughtful and careful and willing to take the time and make the effort to do it right. Otherwise, we run the real risk of reducing, rather than increasing, public access to federally funded research and of causing long-term to America's science and technology infrastructure.

Thank you.

[The prepared statement of Dr. Breckler follows:]

Written Testimony of Steven J. Breckler, Ph.D.
On behalf of the American Psychological Association
Submitted July 29th, 2010 to the
United States House of Representatives
Committee on Oversight and Government Reform
Subcommittee on Information Policy, Census, and National Archives
The Honorable Wm. Lacy Clay, Subcommittee Chair

Hearing on *Public Access to Federally-Funded Research*

Mr. Chairman and Members of the Subcommittee, I am Dr. Steven Breckler, Executive Director for Science at the American Psychological Association. APA is the largest scientific and professional organization representing psychology in the United States and the world's largest association of psychologists with over 150,000 researchers, educators, clinicians, consultants, and students. APA is also the largest publisher of behavioral science research, with 56 of the premier scholarly journals in the field of psychology.

APA strongly supports the goal of enhancing public access to the results of federally-funded research. However, it is not at all clear what the best methods are for accomplishing the goal. The methods implemented to date, and the ones currently under most active consideration, do not necessarily represent the best possible methods. Furthermore, they carry substantial risk of harming scientific scholarship and impeding our ability to accomplish the ultimate goal of enhancing public access to the results of federally-funded research.

APA urges the federal government to refrain from mandating a public access policy that would apply across agencies without further study. In 2009, the Committee on Science and Technology of the United States House of Representatives, in coordination with the White House Office of Science and Technology Policy (OSTP), created a Scholarly Publishing Roundtable to develop a consensus on expanding public access to scientific journal articles. The Roundtable issued its report in January, 2010. Among its many recommendations were the following:

- Agencies should work in full and open consultation with all stakeholders.
- Longer embargo periods may be necessary for some fields of science.
- OSTP should establish a public access advisory committee.

APA supports these recommendations. Indeed, new or expanded public access policies should not be rushed without full consideration of their strengths and weaknesses, with particular emphasis on understanding potential negative consequences and harm that may result to an otherwise strong and vibrant system of scientific research and scholarship.

The Potential for Harm

In a December 8th, 2009 memorandum to the heads of executive departments and agencies, Office of Management and Budget Director Peter Orszag articulated an "Open Government Directive." The guiding principles of this directive included "transparency, participation, and collaboration." Indeed, the memorandum concluded with this statement: "Moreover, nothing in this Directive shall be construed to suggest that the presumption of openness precludes the legitimate protection of information whose release would threaten national security, invade personal privacy, breach confidentiality, or damage other genuinely compelling interests."

As a publisher of scientific scholarship, APA believes that the future of scientific publishing should certainly be regarded as among the "genuinely compelling interests." Possible unintended consequences of public access policies, including those already implemented, are a reduction in the number of peer-reviewed journals, a shift toward "author pays" models of publishing, privileged access to publishing based on ability to pay, and commercial exploitation or re-use of content that is otherwise protected by the legitimate copyright and intellectual property interests of authors and publishers.

Economic Considerations

Federal agencies play a critical role in the development of scientific knowledge by supporting the conduct of research and the generation of research findings that are presented in manuscripts submitted for publication. Scientific publishers promote and disseminate scientific communication and advance scientific knowledge through their investment in a wide range of critical functions. These include editorial selection, peer review, copyediting, design production, marketing, distribution, and preservation. What at times is overlooked in discussions of public access is the value added by the publisher in the development of the peer-reviewed manuscript. This reflects years of investment in developing a journal brand recognized for its merit and standards of excellence in the scholarly community, the process of carefully reviewing articles for further consideration, the selection of peer reviewers, administrative management of the process, and editorial assistance to enhance the quality and readability of the manuscript.

It is important to note that the administration and infrastructure of the peer-review process, even with the reviews being conducted by volunteers, is a costly activity. These costs include honoraria for editors and associate editors, salaries of manuscript coordinators, editorial office expenses, and programming and maintenance costs of the journal manuscript tracking system. On average, for every article that appears in an APA journal, there are five manuscripts requiring peer reviews. After peer review, the accepted manuscript then goes through a production process to make it ready for final publication. At present, the costs associated with peer review and publication production are offset by fees from licenses and subscriptions to APA publications and databases (mainly from libraries).

A viable public access policy must acknowledge that copyright protection extends to the entire work, including the peer-reviewed manuscript, when the author transfers the copyright to the publisher. Such a policy would retain financial incentives for publishers to invest in the scientific enterprise through peer review and the other vital functions related to journal production. Our overriding concern is that when peer-reviewed manuscripts are made widely and freely available on-line, the commercial value of the finished, published work is likely to be seriously diminished, with resulting declines in subscriptions and licensing agreements. This loss of income is likely to lead to less science publishing, and thereby, less public access to research findings.

A public access policy must not have a negative economic impact on publishers, either in this country or internationally, nor on U.S. business or industry, that would undermine our nation's high quality of research. This is likely to occur if publishers are required to forego their copyright interests without just compensation for their vital investments in the scientific enterprise. To address this concern, the public access policy could allow for the use of grant funds for the payment of publication fees, which is not standard practice for social and behavioral science publishing. (Historically, most social and behavioral science publishers have not assessed publication fees.) Alternatively, a federal agency could set aside funds to enter into direct licensing arrangements with publishers to deposit copyrighted work on behalf of authors as some other non-governmental funding agencies have done, such as the Wellcome Trust and the Howard Hughes Medical Institute.

Disciplinary Considerations

Public access policies must take into consideration the inherent variability among scientific disciplines in the nature of research, types of data, and dissemination models. Such factors as frequency of journal publication (e.g., weekly or quarterly) and the shelf-life of articles have significant implications for the development of public access policies for Federal science agencies.

The "embargo period" – the lapsed time between publication and public availability – must reflect sensitivity to the scientific field and the frequency of publication (e.g., weekly, monthly, quarterly). For instance, publishers of biomedical research may be able to generate sufficient revenue within a 12-month embargo period to cover their expenses and thus sustain their publishing programs. Significant sources of revenue include a high volume of subscribers, large amounts of paid advertising, and collection of submission and/or publication fees. The articles in these journals typically have a "shelf life" (how long the article is used over time) that falls within a 12-month period (and often much shorter than that).

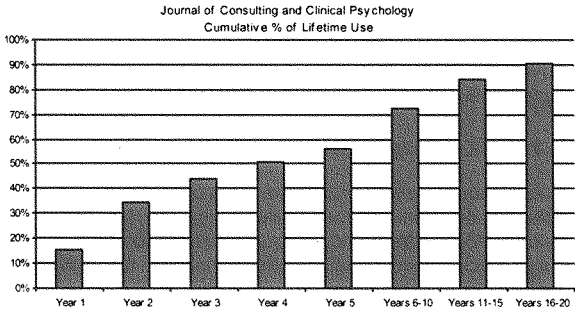
In contrast, the vast majority of publishers of social and behavioral science research tend to have fewer sources of revenue and their articles tend to have a shelf life that greatly exceeds 12 months. This is especially true in APA's experience, where most journals are published quarterly. The cutting-edge research in psychology published by APA is rarely obsolete within a year and may have a shelf life of 5 to 10 years, or more.

Furthermore, only 16% of the eventual "lifetime" usage of APA journal articles—in the form of downloads—occurs within the first year after publication.

APA tracks the usage of individual journal articles and conducts annual data analyses on a journal-by-journal basis. Usage statistics are generated based on annual journal data and lifetime article data. APA's PsycARTICLES full-text database is used to estimate the shelf life of an average journal article by examining downloads by copyright year.

The following table and corresponding graph show our analysis of the electronic usage of an average article appearing in the *Journal of Consulting and Clinical Psychology*. This journal has one of the largest subscription bases and number of NIH-funded articles. These data show the percentage of articles downloaded in a given year with copyrights of that year (Year 1), the previous year (Year 2), and continuing retrospectively for 20 years (Years 16-20). Also provided is the cumulative percentage of "lifetime use," defined as 90% of use.

Year	% in Year	% of Lifetime Use
1	15.4%	15.4%
2	19.0%	34.4%
3	9.3%	43.7%
4	7.2%	50.9%
5	5.4%	56.3%
6-10	16.4%	72.7%
11-15	11.2%	83.9%
16-20	6.8%	90.7%



The data for this one journal are representative of the experience across all of APA's 56 journals. These data demonstrate that articles published in APA journals have a half-life and lifetime usage of about 4.5 and 19.5 years, respectively. Because life-time utilization of APA journal articles occurs over a long period of time, a public access policy with an unduly restrictive embargo period (such as the 12 months under the current NIH policy) can be expected to have a significant, adverse impact on APA journals and all other journals with similar usage patterns.

APA's view is that this pattern of journal article usage is typical for publications in the social and behavioral sciences. An embargo period of 12 months may be sufficient for some publications in biomedical science, but it is clearly too short for publications in other fields.

Public Considerations

An important goal of public access to scientific publications is to make the results of taxpayer-funded research available to those taxpayers. It has not been established, however, that availability of scientific publications is the best way to achieve this goal. To make federally supported research more widely available to the general public, science writers should be enlisted to create public information materials that summarize a body of research for the general public or that outline a series of research findings across areas through periodic communications (e.g., daily press releases, weekly news alerts, and monthly newsletters) written for the public on the results of federal agency-supported research. These could be made accessible through Web sites, radio, television, newspapers, and magazines. Indeed, professional societies such as APA invest heavily in these forms of public education. A mandate for federal funding agencies to engage more extensively in this form of public education is a good way to accomplish the goal.

All stakeholders should have access to scientific publications that are the result of federally-funded research. The fundamental question is who bears the responsibility for the costs associated with producing scientific publications. The current public misunderstanding is that those costs are either inconsequential, or that the federal government already bears those costs. Neither is true. Thus, *public* access to scientific publications is not properly translated as *free* access. APA supports fair pricing policies that allow public access for a reasonable price.

Alternative Models

The National Institutes of Health (NIH) and the National Science Foundation (NSF) are currently implementing two very different public access policies. The NIH model requires all NIH-funded investigators to submit or have submitted for them an electronic version of their final, peer-reviewed manuscript resulting from NIH-funded research to PubMed Central to be made publicly available within 12 months after the actual date of publication. The NSF model requires NSF-funded investigators to submit their final project reports, citations of published research documents resulting from their research, and summaries of the outcomes of their research projects, and for these materials to be made publicly available in a timely manner and in electronic form through the NSF Web site.

The current situation offers the opportunity to conduct a natural experiment with the benefits that it offers to evaluate the various public access models currently in place in both the public and private sector. This opportunity was clearly recognized by OSTP in the following statement in its December 31, 2009 *Federal Register* notice: "The NIH model has a variety of features that can be evaluated, and there are other ways to offer the public enhanced access to peer-reviewed scholarly publications. The best models may [be] influenced by agency mission, the culture and rate of scientific development of the discipline, funding to develop archival capabilities, and research funding mechanisms."

The results of such an evaluative study would help to determine whether there is indeed a one-size-fits-all model of public access for federal agencies that would address the interests of key stakeholders, and if so, what the requisite features of such a model would be. Given the potential for harm associated with public access policies of federal agencies, APA recommends further study as the most prudent course of action and prior to the implementation of more public access policies.

The NSF re-authorization bill currently working its way through both the House of Representatives and the Senate calls for the establishment of an interagency working group, with responsibility for coordinating Federal science agency policies relating to the dissemination of the results of federally-funded research. This was one recommendation of the OSTP Scholarly Publishing Roundtable. If established, the working group could help in the development of an evaluative study. But it is critical that the working group take into account the inherent variability among scientific disciplines in the nature of research, types of data, and dissemination models. APA recommends that the interagency working group receive significant input from scientific societies that publish social and behavioral science research.

Concluding Comment

APA strongly supports the goal of enhancing public access to the results of federally-funded research. However, it is not at all clear what the best methods are for accomplishing the goal. The methods implemented to date, and the ones currently under most active consideration, do not necessarily represent the best possible methods. Furthermore, they carry substantial risk of harming scientific scholarship and impeding our ability to accomplish the ultimate goal of enhancing public access to the results of federally-funded research. Without more careful consideration, public access policies run the risk of undermining scientific scholarship and impeding rather than enhancing public access to the results of federally-funded research.

For more information, please contact Dr. Steven J. Breckler
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Mr. CLAY. Thank you so much, Dr. Breckler, for your testimony. Professor Oman, you may proceed.

STATEMENT OF RALPH OMAN

Mr. OMAN. It is a great honor to be here today. Mr. Chairman, I am not necessarily a stakeholder here. I am appearing as the former Register of Copyrights of the United States. I, as always, represent the public interest.

I don't represent any of the parties. But like an old fire horse, I hear the bells ring and I am off and running to protect the U.S. copyright system.

I am concerned that the new public access proposals that we have before us will in fact weaken the commercial market for scientific, technical and medical journals. If the publishers of these journals eventually get out of business because they can't make it pay, we will lose a very valuable tool for scientific advance. If sales plummet, how can the publishers continue to publish? I suppose that is the issue that we have to answer today, whether or not that dire prediction will in fact come true.

I urge Congress to develop a public access policy that respects the spirit of the copyright law. The patent and copyright clause of the Constitution urges Congress "to promote the progress of science and the useful arts." Summarizing the rest of the provision, "by giving authors and publishers an exclusive right in their writings." With that powerful incentive direct from the Constitution to commercialize their journals, the publishers will reach as broad an audience as possible for these important publications.

The tension between authors and inventors who benefit from Government research grants on the one hand and the advocates of Government ownership of the fruits of that research on the other has been with us for a long time. I worked on the Bayh-Dole legislation back in 1980 for my old boss, Senator Mathias of Maryland. In that debate over patent policy in 1980, Senator Russell Long of Louisiana argued that any patents developed with Government research funds should be owned by the Government. In his inimitable style, he thundered, "We paid for it, we own it."

Senator Bayh and Senator Dole reasoned that the taxpayers would get a far greater return on investment if we instead facilitated private sector ownership and commercialization of these patents, putting the inventions to work for the American people, creating jobs and helping American competitiveness. They won that argument and the Small Business and University Patent Procedure Act has given American innovation a big boost around the world.

The same policy arguments apply here, Mr. Chairman. For all the reasons mentioned by Mr. Adler and Dr. Breckler, I do not think that the Government should get deeply involved in scholarly publishing. It is a bad for a free enterprise economy with our tradition of free speech. With normal copyright protection, the private sector publishers will run the peer-review process, they will select the articles, they will aggressively market those publications to corporations, to libraries, to research institutions. That is the American way. A broad, free public access policy is an unfortunate precedent for a country like the United States whose great strength in foreign markets is intellectual property.

I spent more than 8 years of my life as Register of Copyrights, fighting to protect American authors and publishers from foreign pirates. I find it a little strange today that Congress may now decide to give away some of that intellectual property free of charge. The pirates must feel vindicated.

There is a huge foreign commercial market for these publications and a free access policy would cost the United States millions of dollars that we now get from rich foreign governments and large foreign corporations. As Senator Mathias, my old boss, once said, "talk about Uncle Sap." It is like standing on the coastline and shoveling buckets of greenbacks into the ocean. We are the only country, as far as I know, to have such a give it away for nothing policy.

I hope Congress will give the evolving digital marketplace a chance to come to grips with the new online technologies without undercutting the incentives that publishers have relied on for 200 years. We all have compassion for the parent of a sick child with a rare disease, wanting to have quick and easy access to articles explaining the latest state-of-the-art therapies. Let's solve that problem of patient access without doing damage to the incentives provided by copyright. Let's all sit down and reason together and figure out how to get the job done.

Thank you very much, Mr. Chairman.

[The prepared statement of Mr. Oman follows:]

TESTIMONY OF

RALPH OMAN

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And

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GEORGE WASHINGTON UNIVERSITY LAW SCHOOL

Hearing on

Public Access to Federally-Funded Research

THE U.S. HOUSE OF REPRESENTATIVES

COMMITTEE ON OVERSIGHT AND GOVERNMENT REFORM

Subcommittee on Information Policy, Census, and National Archives

JULY 29, 2010

Mr. Chairman and members of the Subcommittee. It is a great honor to appear before this distinguished panel.

Thank you for the opportunity to testify on this matter of importance to copyright generally, and to the public, to the research community, to the authors of scientific, technical, and medical (STM) articles, and to the publishers of scientific, technical, and medical journals. I would like to focus on the larger policy issues that undergird the American copyright system, with a special focus on how our copyright laws encourage the broadest possible dissemination of high quality, peer-reviewed articles without running roughshod over the rights of authors and copyright owners.

I applaud your decision, Mr. Chairman, to give a full airing of these issues before your Subcommittee. They bear directly on the copyright policies of our government and the incentives to authorship and publication under U.S. copyright law. For reasons I will discuss, any proposal to weaken copyright protection for works based on research done with government money -- on the theory that the taxpayers paid for it so they should own it – could be contrary to our national interest in encouraging access to pioneering research and broad public dissemination of scholarly articles.

In this debate, three key questions must be answered. First, what public access policy will result in the broadest dissemination of high quality, peer-reviewed articles? Second, is it fair for the U.S. government to appropriate the value-added contributions of our private sector publishers? And, third, is it correct to assume that the STM publishers will continue to publish their journals even if they lose a large percentage of their paid subscriptions?

Many of my colleagues in academia recognize that the STM publishers perform many vital functions in bringing these articles into the public forum. For one thing, they make substantial investments in the peer-review process. While they do not as a general rule pay the reviewers, the publishers hire in-house teams of experts to support outside specialists. These teams handle the mechanics of distribution of the articles to the public, stay close to the academic experts in the discipline, both personally and professionally, follow the literature, and engage in on-going communications with the authors about the reviewers' comments and the incorporation of those comments into the manuscript.

In addition to the peer-review process, the publishers make judgments about which of the manuscripts to publish, depending on their quality and the importance of the research itself. They also correct errors, edit the manuscripts, and make them presentable for publication.

My basic concern about government proposals to limit the copyright will, sooner rather than later, weaken the commercial market for these journals. If this prophesy comes to pass, who, I wonder, will handle all of these costly and ethically sensitive administrative details? Some of my academic colleagues are confident that this change in the mechanics of scientific publishing will have little or no impact on the private sector publishers, and that they will remain as robust as ever, even if the government publishes all of their

manuscripts shortly after publication. Some claim that they have "evidence" that STM publishing will continue to flourish. I have not seen that evidence. To me, it represents wishful thinking. In my experience, Congress is normally reluctant to hang major change in information policy on the thin reed of wishful thinking. With the prospect of free copies available in the near term, isn't it reasonable to expect that many corporate and academic librarians will cancel their subscriptions? They all face budget cuts and staff cutbacks, and some estimate a cancellation rate approaching 50 percent. With plummeting sales, how could the STM publishers continue to publish? This is a critical point, and one that this committee has a special sensitivity to. It really goes to the heart of the matter, in terms of public policy.

It is a basic premise of copyright that the law is designed to benefit the public, not reward authors or publishers. But, as James Madison wrote in the Federalist Papers, "the public good fully coincides" with the rights of authors and copyright owners. It seems clear that Congress would not want a free access policy to cause many or all of the private STM publishers to shut down. Of course, if fair market competition, or a change in the culture of academic publishing, or costly overhead were eventually to drive the private publishers out of business, so be it. It is one thing that they should suffer demise because of changes in the marketplace, and it is another to be brought down by governmental fiat. Does the government intend to perform all of the vetting, selection, and editing functions now performed by the learned societies, by the professional organizations, and by the STM publishers? I doubt that Congress wants to hire a thousand new workers to take on these additional responsibilities. So the question occurs: who is going to do it? I do not see replacements for the publishers raising their hands to volunteer. For this reason alone, Congress will think carefully before implementing an information policy that mandates free dissemination of articles that report on federally financed research. And there are larger issues as well. Experience teaches that as a general rule Congress prefers to keep government officials out of the academic peer-review and manuscript selection process. We live in an open society. With a weather eye on the First Amendment, we try to keep the government at arms length from these delicate publication decisions, so as not to skew the integrity of the process.

That being said, the new public access policy brings back vivid memories of the debate we had in 1980 with the Small Business and University Patent Procedure Act. In that debate, Senator Russell Long, Chairman of the Senate Finance Committee, following the script written by Admiral Rickover, the father of the nuclear submarine, argued in favor of existing government policy—that patents developed with government research money belong to the taxpayers who subsidize the research. Senator Bayh and Senator Dole reasoned that the taxpayers would get a far greater return on their investment if we instead facilitated private sector ownership and commercialization of the patents, putting these inventions to work for the people.

The same policy arguments apply on the copyright side. If the government puts the government financed peer-reviewed articles in an online database for free shortly after publication, many of the private publishers will be hard-pressed to survive. To me, it seems far more likely that the U.S. taxpayer will achieve the desired objective—the

broadest possible dissemination of the peer-reviewed article manuscripts—under the current system. With the private STM publishers running the peer-review process, selecting the articles, and aggressively marketing their journals to libraries and other research institutions, both foreign and domestic, the current system lets the publishers bring their professional judgment and expertise into the process and ensures high quality scholarship. Paid subscriptions keep the current system perking along, without intrusive government involvement, and without an infusion of funds from the federal treasury. A free access policy, if broadly implemented, it will almost certainly end this self-policing and self-financing private system and get the federal government deeply into the STM publishing business.

Finally, Mr. Chairman, I would like to mention a few related issues. First, I wonder if any of the articles that the government will post online will contain preexisting materials that the government financed researcher did not create and therefore does not own. Here, I am thinking of charts, diagrams, photographs, and illustrations. Will the government commandeer the rights of those creators as well, or will it require the researcher to clear all of those ancillary rights as part of the "package". Today, of course, the publishers often help the author clear these rights, including electronic distribution rights. Will the government undertake this task if the publishers drop out of the picture?

Second, I wonder if the NIH proposal really serves our international interests. Our trade negotiators are constantly fighting for strong intellectual property protection, which is under siege in many countries around the world. I assume that some of the authors or co-authors are foreign nationals, and they would get protection under the Berne Copyright Convention. The free access policy could violate their rights, and expose the United States to retaliation at the World Trade Organization. And I assume some of the impacted publisher/copyright owners are foreign as well. As I will note in a moment, the new public access policy will seriously threaten the protection of American authored and published works in foreign countries. This government policy reduces the value of the copyright in these works. Some of my academic colleagues argue that the Berne Convention has no relevance to government information policy. They see it as a simple contract matter, and they note that the researchers get very valuable consideration for their assignment of copyright under the government contract. Granted, the researchers do receive a generous stipend, averaging $400,000, but that fact also makes the whole arrangement suspect. To a serious researcher, a governmental grant is a matter of life and death professionally. To claim that the abandonment of copyright is "voluntary"--the product of a free market negotiation--strikes me as a bit disingenuous.

In fact, the government involvement puts a "coerced contract" in a suspect category in the Berne and WTO context. It is not a private contract between commercial interests. Let me draw a hypothetical. The U.S. motion picture industry is now permitted to exhibit theatrically only 10 or so films per year in China. Suppose the government of China were to offer the American film producers a deal: "If you sign a contract waiving your reproduction right, we will allow you to exhibit 100 films a year." The producers would crunch the numbers and calculate the bottom line, even while complaining bitterly that the deal is outrageous and clearly a violation of the spirit of copyright and the Berne

Convention. Nonetheless, they might conclude that on balance they would make more money with the proffered deal than they now make with limited access to the huge Chinese market. So, in the end, they might sign on the dotted line. Could the United States take that "contract" to the WTO and press a claim under TRIPs that China is not complying with its treaty obligations? I think so. The ensuing mass piracy of American films in China would be a direct result of government action that diminishes copyright, disguised as a "contract". In any case, the free access policy is an unfortunate international precedent for a country like the United States, whose great strength in foreign markets is intellectual property.

I find it a little strange, after spending more than eight years as the U.S. Register of Copyrights trying to protect American authors and publishers from foreign pirates, that Congress may now decide to give away that valuable intellectual property free of charge. The pirates must feel vindicated.

There is also a huge foreign commercial market for these publications, and a free access policy would cost the United States millions of dollars that we now get from rich foreign governments and large foreign corporations. As my old boss, Senator Mathias once said, "Talk about Uncle Sap. It's like standing on the coastline and shoveling buckets of greenbacks into the waves."

To its great credit, this subcommittee is looking at the long term consequences of a free access policy. The dedicated researchers who benefit from the NIH grants take great professional pride in being published in prestigious learned journals, all of which constitute a valuable and reliable resource for future research.

Despite some grumbling about high subscription prices, very few researchers, academics, or librarians are suggesting that the journals have outlived their usefulness. The STM publishers should be given the right to compete fairly in a changing marketplace, in which they will innovate and have the opportunity to flourish on their own merits, as long as their copyrights are protected. Proponents of change must convince Congress that a free access policy will not jeopardize the existence of the STM publishers and the indispensable role they play in vetting and selecting peer-reviewed articles. Strong copyright protection will preserve the STM journals as valuable professional tools for scientific research, and thereby promote the progress of science. Congress should give the evolving free market a chance to come to grips with the new online technologies without undercutting the incentives that publishers have relied on for two hundred years.

We can solve the problem of patient access to these valuable STM articles without doing damage to the incentives provided by copyright. Let's all sit down and reason together and figure out how to do it.

Mr. CLAY. Thank you, Professor Oman. And we will now move to the question period for Members and proceed under the 5-minute rule. We will begin with Mr. Chaffetz for 5 minutes.

Mr. CHAFFETZ. Thank you, Mr. Chairman. I appreciate it.

One of the things we are looking at is H.R. 5037. And one of the things that would happen under that piece of legislation is that it would shorten the time, the embargo time, from 12 months to 6 months. Can you give me a sense of the impact that you would see of moving from 12 months to 6 months? I will give you a brief time, but I only have 5 minutes, so I have to go swiftly. We will start with Mr. Adler.

Mr. ADLER. Congressman, the fact of the matter is, we have argued all along, there is no one size fits all embargo period that will make sense in journal publishing across the diverse economic models that exist for publishers. What might work with respect to a large commercial publisher doesn't necessarily work with a not-for-profit society publisher or a patient advocacy organization which publishes a journal not so much in the same way that a large commercial publisher would looking for profits, but simply to help generate additional funds to support some of its other patient advocacy activities.

So the situation here is that if you have a journal that publishes on a schedule that is quarterly, annual, as opposed to one that publishes every month, the idea that an embargo of 6 months is going to work adequately for all of them simply makes no economic sense.

Dr. BRECKLER. That is correct. In the case of social and behavioral science, where the shelf life of new articles is actually quite long, much longer than in other fields of science, we have suggested on the basis of our data that 12 months is too short, 6 months would probably be devastating. It would hurt the circulation of the journal articles, and it would also create a perverse, sort of unfair advantage for federally funded research.

We pride ourselves at APA journals in publishing a substantial number of articles that are not funded by the Federal Government. It is a wonderful thing. It encourages scholarship and it increases productivity. But if you put journal articles out there for free, in 6 months it creates a disincentive for people to purchase the journals, and it drives down the ability for non-funded investigators to get their work published and to be seen.

Mr. CHAFFETZ. Professor Oman.

Mr. OMAN. The incentives to publication are weakened considerably by the 12-month publication requirement. Six months would effectively destroy the market for those journals, in my opinion.

Mr. CHAFFETZ. One of the more compelling arguments for increased public access are these patient groups. You touched on it at the end of your testimony, Professor. How do you address that? What is the answer to that? How do you go back to these patient groups and say, look, we want to get this information as swiftly as possible, I don't care what your financial model is, we have to save lives here?

Maybe Dr. Breckler, we could start with you and then Mr. Adler.

Dr. BRECKLER. That is absolutely correct. We have maintained all along that we would like to sit down with all of the stakeholders

and work out a viable system for everybody, rather than having the Federal Government mandate one particular model that happens to be in favor of one particular——

Mr. CHAFFETZ. I guess that is the issue. If there is something we could get everybody to agree on, I would like to see that. But is there any, is there progress toward that? Is there any suggestion of that? Is there anything that has come close to that?

Dr. BRECKLER. Absolutely. The publishers are already, have always been at the leading edge of innovation in these kinds of things and are working with all kinds of groups to make available the relevant articles, to put them in repositories, to identify the ones ahead of time that are of greatest relevance, to do all kinds of things to increase the accessibility and availability of them.

Mr. CHAFFETZ. Mr. Adler.

Mr. ADLER. That is correct, Congressman. The publishers have been working with patient advocacy organizations in the past few years, for example, to create something called Patient Inform, which is an online service that provides patients and their caregivers access to some of the most up to date reliable research about the diagnosis and treatment of specific diseases, and does so at no cost to them.

Patient Inform also helps to interpret the research and provides access to additional, more easily comprehended materials that help explain diagnosis and treatment. At the same time, many publishers individually have their own programs for providing access to patients, including walk-in clauses, as they are called, in their licenses, that enable libraries that subscribe to their journals to give any member of the public free electronic onsite access to those journal articles.

Mr. CHAFFETZ. Thank you all. I appreciate it.

Thank you, Mr. Chairman. I yield back.

Mr. CLAY. Thank you.

I now recognize the gentlewoman from California, Ms. Chu, for 5 minutes.

Ms. CHU. Thank you, Mr. Chair.

Dr. Oman, in your testimony you wondered if the Government will commandeer the rights of creative pre-existing materials that submitted articles may contain. I have three questions about that.

First, how often do articles contain materials that the researcher does not already own? And second, do publishers always clear these rights for the author? And third, why would publishers not continue to provide this service under an open access policy?

Mr. OMAN. I think they would continue to provide those services if they were still in business and could make a go of it commercially. The danger is, of course, that they won't remain in business and they won't be available to make those valuable services in polishing and shaping and preparing the article for public dissemination.

I probably should defer to the publishers on that point. But it is my view that the system that we have now in terms of giving copyrights to the authors, to the publishers, is the best way of encouraging the dissemination of this material and having those valuable services added on to the raw manuscript that is produced by the Government-funded researcher.

Dr. BRECKLER. If I can respond also, I am not in the publishing end of APA, but I do know enough about how things work. That is an example of the kind of value added to scientific publications, to check those things and to give credit where credit is due. It takes time, it takes staff. It takes work to do that. It takes money to do that and to do it well.

It is just another example of the many, many things that consume resources to bring to the market high quality scientific publications. That is the kind of thing—APA wouldn't publish articles without checking those kinds of things and taking care of those kinds of things, ever. But we have to take into account the economic reality of what it costs to do that.

Ms. CHU. Dr. Breckler, in fact, I wanted to ask about APA, as a psychologist myself, and former member of the American Psychological Association, I understand that our field is different from other scientific research disciplines. Can you explain how the NIH public access model uniquely affects psychology compared to other disciplines? I know in your testimony you talk about 15 percent of lifetime use occurs in the first year. I wonder if that is unique to our discipline or whether it is similar to other ones.

Dr. BRECKLER. Sure, a couple of comments. We don't have ready access to the data from other disciplines, so we can't really speak for them. But we thought a lot about what those data mean and why it is that the uptake is spread over such a long period of time. I think it has something to do with the nature of the publications and how focused those publications are. Are they little, incremental advances in very technical areas, which is common in some fields of science? Or are they big, sweeping things that take years to develop and have years of impact and so on.

The social and behavioral sciences probably fall into that latter category most of the time. They are not small, incremental, technical answers to small, technical questions. They tend to be much broader in scope, which would also be true in other areas of social and behavioral science. So the risk in the context of NIH, of course, is that NIH funds areas of science across the board. They fund physics and chemistry and microbiology, in addition to psychology and sociology and anthropology and other fields.

So to put them all in the same basket and to assume that they all have the same models and the same processes and the same outcomes and so on is a terrible mistake.

Ms. CHU. Mr. Adler, I can definitely understand the concerns of publishers about the significant investments that you have made in reviewing, accepting and publishing scientific journal articles. The numbers are not trivial. However, what I also know is that without the American taxpayer, who funded the research, you wouldn't be able to publish such articles. Which is more important, the publisher's investment or the taxpayers who have paid more than $60 billion annually in just biomedical research alone?

Mr. ADLER. I don't believe there is an either/or choice there. The fact of the matter is that to say that publishers have an advantage because they are able to publish materials that are about something that the Government has funded, well, in our country we hope that publishers always, whether they are newspaper publishers, magazine publishers, book or journal publishers, will be able

to publish about the activities of the U.S. Government and not feel that they owe a bill to the U.S. Government for the right to do so.

In this case, we are trying to distinguish very clearly between the Federal research, the research activity which the Government does fund, and then the subsequent account of that research by the researchers, describing and explaining the research activity which the Government doesn't generally fund. The publisher funds that.

So we think that there is a natural relationship here. It is one that has existed for years. Frankly, it wasn't until the advent of digital network technology allowed for the ability of this type of material to be so easily accessible and to be so distributed so quickly around the world that anyone even second guessed whether or not there was a problem in that relationship.

Ms. CHU. Thank you. I see my time is up, and I yield back.

Mr. CLAY. Thank you, and I thank the gentlewoman from California.

The gentlewoman from New York, Mrs. Maloney, is recognized for 5 minutes.

Mrs. MALONEY. I thank the chairman for having this hearing. I think it is an important one, and I think it raises a great deal of important problems and challenges for the 21st century. Certainly, patients dealing with an illness or their families certainly want to know as much as they possibly can about the illness and to have all the valuable research so that they can know what is happening.

And at the same time, the Federal Government, the taxpayers have invested in this research and it is intellectual property that belongs to the United States. And the copyrights belong to the Untied States. And the publishers have invested in it. So it is an American product that if you open it up to everyone, meaning patients, but also I would say Vietnam, China, the entire world, that would like to take this information and immediately use it for their own purposes.

I feel that one of the challenges that we have as a government for our people and for our taxpayers and for our future is how we hold on to our intellectual property. That is the one thing that we continue to produce that is incredibly valuable. But if everything we produce is immediately made available to the entire world, so that American workers, American companies, cannot take advantage of it, then we are going to be economically disadvantaged to a greater way.

I think that what I would like to ask all of the panelists, and I will begin with Mr. Adler and then go down to Mr. Breckler and Professor Oman, is I think that we need to take another step, not only to protect, to protect the intellectual property. You are talking about publishers, but it goes broader than publishers. It is intellectual property.

We should have a way that we can let American citizens read about information on the latest research on diseases in a way they can understand it. As one whose father died of Parkinson's, I was reading everything I could find on Parkinson's. There is a great deal of research done on Parkinson's. And reading these scientific documents, for someone who is not a scientist and not a doctor, it is very difficult.

So I think you have a two-pronged approach; No. 1, to put the information in a form that the American public can understand and that is usable. But at the same time, if we don't protect our intellectual property, then I fear for the future of our country, quite frankly.

Another item, we are talking about taxpayer-researched projects. But we also have a great deal of investment from the private sector that goes into the latest research that patients should have access to. But also, I represent a research industry, I represent major drug companies, major hospitals that do research. And they have basically told me, if we can't control our intellectual property, they are not going to continue investing in this.

So I think that, and we cannot afford, as a country that now has a huge deficit and a huge debt, we can't afford to keep spending, yet the strength of our country is research. We need to continue investing in research, but we have to hold that research. Otherwise, it is really detrimental to us. We pay for everything and then within 24 hours, other countries feel like, "well, why should I ever do any research? I can just steal it from America."

I think that we need to take another step, legislatively or in some way, with the executive orders, to protect this intellectual property. Otherwise, the private sector is not going to do it. Publishers aren't going to publish it if they can't get some profit out of it. We are a profit company. Unless we want to have Government doing everything, which we can't afford to do, we face a new, innovative approach, a problem that we need a new solution to, where we can allow patients and their families to learn about things.

But we have to protect our intellectual property. And if we don't, then the private investment is not going to be there, whether it is a research facility or a publisher or whatever. So we need to have incentives for the private sector to be involved. And we also have the challenge of how do we get this out to the public that are Americans, not to pirates who then are going to sell it or produce it.

I think that is a huge challenge for the future of research in this country. And if you look at it, what has made this country great, I would say it is our research and our intellectual property. But if we can't hold on to our intellectual property, then I fear for the economic future, quite frankly, of American workers.

So I think there is a huge challenge here, and I would like to start with Mr. Adler and go down the line and see if you have any answers to it. How can we make information available that is, and user-friendly to patients and their families, but at the same time protect the intellectual property so that pirates don't use it and that the incentive is there for private investment, private research, private publishing? If publishers can't get something out of it, they are no longer going to publish it, then the Government has to publish it.

And quite frankly, what we are being told is ways to save money. So I just throw that out to our panelists and see if you have any creative ideas of how to approach this.

Mr. ADLER. Well, Congresswoman, on this particular issue, there is a piece of legislation that has been introduced and is pending in

the House Judiciary Committee by Chairman John Conyers, as you may know, called the Fair Copyright and Research Works Act. What that legislation would simply——

Mrs. MALONEY. What number is that? Do you have it, the number of that bill? I can look it up, never mind.

Mr. ADLER. I am not sure.

Mrs. MALONEY. What does the bill do?

Mr. ADLER. What the bill basically would say is that if you were dealing with research funding for a particular project, where part of the funding comes from someone other than the Federal Government, and you are talking about extrinsic products, things that are derived from that research, or as you characterize it, are about that research that also have substantial added value coming from people other than someone who is contracted with the Government and been funded by the government as part of the research grant, then the Government would not be permitted to take the type of position that has been taken by the NIH under its policy of saying that the Government agency, because it funded the research, now has the right to distribute these articles that simply describe and explain the research, which were not funded by the Government agency, but can be distributed by the Government agency in competition with the publisher, based solely on the fact that the Government funded the research activity.

We think that piece of legislation would not interfere with research funding activities by the Government. It would only make the Government make decisions about when it is appropriate for the Government to decide that the research that it is funding is intended to derive specific products and results that only the Government will be able to control. As opposed to allowing the kind of information which comes out of this research, most of which, after all, is factual, it is not even subject to copyright protection, to be utilized by anyone that wants to be able to either make a living by publishing reports and accounts of this research or by explaining the research, whether as a reporter on a science beat for a newspaper or any other basis of disseminating this information.

We also think that, we have been talking with a U.S. trade representative and the Commerce Department about the fact that as they go around the world and engage in bilateral negotiations with many of our trading partners and try to make sure that U.S. intellectual property is protected under those agreements, that they take a look at what the Government is doing in this instance and see whether in fact this goes completely against the general tenor of what this administration has been trying to accomplish through such efforts.

Mrs. MALONEY. Thank you.

Mr. Breckler.

Dr. BRECKLER. Thank you.

The concept of intellectual property is an interesting thing in the scientific and research community. And generally I think it is safe to say that scientists and researchers want their work to be read, they want it to be seen as broadly as possible, the more the merrier. So they don't want impediments to the ability for their work to get out there around the world. I think that is generally true globally.

But what scientists and researchers do want is mainly three things I think. One is that they want to retain credit for their intellectual work. They want to be given credit and be cited for their work, and they don't want it republished under somebody else's name and so on. So they want that kind of thing.

The second thing is that they want to control the fate of their work, the fate of their publications. And the third, and this is the most important thing for the purpose of this discussion, is that they rely on a signaling mechanism that helps to sort out the really good work from the less good work. I won't call it poor work. They need a signaling mechanism that says, this is a good article, this is a quality piece of intellectual property, we should pay attention to it.

And it is precisely that signaling mechanism that the publishing industry provides through peer review and rigorous selection of articles for publication, we know that in our high quality prestige journals, which are the ones that we are talking about here, if you have an article there, it means something important.

How many of us have children now, or grandchildren, and we spend a lot of time trying to teach them how to sort through what means something and what doesn't mean something on the Internet? It is hard to tell. There are few signaling mechanisms. Because it all looks legitimate.

What the scholarly publishers bring to the table is legitimacy to the process. Anything that destroys that legitimacy is a loss for science.

Mrs. MALONEY. Yes, Professor? Any comments, Professor?

Mr. OMAN. After your stirring endorsement of the virtues and values of intellectual property, I have nothing to add. Thank you.

Mr. CLAY. The gentlewoman's time has expired.

Let me go to Mr. Adler. To recoup costs, have the publishers considered offering access to titles and charge a nominal fee for downloading the full article? Much like music and movie Web sites.

Mr. ADLER. Certainly. That is within the purview of every publisher, whether it is a for-profit or not-for-profit, to consider in terms of its own business model. And that is exactly the way the system should work.

What we are talking about here is whether the Government should be putting its thumb on the scale and essentially coercing a particular business model because the Government believes that in doing so, it is enhancing the ability of the public to learn about research that the Government has funded as if there was no other way for that to be accomplished.

There is nothing that prevents the funding agencies from releasing, for example, the annual progress reports that the funded researchers are required to provide to the funding agency. There is nothing preventing these agencies from having staff people who help to translate into common layman's English what the import of funded research is.

And in an agency like the NIH, for example, which is perhaps the most well-funded of all science research agencies in the world, they certainly have ample resources to find other ways of informing the public about the importance of the research they funded than

by competing directly with journal publishers, using a version of the journal publisher's own acquired articles.

Mr. CLAY. Now, do you or any of the other panelists have any data on how a publisher would go out of business as a result of increased access? Anybody? Any data compiled on that?

Mr. ADLER. It is difficult, Mr. Chairman, to get data about that. Because again, this isn't shutting down publication by these publishers completely. What it is doing is it is making it difficult for them to recover some of the investment they make in certain articles, for which part of that investment gets apportioned. Because those articles happen to be the ones that are funded by the Government agency and subject to this type of policy.

The real question that needs to be asked though is, is there any substantial deficit in the public's ability to learn about important research that is funded by the Federal Government. We in the publishing community don't believe there is. And if there is a deficit, it is simply due to inaction by the Government to take any number of courses that it could take to provide alternative ways for the public to learn about and understand what kind of scientific research the Government is funding.

Mr. CLAY. And along those same lines of questioning, and I guess we will ask Professor Oman this one, if the NIH policy conditions its grants of funding upon the researchers's agreement to make publicly available the article in 1 year, where is the copyright issue? Can't the researchers choose another avenue and not accept the NIH funding?

Mr. OMAN. It is really a difficult choice for the researchers. Obviously, professionally, a grant from the NIH is a very prestigious achievement. And if the author and the publisher have to dedicate their publication or the manuscript, anyway, to the public domain, that in their view probably would be a small price to pay.

But if ultimately what happened is this prestigious journal that they were so proud to get published in had to shut down and go out of business, maybe they would have second thoughts about abandoning their copyright in exchange for the money.

Mr. CLAY. Let me ask, to help me understand better, are the edits or additional texts written by the publishers after peer review or the grantees?

Mr. OMAN. I should defer to the publishing representatives. But my understanding is that in fact, it is a continuing process. The publishers are involved with the author from the beginning in terms of giving them ideas, suggesting improvements to the text, consulting with other experts. They have experts on their own staff. And they do the formal peer review and then help the author incorporate those suggested improvements into the manuscript. So it is a continuing process.

Mr. CLAY. So throughout the process, then, they get a copyrightable attribute?

Mr. OMAN. Yes. They make a copyrightable contribution to the authorship, which is protected by copyright.

Mr. CLAY. Thank you.

Is that how you view it, Dr. Breckler?

Dr. BRECKLER. Yes, that is correct. And if I can clarify, the concept of grants, which is what most of the external funding at NIH

and NSF and some of the other agencies is about, is designed to create an incentive and a motivation for the researchers and the scientists to take ownership of their ideas and their thoughts and the results of the research.

The intellectual work that goes into publications belongs to that scientist. It does not belong to the Federal Government. That is the whole spirit of a grant. And it is one of the reasons why science in this country thrives, why it is so successful. These aren't necessarily contracts or works for hire. The whole scientific research system works this way, and it spurs creativity and rapid advancements and so on.

So the intellectual property really is vested in the investigator, not in the granting agency.

Mr. CLAY. Have you considered a business model wherein the publisher charges the author a fee for publishing and what would be the positives and negatives of such a model?

Mr. ADLER. There are many publishers that do utilize that model. Some of them use it in conjunction with other models. They still continue to obtain revenue through subscribership at the cost and charges to the end user of the material.

The fact of the matter is that if you are going to be basing it, your ability to recover your investments and continue to make investments on whether or not the authors who bring you manuscripts are going to be able to pay for the $4,000 which roughly goes into the processing and handling of every article that is published by a peer-reviewed journal, you are going to have to be sure that those authors come to you with the wherewithal to be able to afford that.

The publishers really don't necessarily want to see authors being constrained and have to use either part of the money that they could otherwise use for research or have to go some place else to find additional money in order to get these articles published. We believe that having the people who make use of these articles, particularly when many of those readers are, as we have suggested to you, corporate institutions that use it for their own commercial research and their own products and services, or national governments, or health-related institutions that use it in furtherance of their own missions, we don't see why those end users shouldn't ultimately have to pay for that use.

Mr. CLAY. A final question. What timeframe would be an acceptable embargo time period in order for publishers to recoup their investment? Anyone on the panel can take a stab at it.

Mr. ADLER. As I said to you before, Mr. Chairman, we honestly believe that after discussing this, and this discussion has now gone on for a number of years since the NIH first proposed its public access policy as a voluntary policy, that there simply is no single standard that can apply across the board to all of the different business models and commercial and not-for-profit publishers in this field. Each one of them has to determine, with respect to their own investments, their own publishing schedules, their own need, to utilize fees and subscription fees that come in from these, to continue their publishing activities, in order for them to decide what would be an appropriate embargo period.

The real question to ask is, is that an appropriate task for the Government, to be determining what an embargo period should be before this material, which is under copyright, transferred by the author to the publisher, now gets to be made freely available around the world by someone else.

Mrs. MALONEY. May I ask another question?

Mr. CLAY. Yes, let me just see, does Dr. Breckler, do you have an opinion about embargo time period?

Dr. BRECKLER. What Mr. Adler said is correct. I think ultimately, if everybody could agree to come to the table and discuss this, we could agree on some methods for determining what the appropriate embargo period would be. This is one of the reasons APA is looking at its own journal, so that we can make a determination of what a fair embargo period would be.

Mr. CLAY. So each Federal agency could decide that a different embargo time period?

Dr. BRECKLER. What I would suggest is that the variables that will determine that is more than just what the agency is or what the agency happens to fund. Because it depends a lot also on the particular discipline of funding. NSF funds things from physics to social psychology. It depends on the format of the journal and so on.

Mr. CLAY. Professor, any comment?

Mr. OMAN. I just wanted to add that perhaps a blanket approach isn't necessarily the best approach. You might want to have immediate access for patient access for people who are private citizens, who are looking for an answer to a question at 3 a.m., when their child is ill, and a normal copyright protection for the rest of the world. I think the system can be nuanced enough with digital technology to achieve that purpose without destroying the fabric of copyright.

Mr. CLAY. Thank you. Thank you all for your responses.

Mrs. Maloney, you are recognized.

Mrs. MALONEY. Thank you. I think that is an interesting statement, Professor Oman. But I don't know how you could protect the copyright. Because someone could just log in through a friend and have it.

I would like to frame another question. I have strongly supported a citizen's right to Government information. In fact, I am very proud of having authored the Electronic Freedom of Information Act of 1996. It was probably the biggest access to Federal archives and Federal information and required it electronically. I probably have gotten more awards as a visionary legislator on that piece of legislation that allows the public to have access to this information.

I also authored the Nazi War Crimes Disclosure Act, which was the largest unveiling of CIA documents probably in history.

But I am concerned that in looking at the issue of public access to federally funded research, we have to be careful to protect the intellectual property, particularly since we live in such a competitive world. At one time, we were competing with another State or another business. Now we are competing with China, India, Vietnam and who knows, another emerging country that may emerge soon.

So we are competing with jobs and in every way. I think that we as a Government need to protect the taxpayer dollars in this research. And a scientific publisher likewise, whether it is for-profit or non-profit, or even a Government publisher, has the right to protect their work product. We need to be careful as we look at this issue. I think it is a very complicated one. And I think we need even more of an answer than Mr. Conyers has put forward, as explained to me by Mr. Adler.

I would say that some proponents of public access to federally funded research call for putting a final manuscript online immediately. Some say 6 months, some say after it is accepted for publication. But this article, in many ways, goes far beyond federally funded. As one who just recently wrote a book, it is not that easy. You present a manuscript, your editors look at it, everybody comments in the world on it, they refine it, they take time to look at this.

So what finally is printed is not, at least in the case of my book, there were a lot of hands going into it and suggesting it could be done in a clearer way, a better way, and why didn't you add this and add that. I would say that is the way all publishing is, whether scientific or a book or whatever. You have publishers, you have researchers, you have fact checkers. They are not going to print anything, they have to fact check it and make sure it is accurate. They have to send it out and have all these other scientists say, you are right or you are wrong, or it is crazy or it is innovative, or it needs more research.

So the point I am making, that it is a product that has been worked on. And we don't want to take that aspect out of the economic chain. If you take that out, you are not going to get the good peer-reviewed, fact-checked article. I mean, you and I can go on the Internet tomorrow and publish whatever we want. Here is my scientific study on whatever, on what I think is the cure for cancer. I could go home tonight, write my paper and print it on the Internet tomorrow. No one would read it, I am sure.

But the point I am trying to make is that anyone can publish anything now, particularly. But when it comes out of a peer-reviewed publication, it is scientific. Other scientists have spent time, and they probably pay them, I don't know, to read it and say, "this is accurate," "this is wrong," "I think it is valuable," "I think it is not valuable." So in other words, it is an expensive process that gives value added to scientific research in our country.

The point I am trying to make is that I don't think we want to take that out of our country. Because if you take that out and don't allow someone to make a profit, they are not going to do it. I just came from a financial services meeting, and one of my bills, they always want everything to be free. I always argue that people have to make a profit or cover their expenses, or they are not going to do it. Whether it is your ATM fees, one of my bills was just letting consumers know there is an ATM fee, and then you decide whether it is worth your time to pay a dollar to get your money at the spot.

But the point is, publishers aren't going to do peer-reviewed research, publish it in the first place, unless they are entitled to have some type of profit or at least pay their expenses. They have to pay people to look at these things. They have to pay fact checkers.

When a publisher prints something, they have fact checked everything in it and paid someone to do it. Maybe for months, who knows. Depends how complicated it is.

So I think there are many levels that we don't want to disrupt scientific research in our country. It is probably the most valuable commodity that we have. Not only do we want it published and peer-reviewed, but in my opinion, I think we have to be careful about protecting the intellectual property in order to be competitive in the world financial markets. If everything that we discover we are going to immediately give to every other country, then they are not going to be investing in research. They will say, "let America invest billions in research," and they will be publishing it the next day that something is peer-reviewed and accurate, and then we can grab it and produce it quickly and undercut them and they won't make any money off their research.

If that starts happening, the private sector certainly is not going to invest in research. And you will have Members of Congress saying, "why are we bothering with this research that is immediately being sent to another country?"

So I think that we really have a huge problem ahead of us on how we protect our copyright and protect our intellectual property for us to be able to compete and win economically. That is how serious I think it is.

Then also, we need to protect the publishers. Otherwise, they are not going to be doing peer reviews. They are not going to be investing in fact checkers. Why should they? They won't make any profit.

So I think we have a challenge where we don't want to kill, you get the point. Now, does anybody have any answers? I certainly don't. But I do know that we have a challenge in front of us. And I think it is a serious one, if we want to compete and win in the world economy and hold on to our scientific research.

And let me add something else. You say that all of these scientists want their product to be read and they want their name on it. Well, no one is going to read their product unless it is published and fact-checked and peer reviewed. That takes money. All of us can write a thesis tonight and throw it on the Internet. Doesn't mean anyone is going to read it. But if it comes out of the so and so review scientific panel of NIH or whatever, then everybody is going to look at it and say, hey, this is important.

I am very interested in women's health, and then I will be quiet on this. I subscribe to certain publishers on women's health, because that is one of the fields that I invest my time in. Certain ones, people mail me, I wake up every morning, there are documents on my front door on women's health.

But the ones I really pay attention to are the ones that are published by respected publishers and scientific communities that I know have been fact-checked, peer-reviewed, tested, tested on rats, tested on people, and that it is really scientifically pure. But that takes money to do it. And I don't think we want to take that out of our system. I think we are going to have a big problem on anybody doing it.

And then also, I am very concerned about our competitiveness in the world economy. We have not done a good job in protecting, we can't even protect a song much less a cure for cancer or other im-

portant scientific research. It is a big issue, Mr. Chairman. You walked into a big issue.

Mr. CLAY. It is.

Mrs. MALONEY. You always do. He always does.

Mr. CLAY. I appreciate your involvement in this hearing.

The gentlewoman's time has expired, and this panel is excused.

We will now ask for the second panel to come up and take your seats. I will now introduce our second panel. On this panel we will hear from Dr. Richard Roberts. Dr. Roberts is the chief scientific officer at New England Biolabs. Dr. Roberts was formally educated in England. His post-doctoral research was completed at Harvard. He is the author of numerous articles and holds several patents. Dr. Roberts is also the 1993 recipient of the Nobel Peace Prize in physiology and medicine for the discovery of split genes. Welcome.

Next, we have Ms. Sharon Terry. Ms. Terry is the president and CEO of Genetic Alliance, a network promoting openness and centered on the health of individuals, families and communities. Ms. Terry, a former college chaplain, and her husband founded and built an organization that enables ethical research and policies, and provides support and information to Members and the public. In 2009, she received a Research America distinguished organization advocacy award. Ms. Terry also has an honorary doctorate from Iona College. Welcome to the committee, Ms. Terry.

Next we have Mr. Elliott Maxwell. Mr. Maxwell is a graduate of Brown University and received his law degree from Yale. He is a former Department of Commerce official, specializing in international technology policy, technology administration as well as digital economy. He served as a senior fellow at the Aspen Institute. He currently advises on the intersection of business, technology and public policy and electronic commerce and telecommunications. Welcome to you.

Next we have Professor Sophia Colamarino, a graduate of Stanford and the University of California San Francisco. After 16 years of laboratory research experience, Sophia joined Cure Autism Now in November 2004, as science director. After receiving her Ph.D., Professor Colamarino conducted research on genetic disorders in Milan, Italy. Sophia's extensive research has been included in many publications, in addition to her work in Autism Speaks. She is also a consulting associate and professor in the Department of Psychiatry and Behavioral Sciences at Stanford University. Welcome to you.

Next we will hear from Dr. David Shulenburger. Dr. Shulenburger is a graduate of the University of Illinois, receiving a master's degree and a Ph.D. He is the author of numerous articles and publications. Dr. Shulenburger was recently the executive vice chancellor and provost at the University of Kansas. He is currently the vice president of Academic Affairs at the Association of Public and Land Grant Universities. Welcome.

Our final witness on this panel will be Ms. Catherine Nancarrow. Ms. Nancarrow came to the Public Library of Science Community Journals in January 2005 to coordinate the editorial production Web and marketing efforts of the Community Journals. She is experienced as both a managing editor and development editor on peer-reviewed medical journals. Welcome to you also.

It is the policy of this committee that we swear in all witnesses before the testify. Would you all please stand and raise your right hands?

[Witnesses sworn.]

Mr. CLAY. Thank you. You may be seated. Let the record reflect that the witnesses answered in the affirmative.

Each of you, of course, will have 5 minutes to make an opening statement. We have your complete written testimony as part of the hearing record. Please observe the lights in front of you.

Dr. Roberts, you may begin.

STATEMENTS OF RICHARD ROBERTS, PH.D., F.R.S., CHIEF SCIENTIFIC OFFICER, NEW ENGLAND BIOLABS; SHARON F. TERRY, PRESIDENT AND CEO, GENETIC ALLIANCE; ELLIOT MAXWELL, DIRECTOR, DIGITAL CONNECTIONS COUNCIL, COMMITTEE FOR ECONOMIC DEVELOPMENT; SOPHIA COLAMARINO, VICE PRESIDENT, RESEARCH, AUTISM SPEAKS; DAVID SHULENBURGER, VICE PRESIDENT FOR ACADEMIC AFFAIRS, ASSOCIATION OF PUBLIC AND LAND GRANT UNIVERSITIES; AND CATHERINE NANCARROW, MANAGING EDITOR, PUBLIC LIBRARY OF SCIENCE COMMUNITY JOURNALS

STATEMENT OF RICHARD ROBERTS

Mr. ROBERTS. I thank you, Chairman Clay.

My name is Sir Richard Roberts. I am chief scientific officer at New England Biolabs, a small company in Ipswich, MA that makes reagents for biological research.

I am also the 1993 Nobel Prize Laureate in Physiology or Medicine.

Let me thank you for inviting me to testify here on the important subject of public access to the results of publicly funded research. Because scientific research critically depends on the knowledge of the scientific literature and building on the work of others, access to this literature is the key to progress.

In my view, the open access movement is one of the single most important initiatives currently underway within the scientific community.

In addition to my role as chief scientific officer, which involves producing the scientific vision for the future business of New England Biolabs, I am also an active, working scientist, running both an experimental laboratory and a computer-based bioinformatics lab. In my various roles, I rely completely on digital access to a broad swath of the scientific literature, so that I am aware of all the major advances in biology as well as the latest work in my own field.

I read articles in a large number of different journals, and am acutely aware of the difficulties accessing articles that are not available via open access. Because of the ever-increasing cost of subscriptions, our company, like most small biotech companies, cannot afford subscriptions to all of the journals we might read.

As a result, I often find myself paying the $30 or more that is often necessary to read an article that is in a journal to which I do not subscribe. Since a use of the scientific literature depends

upon being able to quickly move from one article to another to find the relevant science, it is frustrating and inefficient when each step requires the time to make another payment. Even more disconcerting is when the article that one paid to read turns out to be totally irrelevant to the search in hand.

Of course, the biggest problem is that without comprehensive access to the literature, it is impossible to know where the cutting edge of science lies. It is at this cutting edge that science must work if we are to be productive. This lack of access has a very deleterious impact on the small startup biotech companies and others for whom cutting edge science is their bread and butter.

Promoting public access to publicly funded research results will have a huge impact in improving the health of small U.S. companies that depend on science and will also send a strong message that the routine practice of denying access to those who are unable to afford the subscription costs is actually impeding science.

Also, as we all know, it is these small entrepreneurial companies that create the new jobs in the United States, jobs that are very badly needed at present.

While major universities enjoy a great deal of access to the scientific literature, no institution can afford to subscribe to all of the journals that they might want to provide to their constituents. This is even more of a problem in many other sectors of society. Many of the smaller colleges, including most of the liberal arts colleges, that feed their graduates into the major research universities, have extremely limited access to the scientific literature. Ensuring public access to at least that subset of research results produced using public funds is something we can do right now, and would be a useful and exemplary step toward filling this gap.

Even more importantly, as was brought home to me when I attended the recent 2010 Intel Science Fair in San Jose is that high school students, such as those preparing science fair projects, increasingly require access to the scientific literature if their projects are to include the innovation that makes them the winners. While most schools now have good access to computers, it is only when articles are available through open access that they also have access to the full range of the scientific literature. Most high schools can only dream of affording access to pricy scientific journals.

We must remember that these young people going through our schools are the next generation of scientists that will enable our country to remain competitive into the foreseeable future. Providing public access to the results of publicly funded research would have an immediate and positive impact on the quality of information available to these students.

Too often we forget that research is carried out in many places other than the well-known research universities. A strong policy demanding open access to the results of Government-funded research can help small companies become competitive, can stimulate job opportunities within those companies, and can ensure that our students, the scientists of the future, can find out where the cutting edge of research really lies.

Thank you. I welcome any questions.

[The prepared statement of Mr. Roberts follows:]

Statement of
Sir Richard Roberts, Ph.D F.R.S.
Chief Scientific Officer,
New England Biolabs

Before the
Subcommittee on Information Policy, the Census and National Archives
Committee on Oversight and Government Reform
Regarding Public Access to Publicly Funded Research

July 29, 2010

Chairman Clay, Ranking Member McHenry and members of the House Oversight and Government Reform Subcommittee on Information Policy, the Census and National Archives, thank you for the opportunity to testify today on the important issue of improving public access to the results of federally funded research.

My name is Sir Richard J. Roberts, Ph.D. F.R.S. and I am the Chief Scientific Officer at New England Biolabs, a small company in Ipswich, MA that makes reagents for biological research. I am also the 1993 Nobel Prize Laureate in Physiology or Medicine for the discovery of split genes.

I am pleased to have the opportunity to testify before your committee on the issue of public access. Because scientific research critically depends on knowledge of the scientific literature and building on the work of others, access to this literature is the key to progress. In my view, the open access movement is one of the single most important initiatives currently underway within the scientific community.

In addition to my role as Chief Scientific Officer, which involves producing the scientific vision for the future business of New England Biolabs, I am also an active working scientist running both an experimental laboratory and a computer-

based bioinformatics laboratory. In all of my various roles, I rely completely on digital access to a broad swath of the scientific literature so that I am aware of all major advances in biology, as well as the latest work in my own field. I read articles in a large number of different journals and am acutely aware of the difficulties accessing articles that are not available via open access.

Because of the ever-increasing cost of subscriptions, our company, like most small biotech companies, cannot afford subscriptions to all of the journals we might need. As a result, I often find myself paying the $30 or more that is necessary to read an article in a journal to which my company does not subscribe. Since the use of the scientific literature depends on being able to quickly move from one article to another to find the relevant science, it is frustrating and inefficient when each step requires the time to make another payment. Even more disconcerting is when the article one paid to read turns out to be irrelevant to the search in hand.

Of course the biggest problem is that, without comprehensive access to the literature, it is impossible to know where the cutting edge of science lies – and it is at this cutting edge that scientists must work if they are to be productive. This lack of access has a deleterious impact on the small start-up biotech companies and others for whom cutting edge science is their bread and butter.

Promoting public access to publicly funded research results will have a huge impact in improving the health of small U.S. companies that depend on science and will also send a strong message that the routine practice of denying access to those who are unable to afford the subscription costs is actually impeding science. As we all know, it is these small entrepreneurial companies that create the new jobs in the U.S., jobs that are very badly needed at the present.

While major universities enjoy reasonably good access to the scientific literature, no institution can afford to subscribe to all of the journals that they might want to provide to their patrons. This is even more of a problem in other sectors of society. Many of the smaller colleges, including most of the liberal arts colleges that feed their graduates into the major research universities, have extremely limited access to the scientific literature. Ensuring public access to at least that subset of research results produced using public funds is something we can do right now and would be a useful and exemplary step towards filling this gap.

Even more importantly, as was brought home to me when I attended the recent 2010 Intel Science Fair in San Jose, is that high school students such as those preparing science fair projects increasingly require access to the scientific literature

if their projects are to demonstrate the type of innovation that can make them winners. While most schools now have good access to computers, it is only when articles are available through open access that they also have access to the full range of the scientific literature. And most high schools can only dream of affording access to pricey scientific journals.

We must remember that these young people going through our schools are the next generation of scientists that will enable our country to remain competitive into the foreseeable future. Providing public access to the results of publicly funded research would have an immediate and positive impact on the quality of information available to these students.

Too often, we forget that research is carried out in many places other than the well-known research universities. A strong policy demanding open access to the results of government-funded research can help small companies to be competitive, can stimulate job opportunities within those companies and can ensure that our students, the scientists of the future, can find out where the cutting edge of research really lies.

Mr. CLAY. Thank you so much, Dr. Roberts.

Ms. Terry, you are recognized for 5 minutes.

STATEMENT OF SHARON F. TERRY

Ms. TERRY. Chairman Clay, thank you for the opportunity to testify at this hearing.

I am president and CEO of Genetic Alliance, which works to transform health through genetics. Our network includes more than 1,200 patient advocacy organizations and thousands of partnerships with universities, companies, government agencies and policy organizations. The network is an open space for thousands of shared resources, hundreds of creative tools and dozens of dynamic programs.

I am also the mom of two children diagnosed with pseudoxanthoma elasticum in 1994. My husband, who is a trade school graduate, and I, a college chaplain, stole access to medical libraries, hacked into Internet Grateful Med, and ultimately read 400 articles on this disease. As a result of what we learned, we founded PXE International, created a biobank, cloned the gene, created a diagnostic test and initiated clinical trials. We are the ordinary American public and our access to these articles has been critical.

We are not odd, there are many like us, managing disease research and managing personalized care. I have heard there are hundreds of thousands of unique users of PubMed Central a day. These are not only scientists. Imagine if we had public access to all scientific articles.

We applaud the Congress for the current NIH policy. Translating basic science into diagnostics and therapies is an urgent need. All information on the raw materials of making sense of a disease and mitigating its effects should be immediately available.

Some say that only academicians and scientists at major institutions need access to these journal articles. Not so. We live in an information age that can and will thrust us into a new age of innovation and health and healing. This requires multidisciplinary articles in the hands of patients, parents, students, engineers, entrepreneurs and scientists in land grant colleges and historically Black colleges. It is unconscionable that scientific information is not immediately available to everyone.

While publishers argue that they create value around the raw information, we would argue that scientists funded with Federal tax dollars and so stewards of the public trust infuse these articles with value. There is no doubt that the publishers add value and that the value proposition around this body of knowledge should be paid for. But not the analysis of research results themselves. It is the duty of the Federal Government to facilitate sunshine on this data and to bring these articles into the public comments as quickly as possible.

We have seen business paradigms for all kinds of industries evolve as information aggregation changes. It is time for the biomedical publishing industry to evolve as well. Today we are among the millions facing an uphill battle, including the future of disease and disability for our children. Thousands of diseases affect mil-

lions of Americans. I have watched thousands of people in our community die in these years, and the time for waiting is over.

Let's do it, let's not spend any more of our precious time debating this, commenting on this. We live on the promise and inestimable value of publicly funded science. Obstacles to translating basic science into practice abound. But gated access is an artificial one. Remove barriers to information immediately. Grant us public access to publicly funded research without delay. We have a great deal of work to do, and we need the tools now.

I would be happy to take any questions.

[The prepared statement of Ms. Terry follows:]

Congress of the United States

House of Representatives

Information Policy, Census, and National Archives Subcommittee

Committee on Oversight and Government Reform

Written Public Testimony of

Sharon F. Terry, President & CEO, Genetic Alliance, Washington, DC

sterry@geneticalliance.org, Phone: 202.966.5557 x201

29 July 2010, 2:00 PM

Chairman Clay, Representative McHenry, and Committee Members, thank you for the opportunity to testify at this hearing on Public Access to Federally-Funded Research.

I am the president and CEO of Genetic Alliance. Genetic Alliance transforms health through genetics. We accomplish this by integrating individual, family, and community perspectives to improve health systems and services, by bringing together diverse stakeholders to create novel partnership, and by promoting individualized decision-making through increased access to information.

Genetic Alliance's network includes more than 1200 disease advocacy organizations, and thousands of partnerships with universities, companies, government agencies and policy organizations. The network is an open space for thousands of shared resources, hundreds of creative tools, and dozens of dynamic programs.

I am also a mom of two children diagnosed with pseudoxanthoma elasticum (PXE) in 1994. My husband (a trade school graduate) and I (a college chaplain) stole access to medical libraries, and

hacked into Internet Grateful Med, and ultimately read 400 articles on this disease. As a result of what we learned, we founded PXE International, created a biobank, cloned the gene, created a diagnostic test and initiated clinical trials. We are the ordinary American public and our access to these articles has been critical. Imagine if we have open access.

We applaud the Congress for enacting the policy expressed in Division G, Title II, Section 218 of PL 110-161 (Consolidated Appropriations Act, 2008 and National Institutes of Health (NIH)) for implementing this mandatory open access policy. This was a step in the right direction, and we are also acutely aware of the profound urgency inherent in a society that requires accelerated translation of basic science to meaningful clinical interventions. All information, the raw materials of making sense of disease and mitigating its effects, should be immediately available. This includes journal articles funded by all federal agencies.

Some say that only academicians and scientists at major institutions need access to journal articles. Not so. We live in an information age that can and will thrust us into a new age of innovation in health and healing. This requires multidisciplinary articles in the hands of patients, parents, students, engineers, entrepreneurs, and scientists. It is unconscionable that scientific information is not immediately available to everyone. While publishers argue that they create value around the raw information, we would argue that scientists, funded with federal tax dollars, and so stewards of the public trust, infuse these articles with value. There is no doubt that publishers add value, and that the value proposition around this body of knowledge should be paid for – but not the research results themselves. It is the duty of the federal government to facilitate sunshine on this data, to bring these articles into the public commons as quickly as possible.

Information critical to health should no longer be held hostage by arcane publishing practices. It is time for publishers, both private and academic, to redesign their business models in response to a new age of information sharing and a stronger sense of the scientific commons. We have seen business paradigms for all kinds of publishing industries evolve as information aggregation changes. It is time for this industry to evolve as well.

Public access to scientific literature is critical. It is the bedrock of our current system of discovery and the catalyst for science to build on science. Scholars and educators will find riches in new data and studies to use in classrooms; researchers across disciplines will have new opportunities for collaboration as they engage this treasure of publicly funded knowledge; and the work of all authors will be used and cited more frequently, enhancing their contribution to their field. Public access to the biomedical literature will yield untold benefits for medical research and discovery of treatments and therapies.

Today, we are among the millions facing an uphill battle, including a future of disease and disability for our children. Thousands of diseases affect millions of Americans. I have watched thousands of people in our community die in these years, and the time for waiting is over.

Let's do it, let's not spend any more of our precious time debating this, commenting on this. We live on the promise and inestimable value of publicly funded science. Obstacles to translating basic science into practice abound, but gated access is an artificial one – remove barriers to information immediately – grant us public access to publicly-funded research without delay. We've got a great deal of work to do, and we need the tools now.

Sharon F, Terry, MA
President & CEO
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Mr. CLAY. Thank you so much, Ms. Terry, for your testimony.

Mr. Maxwell, you are recognized for 5 minutes.

STATEMENT OF ELLIOT MAXWELL

Mr. MAXWELL. Thank you, Mr. Chairman. I am honored to have this opportunity to testify before the subcommittee.

My name is Elliot Maxwell. I am here representing the Committee for Economic Development, a non-profit, non-partisan business-led public policy organization.

For nearly 70 years, CED has provided sound policy research on major economic and social issues facing the Nation. The membership of CED is made up of some 200 senior corporate executives from a wide range of industry sectors, as well as leaders from U.S. universities.

To address cutting edge technology issues, particularly those arising from the emergence of the Internet, CED established its Digital Connections Council, comprised of information technology experts from CED companies. Since 2004, I have directed the DCC, which has published a series of reports focusing on the impact of the Internet and on increasing digitization of information.

The members of the DCC, coming from high technology organizations, all rely incredibly on intellectual property protections as their parent organizations. But they have come to realize that the rise of the Internet and the digitization of information has led to an explosion of greater openness, and that greater openness is critical for increasing innovation.

Economic development is part of the name of the Committee for Economic Development, and that is where its focus is. These are businesses that are interested in economic activity, in economic growth and the innovation that is necessary to accomplish it. They came to the conclusion that this bill and policies that increase openness are absolutely crucial for economic growth and to restrict access to information, to continue policies that would limit access by businesses, by individuals, by academic institutions, more broadly would be harmful to the economic growth of the United States, would prevent the kind of growth we need at this very moment.

The bill addresses three important points. One is to increase access to the research. We have heard from two people, one representing a small business, one representing individuals who are concerned about the health of their children or relatives. They don't have access. In some cases people can't afford it, in some cases they are not able to get to the information to where, or to institutions where they would have access to it. Businesses can't afford all the kind of information that they would like to have.

It is axiomatic that the more people who have access to information, the more people who can buildupon it. And the real value of information is in its use. It is not in the information itself; it is in people using it.

The second important part is, you want to increase the impact of the research that you fund. You want to get a higher return on the investment, an enormous investment that is made by the U.S. Government. And the way to do that is to give it more, make it more available to people who are creative and who want to use this

information. We can't know before hand how they are going to use it.

So it is very important to try to get this out as broadly as possible. To be frank, it is not necessarily in the interest of publishers to get it out more broadly, it is in the interest of publishers to maximize their return. And that is perfectly sensible.

It is in the interest of the U.S. Government to get its funded research out to as many people as possible to broaden its impact. Greater openness, greater accessibility increases the speed of discovery. It broadens discovery because it makes information available to people who might not otherwise know about it, or even be working in the same field. It reduces redundant research. It keeps people from going over blind alleys they wouldn't know about because they didn't have access to it.

And most importantly, it allows more people to innovate upon that research. Think about the Weather Service. I remember 2 years ago, 3 years ago, people were saying, "why don't we have the Weather Service's information?" We can get it from the Weather Channel. But the Weather Channel couldn't exist without the availability of U.S. Government information. It is allowing people to have access to information, to innovate upon it, that creates those opportunities that allows people to build businesses, to create jobs, to innovate. That is what we need to do now.

So we are speaking for businesses who want innovation, who want economic growth and know that the way to do that, the social return on the investment of research is enhanced by making it more broadly available. It is not enhanced by restricting it.

It helps people who worry about the health of their children, it helps small businesses. It helps anybody who is creative in making available this information. And because it is a U.S. Government investment, we need to think about the best way of increasing that return on investment.

It is consistent with intellectual property laws, the idea that journal articles exist separately from the research in some disconnected fashion seems implausible. They wouldn't exist without this research. We need to do everything we can to make the return higher, to spur innovation and to get more economic growth.

Thank you, Mr. Chairman.

[The prepared statement of Mr. Maxwell follows:]

Testimony of Elliot Maxwell

Director, Digital Connections Council

Committee for Economic Development

July 29, 2010

U.S. House of Representatives Committee on Oversight and Government Reform

Subcommittee on Information Policy, Census and National Archives

2154 Rayburn House Office Building

Washington, DC 20515

Mr. Chairman, members of the Subcommittee, thank you for this opportunity to present the views of the Committee for Economic Development's (CED) Digital Connections Council on the important issue of public access to the results of federally funded research.

CED is a non-profit, non-partisan business-led public policy organization. For nearly 70 years CED has provided sound policy research on major economic and social issues facing the nation. The membership of CED is made up of some 200 senior corporate executives from a wide range of industry sectors as well as leaders from U.S universities. To address cutting edge technology issues, particularly those arising from the emergence of the Internet, CED established its Digital Connections Council (DCC) composed of information technology experts from CED-affiliated companies.

Since 2004 I have directed the DCC which has published a series of reports focusing on the impact of the Internet and the increasing digitization of information. These two developments have greatly broadened access to information and fostered a new culture of participation in which everyone can be a publisher and information can be remixed, repurposed and redistributed; they have also raised difficult new policy challenges. In order to develop policy positions responsive to this new environment the DCC has studied the special nature of digital intellectual property as well as the lessons learned from the growth of open standards, open source software, and what has become known as "open innovation."[1] Applying what it learned from these two studies the DCC then examined the impact of greater openness made possible by increased access to information as well as a heightened ability to make use of this digital information in different ways on two key sectors—health care and higher education—that depend heavily on information.[2] My testimony today draws heavily from these four studies which can also be found at my website www.emaxwell.net.

THE MEANING OF OPENNESS

The DCC's studies attempted to better understand what people have meant by openness, a word used in many different policy contexts—open standards, open source, open innovation, open spectrum, open access, etc. The reports eventually defined openness as a continuum ranging from closed to open on which information, processes, and even institutions could be placed depending on how accessible and responsive they were. At the closed end of the continuum, for example, is information that is not shared; somewhat more open is information only available to subscribers but which cannot be repurposed. At the other end is information posted on the World Wide Web available to all to be used without any restrictions.

THE BENEFITS OF GREATER OPENNESS

The DCC eventually concluded that movement toward greater openness facilitated by the Internet and the digitization of information was beneficial although it was necessary in each particular case to try to determine the appropriate degree of openness to achieve a particular purpose. As the most recent DCC report on openness in higher education put it, "Over the course of our work we have found that greater openness fosters quicker and broader innovation, primarily because of the potential for many more people to contribute, as opposed to having to

rely on the work of a lone "genius" or the capabilities of a very small group. Individual creators certainly play an important role. Their value should not be underestimated. But openness taps the potential of a much larger number of potential creators, who might see the problem in a different way or be aware of alternative solutions and who are able to contribute drawing upon their own experience and expertise."[3]

In its report on open standards and open-source software the DCC gave a concrete example of how greater openness can be beneficial. In proprietary software the source code is concealed. In open-source software the source code is completely open. The difference between the two practices can be seen in an aphorism of the open-source software community: "With enough eyeballs, all bugs are shallow." In seeking to continuously improve open-source software such as LINUX, the open-source community distributes the source code as broadly as possible. Even the intellectual property licenses used by the open-source community are designed to increase (and preserve) the accessibility of the code for everyone.

The rationale is that the more people who view the source code, the more likely it is that someone, somewhere, will have the expertise, experience, and inclination to detect and fix the inevitable errors (or "bugs"). Broad distribution makes it more likely that the unknown programmer for whom the bug is "shallow" will encounter the source code and suggest improvements. Making the source code accessible, rather than controlling it and excluding others from access to it, as is done with proprietary software, is necessary because the programmer for whom the bug is shallow cannot always be identified in advance.

It is clear that greater openness can sometimes be problematic. For example, health care can be improved by using electronic health records "open" enough to be accessible to all those providing care to a patient but not open to his or her landlord or employer. Similarly while greater openness increases access to information it also can create a tsunami of information that must be sorted to find the information that is actually valuable. But it should be noted, particularly in the context of today's hearing, a belief in the virtue of greater openness is not inconsistent with support for intellectual property rights which provide a certain degree of control for the rights holder to "close" the information in order to create an incentive for acts of creation. Many of CED's member companies rely heavily in their businesses on intellectual property.

INCREASING PUBLIC ACCESS TO FEDERALLY FUNDED RESEARCH

Given the conclusion that making research more broadly and quickly available increases its speed and breadth of discovery, it is not surprising that the DCC has supported the present NIH public access policy and its extension to other federal agencies. In its 2009 report the DCC found that:

> "Congress has greatly advanced openness in research by passing legislation that dramatically increases access to research funded by the National Institutes of Health (NIH). ...This policy is being vigorously opposed by publishers who claim that their intellectual property (IP) interests are being infringed by the open access requirements. Not only do we believe that the NIH policy is consistent with copyright law and good public policy—to increase the pace of innovation and

> avoid making the taxpayer pay twice for taxpayer-funded research—but we believe that the public-access mandate should be expanded. Recently introduced legislation would extend public access to research funded by the 11 federal agencies that each provides more than $100 million in support. We also support increasing access to data collected by the government such as for regulatory purposes. The National Science Foundation has already moved in this direction by establishing a policy that any scientific and engineering data funded by NSF must be made broadly available and useable."[4]

Supporting the DCC's view in favor of promoting access to publicly funded research is a 2007 OECD report on public access to research data from public funding, which notes the benefits of improved access to, and sharing of, such data because it:

- Reinforces open scientific inquiry,
- Encourages diversity of analysis and opinion,
- Promotes new research,
- Makes possible the testing of new or alternative hypotheses and methods of analysis,
- Supports studies on data-collection methods and measurement,
- Facilitates the education of new researchers,
- Enables the exploration of topics not envisioned by the initial investigators, and
- Permits the creation of new data sets when data from multiples sources are combined.[5]

The OECD Recommendation, citing a U.S. National Research Council Report, states: "The value of data lies in their use. Full and open access to scientific data should be adopted as the international norm for the exchange of scientific data derived from publicly funded research." Open access should be "easy, timely, user-friendly, and preferably Internet based." Such a regime, according to the OECD Recommendation, not only "helps to maximize the research potential of new digital technologies and networks, but provides greater returns from the public investment in research."[6]

In addition to the reasons set out in the OECD recommendation there is some intriguing research that suggests that billions of dollars of additional economic activity can be generated by making research more openly available.[7]

BARRIERS TO PUBLIC ACCESS TO FEDERALLY FUNDED RESEARCH

The current NIH policy—and the proposed legislation, if enacted—would dramatically reduce barriers that the public faces in gaining access to the results of research that the public funds.

The most important barrier is cost. The costs of subscriptions or licenses have been rising, putting them out of the reach of many subscribers. Prices for subscriptions have climbed four times faster than the rate of inflation in the recent past, increasing some 300 percent over the last twenty years, leading some institutions to cut back on their subscriptions, thus reducing access to cutting edge research results. In addition, researchers who do not have access to institutions that continue to subscribe or have licenses for publications are similarly without access. If

researchers do not have access to the results of others' work, it is far more likely that they will duplicate it, and it is a certainty that they cannot build upon it.

A second barrier is that journals are increasingly providing electronic versions under license. These licenses may cut off a subscriber's access immediately and even limit access to older collections, including some, but not all, of the journals that had previously been available, and prevent researchers from transferring journals to new institutions if they change employers. One other barrier is likely to reduce the impact of publicly supported research. As the DCC report on openness in health care points out, the intellectual property rights that protect the content and underlying data of many journals prevent those researchers who do have access from doing what researchers are most skilled at—adding to, revising, modifying, repurposing, and reusing the content to generate new knowledge. Some of these actions might be possible under today's intellectual property rules, but researchers without access to underlying data may be prevented from making use of new and powerful computational techniques such as machine aggregation and manipulation of data.

In launching the Public Library of Science's open-access journal *PLoS Biology*, Patrick Brown, Michael Eisen, and Harold Varmus explained why they believed they were making the information they would publish more valuable:

> Freeing the information in the scientific literature from the fixed sequence of pages and the arbitrary boundaries drawn by journals or publishers—the electronic vestiges of paper publication—opens up myriad new possibilities for navigating, integrating, 'mining', annotating and mapping connections in the high-dimensional space of scientific knowledge. Consider how the open availability and freedom to use the complete archive of published DNA sequences in the GenBank, EMBL, and DDBJ databases inspired and enabled scientist to transform a collection of individual sequences into something incomparably richer.[8]

Research also suggests that a broader, more cross-disciplinary audience uses open-access materials. This is particularly encouraging because research has found that scientists working together with those in different fields are more likely to solve scientific problems. And if other researchers have access to data underlying the articles they read, they may provide a means superior to traditional peer review for replicating research and detecting fraud or identifying scientific problems.[9]

THE IMPACT OF THE PROPOSAL ON PROPRIETARY PUBLISHERS AND UNIVERSITY PRESSES

Changes in the Marketplace

There is little doubt that recent developments in the conduct of research are having a profound effect on scholarly journals and university presses. More important than the NIH public access policy or the proposed legislation has been the growing acceptance of immediate disclosure of

research results via the Internet—as in the Human Genome Project; instead of waiting weeks and months for publication in a prestigious journal many researchers have come to the conclusion that their research will have greater impact and increase the pace of scientific discovery if it is quickly disclosed allowing other researchers to build upon it. At the same time the rise of open access journals—peer reviewed journals available to all online—with very different business models has contributed to the upheaval in the existing marketplace for scholarly communications. A commitment to rapid release of research results and the Internet's existence as a vehicle for such release, combined with public access mandates, is challenging scholarly journals in much the same way as the existence of citizen journalists and the Internet's availability is challenging traditional print news media and the direct distribution of their music by independent bands is challenging the traditional music industry.

The Response of Proprietary Journals to Changes in the Marketplace

As in the newspaper and music businesses the challenges have led to a variety of creative responses. About 30 proprietary journals have become open-access journals. Some proprietary journals have voluntarily reduced the period of exclusivity during which only subscribers can have access to the published research; the *Nature* publishing group has adopted a six-month restricted window. Other proprietary journals have made their back issues freely available.[10] The second largest proprietary scientific and technical publisher has become the largest open-access journal publisher by purchasing the open-access journal BioMedCentral.

Some proprietary publishers have embraced the NIH public-access policy; some have even announced their intentions to deposit articles that they publish into PubMed even though the articles are not formally covered by the policy. In contrast, the American Psychological Association initially proposed charging authors subject to the NIH policy $2500 to deposit their articles in PubMed; the association withdrew the proposal after considerable criticism.[11]

The variety of responses of proprietary journals suggests the vibrancy of the marketplace. Just as the music industry began to adopt digital delivery in the face of challenges by Napster and others—think of the billions of iTunes tracks and millions of iPods sold—proprietary journals are finding new and better ways to serve their audiences. The period of exclusivity provided by the NIH public access policy attempts to take into account the interests of publishers and allows them to experiment with new business arrangements while at the same time recognizing the power of broad access to information to quicken discovery; public policy should not be used to protect particular business models but should focus on accomplishing larger social goals such as fostering innovation.

Public Access and Universities Presses

In its most recent report on openness in higher education the DCC also examined the future of the university press. In the past, the university press served as a vehicle for the dissemination of scholarly work which might not have sufficient commercial appeal to be otherwise published, including the monographs that junior faculty produce, in part, to get tenure. The scholarly press was an important part of the academic ecosystem.

The ranks of university presses have thinned over time. They are expensive to operate and few have the necessary economies of scale. They are now facing threats similar to those faced by

proprietary scientific and technical publishers, particularly from the posting of scholarly work online.

Some university presses are reacting much like commercial publishers. The Princeton University Press, for example, has complained about the unauthorized posting of its copyrighted materials on the Web and, like commercial publishers, has filed copyright "take-down notices" with those hosting the disputed materials seeking to have the materials removed from public access.[12]

Such actions might be more easily justified if the university press provided substantial financial support to its host institution. On the other hand, take-down notices appear at least arguably inconsistent with the mission of the university to further the dissemination of knowledge, especially when one compares the access provided by even the most accomplished university press with the global access made possible when digital materials are made freely available on the Web.

It seems clear that universities and their presses will have to adjust to a future in which scholarship is delinked from print publication.

Alternative models are being developed. Some presses are going completely online. Some are attempting to achieve financial stability through the sale of subscriptions to their restricted websites. A different model is being developed by Rice University Press and other members of its university press consortium that are embracing openness and Internet distribution but also providing inexpensive on-demand printing services for those who want open educational resources (OER) in hard copy. The University of Michigan press has announced that it will provide on-demand printing of over 400,000 out-of-publication books digitized by Google. The National Academies are providing free digital access to over 4,000 Academy reports. Indiana University has recently proposed an infrastructure for digital publishing that could be shared by colleges and universities and that could provide economies of scale for journals, universities presses and non-profit societies.[13]

As with proprietary journals university presses are in a period of transition with old models threatened and new models emerging to be tested in the marketplace. The DCC believes that the university press will continue to play a role in the support and dissemination of scholarly work but that it should do so in a way that is consistent with the university's historic mission to create and disseminate new knowledge as broadly as possible.

Public Access and the Potential Reduction of Support of Research

Another argument raised against open-access publishing and public access requirements generally is that it will eventually reduce the volume of research as publishers, particularly learned societies, will reduce or eliminate their publishing activities. In addition, many learned societies depend on journals to support their other activities and might be forced to find other revenue streams or cut back their activities. As to the first point the DCC noted in its most recent report that it is hard to believe that research good enough to be published in learned society journals will not find another outlet particularly when self publishing via the Internet remains as an option. While learned societies play an important role in the academic ecosystem, providing support for their other activities is an issue they must address directly; public policy to restrict the broad disclosure of publicly funded research would be an inappropriate way to address this issue.

PUBLIC ACCESS AND INTELLECTUAL PROPERTY RIGHTS

Some proprietary publishers, including scholarly societies and universities presses, have attacked the NIH public-access policy. They have protested the mandate on the grounds that it violates U.S. copyright law by forcing authors to give up part of their copyrights prior to later transfer to a publisher. Some have also supported legislation—the Fair Copyright in Research Works Act—which would overturn the NIH mandate.

The DCC is not a body whose expertise lies in interpreting U.S. copyright law. However, based on a review of responses to NIH's requests for comments on its public access policy, the DCC has stated its belief that the policy is consistent with U.S. copyright law.

An author's copyright consists of a bundle of rights that belong to the author. One or more of these rights can be transferred on a voluntary basis by the author. Under the NIH public access policy researchers who conduct research and report on that research agree, in return for public funding for their research, that they will grant NIH a license to make the researcher's final version of the report publicly accessible within 12 months of publication. This kind of agreement is the same kind of agreement that authors enter into with other entities that fund the creation of copyrighted work—such as authors who receive an advance from a commercial publisher. Any party that funds a researcher's creation of a copyrighted work could require some agreement with the researcher about the disposition of some or all of the bundle of rights belonging to the researcher in exchange for such funding.

Unlike commercial publishers who generally seek an exclusive license of rights in return for advances and/or the promise of future royalties, NIH, or another government research funder, only requires the grant of a non-exclusive license leaving the researcher free to transfer any or all of his or her rights to a journal publisher or anyone else. The researcher could voluntarily provide a non-exclusive license to the final version to anyone else, with or without compensation, without compromising the rights which a journal publisher requires in order for the publisher to able to publish the results of the research.

Another argument that has been made is that the public access requirement might violate U.S. obligations under various intellectual property treaties to which the U.S. is a signatory. These treaties deal with copyright laws and limitations and exceptions to such laws. But these treaties do not apply to contracts in which a researcher agrees to voluntarily provide non-exclusive licenses to his or her work in exchange for funding. Moreover it is traditional U.S. procurement policy that when a federal agency enters into a contract that would lead to the creation of intellectual property that the agency must reserve a license to use such intellectual property.

It should be noted that a number of other research funders, public and private, have amended their funding contracts to require, as a condition of support, that authors make their work publicly accessible through deposits into online digital repositories. The U.K Medical Research Council, the European Research Council, the Canadian Institutes of Health Research, among others, have adopted such policies and provide a 6 month window of exclusivity for the publisher before the deposits are made publicly accessible.

In a related development, based on the same belief that broad dissemination of research results fosters the creation of knowledge and prevents redundant research, the MIT faculty unanimously agreed to require that the results of MIT research be deposited into an open-source digital repository to be available to all; while individual authors can block public access to the results the fact of the existence of the research is available so that interested parties can seek access directly from the author. Other leading institutions of higher education have adopted similar policies.

OTHER POTENTIAL ACTIONS TO FOSTER GREATER OPENNESS

The DCC fully supports greater public access to publicly funded research. In its four reports the DCC has also made a series of other recommendations for governmental actions that would allow the U.S. to benefit from the potential for greater openness. I would like to highlight some of these recommendations and encourage the Subcommittee to explore the possibility of legislation that would implement them. They all share a common goal of increasing public access to information and allowing the public to make creative uses of information. These recommendations include:

- Extending the public access policies, under appropriate conditions, to primary data gathered pursuant to publicly funded research and to data submitted in support of governmental regulatory activities. One area of critical importance is access to data underlying clinical trials submitted to the FDA as part of the approval process for drugs and medical devices; this data is sometimes withheld for years being considered "trade secrets". Recent discoveries of potential dangerous side effects of approved drugs based on data submitted as part of the approval process show the importance of such access.

- Requiring data that is gathered pursuant to publicly funded research and data submitted in support of governmental regulatory activities to be in a form that is searchable and computable using common standards so as to maximize the utility and "responsiveness" of the data.

- Requiring federal agencies that fund research to review their granting guidelines to take into account the research accomplishments of potential grantees who choose to promptly disclose the results of their research and who may therefore forego publication (as the work is deemed by some publishers as already "published"). These agencies should explore alternative mechanisms for determining scholarly achievement beyond traditional scholarly publication in awarding grants and other awards.

- Encouraging federal funding agencies to be receptive to requests for funding for the publication/disclosure of research results in open access journals that utilize an "author pays" funding model.

- Improving access to so-called orphan works—those still under copyright but whose rights holders cannot be reached—by legislatively permitting "good faith" use until receiving a valid "take-down" notice or by limiting liability for "good-faith" use until a valid "take-down" notice is received.

- Supporting efforts to establish compatibility, comparability, and transparency regarding degrees and certificates that are acquired utilizing federal student grants or loans.
- Encouraging accrediting agencies for institutions of higher education that are recognized by the federal government to make more information available about the institutions that they accredit in order for students to make better choices about where to apply and matriculate.
- Encouraging colleges and universities which obtain patents based on federally funded research to consider the longer-term benefits of non-exclusive licenses and the benefits of wider dissemination of knowledge.

Thank you again for the opportunity to offer this testimony and to support greater openness through increasing public access to publicly supported research.

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[4] Ibid.

[5] Organization for Economic Cooperation and Development, "OECD Principles and Guidelines for Access to Research Data from Public Funding," 2007.

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[12] Scott Jaschik, "Pirates vs. University Presses," *Inside Higher Ed,* February 18, 2009, available at <http://www.insidehighered.com/news/2009/02/18/pirate>.

[13] Indian University Digital Library Program, "About Us: Overview of the Digital Library Program," May 2009, available at <http://www.dlib.indiana.edu/about/index.shtml>.

Mr. CLAY. Thank you so much, Mr. Maxwell.

Professor Colamarino, you are recognized for 5 minutes.

STATEMENT OF SOPHIA COLAMARINO

Ms. COLAMARINO. Thank you, Chairman Clay. I am speaking on behalf of Autism Speaks, the Nation's largest autism science and advocacy organization. Importantly, I ask that my full statement be included in the hearing record.

I am here today as a scientist with a Ph.D. in neuroscience who serves as the vice president of research for Autism Speaks. We invest over $20 million in annual funding for research into the causes, prevention and treatments for autism.

I am also speaking to you today as the architect of the first public access policy for a U.S.-based non-profit advocacy organization.

Today I would like to underscore the importance of open access from three perspectives: that of the families affected by a disorder; that of an active scientist who needs access to effectively do her job; and that of a funder that needs access to achieve our mission and provide accountability while doing so.

So first, the families. My main motivation for being here today is the desire to improve the lives of individuals with autism. Autism impacts nearly 1 in 100 children in the United States. There are currently no effective treatments that address the core symptoms. For decades, parents and care providers have cobbled together intervention approaches as they best see fit.

Access to the latest findings would empower them to be more educated advocates by allowing them to read first-hand the research progress. However, they have to struggle to find the most credible information necessary to make informed decisions because of what currently amounts to an arbitrary barrier to accessing published research literature. Sadly, in 2010, where essentially anything said by anyone can be accessible within a matter of moments, families are inundated with information and have access to all but the most scientifically rigorous data. And it is time for that to change.

Second, my job as a scientist. I am tasked on providing counsel and investing millions in research funding. However, when I left academia to direct research in the context of an advocacy organization, I had no idea what a major hurdle I would find. On a Friday in 2004, I left my research position at the Saulk Institute, where I had full access to scientific literature. The following Monday, I started my new position as science director of an international research organization and I had none.

To this day, Autism Speaks grantees and fellow scientists are shocked to find out that our organization does not have free access to these articles. This is not unique to us. It is not financially possible for non-profit funders of health research and training to subscribe to the full range of science journals needed to do their work.

I also want to emphasize, this barrier is not exclusive to science duties. My colleagues in our Government relations divisions cannot access the primary research literature required to substantiate their policy recommendations.

In sum, there is an entire segment of scientists and health advocates blocked from effectively doing their jobs without this access.

Third, our mission. The mission of Autism Speaks is to improve the future for all who struggle with autism. We are dedicated to funding global biomedical research and translating discoveries into tangible impacts. I cannot stress how important it is for research findings to be in the public domain. Funding organizations such as ours can support as much research as they wish. But unless the knowledge is utilized by others, it remains useless.

Unfortunately, just as there are scientists currently denied access based on our employment situations, there are also academic researchers in less developed countries who cannot afford journal access, and even lay people who want to devote their minds to autism but cannot gain access to the literature to study it. It is critical to our mission that research papers resulting from public funding be readily available to anyone with an interest in autism research.

We must also be accountable in pursuit of this mission. Our donors are typically the families of the very individuals we are aiming to help, many of whom are already financially struggling due to the heavy burden of autism care. It is exceedingly important for them to see the outcome of their investment and their impact on reducing disease burden.

I find it frustratingly difficult to explain to a donor who provided me with the money in the first place to pay for the research that they have to pay once again to see the outcome of that research.

Now, as I said at the start, Autism Speaks is perhaps uniquely qualified to call for expanded access to the results of publicly funded research, because in 2008, we implemented our own public access policy. We modeled this policy on the highly successful policy of the NIH. Several other non-profit organizations have since expressed interest in following ours. This is perhaps the best proof that what I have spoken of today is not about the needs of autism per se, but about the fundamental way to change the way stakeholders are finally included in this discovery process.

In summary, open access to publicly funded research will lead to more informed advocacy and further research advances. It has enormous benefits for families that need information that directly affects their lives, and it will greatly enhance the ability of scientists like me who quite simply require access to invest our scarce research dollars. It will also help the myriad other organizations such as Autism Speaks achieve their mission; namely, benefiting the public by accelerating research toward breakthrough discoveries, treatments and eventually cures.

Thank you for providing me with this opportunity to speak, and I am happy to take any questions. Thank you.

[The prepared statement of Ms. Colamarino follows:]

Statement of
Dr. Sophia Colamarino on behalf of
Autism Speaks

Before the
Subcommittee on Information Policy, Census and National Archives
Committee on Oversight and Government Reform
Regarding Public Access to Publicly Funded Research

July 29, 2010

Chairman Clay, Ranking Member McHenry and members of the House Oversight and Government Reform Subcommittee on Information Policy, Census and National Archives - thank you for the opportunity to testify today on the important issue of improving public access to the results of federally funded research. I am speaking on behalf of Autism Speaks, the nation's largest autism science and advocacy organization. (I ask that my full statement be included in the hearing record).

I am here today as a scientist with a Ph.D. in Neuroscience who serves as the Vice President for Research at Autism Speaks, a non-profit organization which invests $20-30 million in annual funding for research into the causes, prevention, treatments and, ultimately, a cure for autism. The organization is also dedicated to raising awareness of the spectrum of autism disorders and, crucially, to advocating for the needs of individuals with autism and their families.

I am also speaking to you today as the architect of the first public access policy for a US-based non-profit advocacy organization, which was implemented by Autism Speaks in December 2008. For the reasons I will describe, we believe our policy is an important first step toward transparency and accountability of the outcomes of funded research in the US. We fully support expanding access to research results – especially

to that crucial subset of scientific findings that are produced as a result of our nation's collective $60 billion annual investment in biomedical research.

Today I'd like to very briefly underscore the importance of opening access to the results of publicly funded research to a not-for-profit research organization such as Autism Speaks from 3 perspectives:

1) that of the families affected by a disorder such as autism;
2) that of an active scientist who needs access to effectively do her job; and
3) that of a funder that needs to achieve our mission and provide accountability to our many stakeholders while doing so.

First: Access to the results of research generated using public funds is important to families.

The main motivation for my being here today in support of open access is the desire to improve the lives of individuals with autism and their families. Autism is a challenging disorder that now impacts nearly 1:100 children in the United States. Characterized by varying degrees of impairment in communication skills, social interactions, and restricted and repetitive patterns of behavior, individuals with autism

often require life-long support. Other than behavioral interventions which result in highly variable outcomes, there are currently no effective treatments that address the core symptoms of autism, and families are left to handle the situation as best they can.

For decades, parents and care-providers have cobbled together intervention approaches as they best see fit. I spend much of my time traveling the country to lecture to these families about the science of autism, the progress of research, and the hope that it is bringing. Families with autism are, by nature, motivated advocates constantly seeking new and reliable information to educate themselves and I have found them to be particularly sophisticated in their ability to read and interpret scientific literature pertaining to autism. Giving individuals with autism and their families access to the latest research findings empowers them to be better, more informed advocates by allowing them to read, first-hand, what progress is being made on various research fronts.

However, because of what amounts to a seemingly arbitrary barrier to accessing published research literature, they have to struggle to find the most credible information necessary to make informed decisions. In today's information age, where essentially anything said by anyone can be made accessible within a matter of

moments, it is unfortunate that families have easy access to all BUT the most scientifically valid information, that which can be found in scientifically reviewed research literature. Perhaps twenty years ago, when we still relied on the slow transfer of information through printed format, restricting access to a subset of knowledge had less of an impact. In 2010, families are inundated with information that may not always be credible, and yet they are unable to read the most scientifically rigorous data. It's time for that to change.

Second: Access to the results of research generated using public funds is required for me as a scientist to do my job.

As a scientist and, particularly, as the Vice President for Research, I am tasked with providing counsel on investing ~$30 million in research funding for Autism Speaks annually. To carry this out, I must have access to the most complete and up-to-date scientific research finding in areas as diverse as neuroscience to nutrition. Just as any academic researcher, I am responsible for actively pursuing the literature, analyzing the reports, interpreting the data, and determining where the holes are that must be addressed.

However, in 2004 when I made the decision to leave academic research to direct research in the context of an advocacy organization I had no idea that a major hurdle

would exist to keep me from effectively achieving these goals. On a Friday I finished my research associate position at the Salk Institute in La Jolla, CA, where I had full access to scientific literature. On a Monday I started my new position as Science Director of an international research sponsoring organization, and had none.

To my dismay, I was being asked to strategically direct limited resources and make allocation decisions without knowledge of the latest research! While I was accustomed to skimming dozens of articles a week, I soon found that I had to pay what could be up to $30 a paper. Worse yet, many of these were research reports sponsored by my own organization, but I still had to pay to read them in their final format. To provide an example of the scope of the problem, reading all the papers published in autism in 2009 could amount to $120,000. The non-profit organization I worked for could not absorb these costs, so I relied on colleagues in the academic world to share copies of published papers. This occupied a large amount of time that would otherwise have been spent in further pursuit of effective treatments for autism.

To this day Autism Speaks' grantees and fellow scientists are shocked to find out that our organization does not have free access to these articles. Thankfully I now have a faculty appointment at Stanford University Medical School and, while I do not get paid for this position, it is worth any extra responsibilities I have taken upon as it

allows me to have access to a full library catalogue, one which I use to do my real job at Autism Speaks.

I want to emphasize this is not unique to Autism Speaks. It is not financially possible for not-for-profit funders of health research and training to subscribe to the full range of scientific journals needed do their work. In fact, last month, because of the exact issues I have just laid out, science officers of funding organizations that are members of The Health Research Alliance, a consortium of non-governmental funders of health research, issued a query on their member listserv concerning how they might obtain access to the science literature. Unfortunately, although a great deal of interest was expressed in gaining online access to the science literature, members reported it currently does not appear feasible to purchase access even by banding together. Presumably, just as I have done with my faculty appointment, everyone will have to find their own work-around.

Finally, I also want to emphasize this barrier is not exclusive to science duties. My colleagues in our government relations division, some of whom are here today, cannot access the primary research literature required to substantiate their policy recommendations and legal arguments.

In sum, there is an entire segment of scientists and health advocates who are blocked from effectively doing their jobs without access to this literature.

Third: Access to the results of publicly funded research is important to pursue the mission of Autism Speaks.

The mission of Autism Speaks is to improve the future for all who struggle with autism spectrum disorders, and we are dedicated to funding global biomedical research into the causes, prevention, treatments, and cure for autism. Our goal is to translate research discoveries into diagnoses and treatments that will have a real and *tangible* impact on the lives of individuals with autism and their families. Research is an iterative process, with each finding building upon previous findings, piece by piece. Research is also self-correcting; it requires independent validation to progress. Therefore, from the standpoint of the mission of Autism Speaks, I cannot stress how important it is for research findings to be in the public domain; funding organizations such as ours can support as much research as they wish, but unless the knowledge is utilized by others, it remains useless.

Specifically, in the case of autism, given its complex biological and behavioral nature, scientific progress will require the continuous influx of new ideas from multiple and disparate disciplines. When you are a parent of a sick or impaired child, there can

never be enough minds thinking about your problem. And unfortunately, just as there are scientists such as myself who are currently denied access based on our employment situations, there are also academic researchers in less developed countries who cannot afford journal access (and who, ironically, email to ask me for copies of articles). Similarly, there are researchers in non-academic environments, and even lay people, who want to devote their minds to autism, but they cannot gain access to the literature to study it. Again, from the perspective of Autism Speaks, if your mission is to improve the lives of persons with autism, and urgency is a core value, why would we want to keep knowledge restricted? We believe it is critical that the research papers that result from public funding be readily available to anyone with an interest in autism research. Better access to this information can only lead to positive things, whether it's more effective advocacy or further research advances.

Additionally, moving precious literature into public access will advance research discovery by allowing better archiving of scientific material and permitting database integration, two capabilities which may not have been at issue when the current limited access parameters were originally established.

Finally, as a non-profit organization utilizing donations from generous benefactors, we must be held accountable in pursuit of our mission. Typically our donors are the

families of the very individuals we are aiming to help, many of whom are already financially struggling due to the heavy cost of autism care – an estimated $3.2 million in incremental costs over the lifetime of an individual with autism. Opening access to research results plays a role here, too. When speaking of our accomplishments or making the case for continued investment, it is exceedingly important for donors to Autism Speaks, or to other non-profits, or even taxpayers to NIH, to have the ability to see the outcome of their investments and the impact of those investments on reducing disease burden. I find it extremely difficult to explain to a stakeholder that has provided me with the money to pay for the research, that they have to pay once again to see the results of that research.

As I noted earlier, Autism Speaks is perhaps uniquely qualified to call for expanded access to the results of publicly funded research, because we as a funding organization have committed to not only "talking the talk" about greater access, but also "walking the walk."

Autism Speaks invests several million per year in original autism research. To ensure that this investment is fully leveraged – that as many people who might want to have access to the results of research can do so as soon as possible, to begin to understand it, and to build on it, in 2008 we implemented our own "public access" policy – to

require that any researcher that receives grant funding from Autism Speaks to agree to make a copy of any article resulting from that funding freely, publicly accessible through an online public site no later than 12 months after publication in a peer-reviewed journal.

We modeled our policy on the highly successful public access policy of the National Institutes of Health (NIH) and, in fact, chose the PubMed Central Data database maintained by the NIH as the repository into which all Autism Speaks funded research papers will be deposited. Since that time, I have been contacted by several other non-profit advocacy organizations interested in following our model, and it is my understanding that this Fall, CURE Epilepsy will announce a policy that is based upon ours. This is perhaps the best proof that what I have spoken of today is not about autism per se, but about the fundamental need to change the way stakeholders – parents, providers, scientists and advocates – are finally included in the discovery process.

FINAL SUMMARY

Opening up public access to the results of publicly funded research has enormous potential benefits – not just for families affected by conditions like autism, but families of all kinds with an interest – or a need – for information on a broad spectrum

of biomedical research that affect their lives. It has the potential to greatly enhance the ability of scientists like me, who, quite simply, **require** access to scientific results to be effective – as researchers, and also as scientists tasked with helping organizations of all kinds make the most informed decisions possible about investing scarce research dollars into the most promising research avenues. Opening up access to publicly funded research has the potential to help myriad other organizations like Autism Speaks accelerate their quest to achieve their missions – benefiting not only science, but countless members of the public by speeding up progress towards breakthrough discoveries, treatments and, eventually, cures.

Thank you once again for providing me with the opportunity to speak about this very important issue.

Mr. CLAY. Thank you so much, Professor.
Dr. Shulenburger.

STATEMENT OF DAVID E. SHULENBURGER

Dr. SHULENBURGER. Thank you, Chairman Clay, for the opportunity to speak today about public access. It is an important topic for higher education for the future of the country.

The Association of Public and Land Grant Universities [APLU], supports Federal legislation ensuring public access to scholarly articles growing out of federally funded research. APLU is an association of public research universities including all flagship and all land grant universities in every State. Our 219 members enroll more than 4.7 million students, award 60 percent of the U.S. doctoral degrees, and conduct nearly two-thirds of all federally funded academic research.

For the last 4 years, I have been the academic affairs officer of APLU. Before joining the organization, I spent 13 years as provost at the University of Kansas, and a total of 34 years on its faculty. I am also an economist.

My interest in access to scholarly writing was intensified both by my duties as provost and my discipline as an economist. For over two decades, journal prices increased at a nearly 10 percent annual rate, while KU's budget barely kept up with inflation. Why did journal prices increase at a rate that made them less available to higher education? That question has since been my major research focus.

The problem we address is that faculty from time to time experience delays in accessing articles published in scholarly journals or cannot gain access at all. These road blocks harm their productivity. The public access policy is primarily aimed at easing these road blocks.

But access to scholarly literature is also important to the quality of education. Clearly, superior graduate education is based on the use of this literature. But this research also informs good undergraduate instruction. Unfortunately, students at non-research institutions and their faculty don't have broad access to this research literature. Perhaps those with least access are at the community colleges, where half our country's students are now enrolled. A Federal public access policy would have positive impacts on all post-secondary education.

As you have heard, many businesses, especially high-tech startups, need access to research findings. Better access improves their chances of remaining competitive. The need of individuals to access the scholarly literature comes from many directions. When a child receives a deadly diagnosis, parents have difficulties understanding why they can't have ready access to the research that has been funded with their public dollars.

APLU supports NIH's public access model. It works. So we support its spread to other funding agencies. The Federal Research Public Access Act follows NIH's proven model, and APLU endorses its passage, with some caveats.

Central deposits, such as NIH has, may not be necessary. An article conceivably could be placed in a faculty member's own university repository and be included virtually in the funding agency's

public access repository. To the extent possible, we would hope deposit requirements and procedures should be uniform across funding agencies, because that would reduce the cost of compliance considerably.

The NIH has a flexible, zero to 12 month embargo period, not as you have heard, a one size fits all, but it is a flexible period that exists now, and it depends upon the preferences of the journal publication. We believe that is acceptable for public access. Shorter would be better, but 12 months is acceptable.

A choice has to be made between deposit of the final manuscript version of the article, or the article in the form in which it appears in the journal. We favor the latter, so long as full text, word by word search can be made. Some suggest that access to the final grant report would provide adequate access to research findings. We do not accept this contention. Most grant reports are narrowly focused. Journal articles generally provide context for the results reported, relate those results to the wider literature, and are more easily located through public finding aids.

Public access with characteristics I have enumerated, would be compatible with the continuation of subscription-based scholarly journals. The evidence is that public access has little impact on subscription revenue and is thus fully consistent with ensuring that the refereeing of the literature continues. Thank you.

[The prepared statement of Dr. Shulenburger follows:]

Testimony on *Public Access to Federally Funded Research* to the Information Policy, Census, and National Archives Subcommittee of the Oversight and Government Reform Committee

Association of Public and Land-grant Universities, A·P·L·U,
David E. Shulenburger, Vice President for Academic Affairs

July 29, 2010

I thank the committee for the opportunity to speak with you today on *Public Access to Federally Funded Research*. This is an important topic for higher education and the future of this country and I am pleased to have this opportunity.

I am currently the Vice President of the Association of Public and Land-grant Universities. Prior to this position I spent 13 years as provost and executive vice chancellor of the University of Kansas. I am also an economist. My interest and long-time involvement in access to scholarly writing was at first intensified by my both my duties as provost and my discipline as an economist. Decisions about resources for the Kansas library were important as they had a direct effect on our ability to succeed as a teaching and research institution. When, over two decades, journal prices increased at a nearly 10% annual rate while our budget barely increased in real terms, we faced some hard decisions. That continuing very high inflation rate raised my interest as an economist. I began to study the economics of scholarly journals and, in 1998, I spoke to the Association of Research Libraries and outlined a possible remedy for the journal access problem: the National Electronic Article Repository (NEAR). NIH's PubMed Central has many of the characteristics that I outlined for NEAR. I have written and spoken frequently on scholarly communications in the U.S., Europe and Asia. My involvement in this issue continued into my current role as Vice President for APLU and is an issue important to the association.

On behalf of the Association of Public and Land-grant Universities (APLU), I speak in strong support of increasing public access to federally funded

research by providing public access to the results of research funded by the federal government that is subsequently published in scholarly journals. We support Federal legislation ensuring public access. Well-formed public access policy will increase the pace of scholarly inquiry and is needed. APLU's endorsement of public access is based on our polling of the Association's Board and of all the Provosts and Research Officers at our member universities. Our member universities have a special mission of outreach and engagement with their communities; ensuring that the research they produce is widely available to the public at no additional cost to them is a true expression of that mission.

Background of the Association

APLU is an association of public research universities, including the flag ship and land-grant institutions in every state and many state public university systems. Our 219 members enroll more than 4.7 million students, award 60 percent of U.S. doctoral degrees and conduct nearly two thirds of all federally funded academic research, totaling more than $18 billion annually. The 1890 historical black land-grant schools are our members as well as the 1994 tribal land-grant colleges. We are the face of this country's highly diverse public four-year higher education system, especially of those universities that have a research focus. And, while we do not have community colleges as members, their students frequently transfer to our member universities so we have a keen interest in factors like the availability of scholarship, which affect their quality.

Benefits to Research

Provision of public access to scholarly work arising from federally funded grants and published in scholarly journals will enable faculty and researchers to benefit from these findings and to build on them in their own research. While 131 of our member universities are classified by Carnegie as "high" or "very high" research universities, their libraries cannot afford to subscribe to all of the scientific literature. Their faculty from time to time experience delays in accessing articles published in scholarly journals or cannot gain access. These roadblocks negatively affect their research productivity. We think that the AAAS survey of difficulties encountered in accessing copyrighted literature is representative of the difficulties researchers at APLU institutions face (*Intellectual Property Experiences In the United States Scientific Community*, 2007, Stephen A. Hansen, et. al., on behalf of

the American Association for the Advancement of Science http://sippi.aaas.org/Pubs/SIPPI_US_IP_Survey.pdf). The study surveyed 2,157 U.S. scientists. 562 of those scientists reported negative effects on their work because of difficulty in accessing the scientific literature. The table below reports the degree of effect on their work by category (op. cit, p. 112). The consequences ranged from brief delay to abandonment of the research project.

Q 35. Problems associate with accessing scientific literature had the following effect(s) on your work (check all that apply):

	Count	Percent
I have not had problems associated with accessing scientific literature	52	10%
There were no effects on my research	51	10%
They delayed my research less than one month	217	42%
They delayed my research for one month or more	108	21%
I had to change the research approach	67	13%
I had to abandon my research project	18	3%
There were other effects on my research. Please explain.	16	3%
Loss of research funds to pay for access or to duplicate work	24	5%
Less background research done	49	9%
Unspecified delay of work	12	2%
Total	614	119%

516 responses out of 534; item response rate+96%

We are confident that improved access to research findings will have positive effects on the research products of faculty at public research universities in the United States.

Additionally, our universities have global missions that would be aided by broadened access to research findings. Especially in low-income and developing countries where access is now difficult if not impossible, improved access could lead to substantial advances in scientific discovery. Many faculty in universities in these countries received their Ph.D.s from U.S. universities and would readily make use of improved access in both their research and their teaching. The latter is of great importance because many of their students will ultimately become graduate students in the U.S. It is in our interest for those students to arrive with undergraduate educations fully informed by the most recent scientific findings.

Preservation and the Need for Legislation

A well-formed public access policy will also ensure that the scholarly literature arising from federal grants is preserved. Scholarly journals are moving increasingly from print to electronic form. Many new journals are issued only in electronic form. Universities license access to electronic journals for a fixed period of time. Thus the ability of universities to preserve the literature by preserving printed volumes does not work in the digital world. Ultimately universities and scholars must rely on the publisher to preserve the literature. Some publishers are undercapitalized, some publishers have incentive to preserve the literature only so long as there is a market for selling it, and some publishers simply do not have the technical ability to ensure long-term preservation of electronic documents. Public access policies that mandate deposit in secure depositories which are adequately backed-up, spread about geographically, and kept up to date technologically provide the preservation that scholarship requires.

Voluntary deposit will not produce a complete set of this critical literature. NIH's experiment with voluntary deposit proved this point. Busy scientists for many reasons do not have voluntary activities as their highest goal. Failure to have a complete record of scholarly articles arising from federally funded research will lead to inefficient research efforts in the future; efforts that do not learn from past successes and failures. Only a federal mandate that the complete record of this work be preserved can ensure that it will be preserved.

Benefits to Education

Clearly, superior graduate education is based on use of scholarly literature. The highest quality graduate student research papers, theses and dissertations can be produced only by those with substantial access to the literature. Ensuring that all published research arising out of federally funded research is available to graduate students would improve their papers and permit them to build on past findings in their research. Since many doctoral students serve as research assistants while pursuing their degrees, improved access to research findings also has the potential of improving the research products of the faculty members for whom they work.

Undergraduate study at our universities differs from study at non-research universities. Our faculty members are well-versed in the research literature and use research findings in their classroom presentations. The best of our undergraduates incorporate undergraduate research experiences in their programs of study. Essentially all of our undergraduate students access the scholarly literature as they write papers for their courses. Improved access to research will benefit undergraduate education.

While it varies across member universities, 20% to 60% of admitted students take coursework at community colleges. Few community colleges can afford to subscribe to an extensive array of scholarly journals. Thus, during the community college portion of their education, students have far less access to the scholarly literature than after they transfer to research universities. Thus, papers that they write while at the community college cannot benefit from access to scholarly literature. Similarly, their faculty members cannot incorporate in their instruction the latest research discoveries. While improved public access would have significant positive impact on research university undergraduates, it arguably would have the greatest impact on community college students because it would dramatically improve access by their faculty to research findings.

Benefits to Business and Members of the Public

Having faculty research fully and freely accessible to all members of the public is of high importance to public institutions. As scholarly journals have migrated from print to electronic form, access to their contents has been restricted largely to those who are members of the university community for which the electronic journal is licensed. Universities that once could lend copies of journals to the general public or permit them to have photocopies through inter-library loan can no longer do so. Thus the continuing migration of the scholarly literature to electronic form reduces its availability to the public.

Some members of the public have substantial educational foundations and seek to remain abreast of research developments in specific fields. Some are writing books and articles or even pursuing research. Some have diseases or family members with diseases and wish to know the latest research findings.

Many businesses need access to scholarly literature. Clearly, high-tech start-ups are in this category, but so are existing businesses whose processes are dependent on technology. Better information access improves their chances of remaining competitive and profitable.

Citizen desire to access the scholarly literature has many motivations. Those faced with disease want to know first-hand the results of government research that may provide greater understanding of their conditions, and many informed laymen can bring referenced findings to the attention of their physicians. Members of the public who simply want to be well-informed also appreciate access to the scholarly literature. Intensely motivated individuals learn how to read this often esoteric literature and make use of the findings it reports. The same motivations that lead government agencies to commission a scholarly work motivate such members of the public to want to read the results. Individuals motivated to read this literature have difficulty understanding why they cannot gain ready access to research that has been funded with public dollars.

What form of Public Access does APLU Favor?

The NIH public access model has proven very popular with our member universities and we support the spread of the model created by NIH to other federal funding agencies. The Federal Research Public Access Act follows the NIH model and APLU has endorsed its passage with some modifications noted below.

Ease of Compliance: This model is designed in such a way that compliance is easy. We have received only positive feedback from our members about the deposit process during the two and half years the policy has been in place.

Because a federal government-wide public access policy would involve multiple research funding agencies, it could potentially involve multiple public access repositories. Major research universities will have faculty members who hold grants from all of these agencies and some will have grants from multiple agencies at the same time. We urge that the ease of compliance presented by the single NIH policy be maintained as the policy is applied to multiple agencies. We suggest that, to the extent practicable, uniform requirements and procedures regarding deposit of papers be established across all funding agencies covered. Uniformity of deposit

requirements will reduce the complexity and cost and, simultaneously, increase the rate of compliance.

Ease of Access: Access to those items placed in PubMed Central is also easy. The PubMed Central database is fully searchable and items in it are fully accessible by Google and other search engines. The same ease of access can be replicated in university digital repositories, those maintained by disciplines, or by other research agencies.

Period of Embargo: The flexible zero- to twelve-month embargo period, depending on the preference of the journal of publication, also is acceptable. While everyone would like to have immediate access to text, such complete open access may not be compatible with the economics of the dominant form of journal, the subscription-based journal. We know of no rigorous studies that delimit how long an embargo is needed to provide financial viability for subscription-financed journals. We are unaware of any journals whose financial viability has been significantly damaged by the NIH public access requirement. On this basis we favor at least initial implementation of public access more broadly with the zero- to twelve-month embargo period.

To What Federally Financed Research Should Public Access Requirements Apply?

In principle, open public access should be the practice for research arising out of all federally funded grants. In practice, however, we believe that all federally funded research except that funded by the National Endowment for the Humanities and the National Endowment for the Arts should be covered by the public access policy. These two agencies are small relative to other funders and cost of public access per covered manuscript is likely to be very large. Both of these endowments fund activities that are less likely to be published in scholarly journal article form than are works funded by other federal funding agencies. In addition, journals in the humanities and the arts are more likely to be negatively impacted by a twelve-month maximum embargo period than are journals in the social, biological, and natural sciences, because the material in them is little diminished in value as time passes.

In What Form Should the Material be Made Available?

The choice is between the final manuscript version of the article and the form in which it appears in the journal. We favor the latter, so long as full-text, word-by-word search-ability can be made available. The article form of the material permits easy citation directly from the public access database as the page numbers of publication are present. Should full-text search-ability be limited in the article form, we favor inclusion of the manuscript form (XML) in the public access repository. Our preference for full-text search capability is because very powerful search engines with access to all content produce search results of greatest use to scholars.

Some suggest that access to final grant reports would provide adequate access to research findings. We do not accept this contention. While some grant reports are accessible, most are exceedingly narrow as they focus only on reporting findings related to the research question for which the funding was received and the methodology utilized. Articles appearing in scholarly journals often provide context for the results reported and relate those results to the wider literature. Scholarly articles are also more easily located through a variety of finding aids. Researchers, students, citizens and business users are best-served if they have access to the scholarly journal literature.

Who Should Have Access to the Collections of the Public Access Repository?

In brief, everyone. Since the material included will have been published, there will be no need for bans on access for any reason. Full transparency is more easily guaranteed if there is full access to the repository.

"Everyone" includes all types of searchers. The numbers of articles on some topics number in the tens or hundreds of thousands and are simply too great for individuals to read them all. Intelligent crawlers must be permitted full access to the collections so that all the material can be assessed by artificial intelligence. In this way individual researchers can be pointed to articles that appear to be relevant to their interests.

What Form(s) Should a Repository (Repositories) of Public Access Works Take?

We are agnostic on the question of form. The NIH PubMed Central model has proven to be functional but it may or may not be superior to a distributed model in which the material is deposited in multiple locations but brought together virtually as though it were located in a single repository. Thus an article conceivably could be placed in a faculty member's own university repository and be automatically and seamlessly included virtually in the funding agency's public access repository. Clearly, wherever and however the material is stored, it must be regularly backed up by multiple repositories in diverse geographic locations and otherwise protected against loss of data.

In this regard please note that most research universities have made major investments in electronic digital repositories. They are used to make readily available to all research forms like theses and dissertations, working papers, etc. that previously were difficult to access. These repositories could readily be used by research agencies if they chose a distributed rather than centralized approach.

Ultimately, items in the repository should be operationally linked to the data on which an article is based, such that a researcher can easily access the data. In time all federal agencies will require that data generated from grants be accessible and the public access repository should be designed such that the data will be easily matched with articles that rely on it.

How Should Public Access be Evaluated?

Public access should be evaluated on the use made of the scholarly literature. Frequency of access to the scholarly literature will undoubtedly be far greater than is presently the case if public access is mandated. We can take on faith that greater access will produce more rapid advance of knowledge although we can never measure the subjunctive.

Is Public Access Compatible with the Journal-Based Peer Review System?

Journal publishers opposing public access often claim that it will take away the funding needed for them to continue to support the refereeing process. Clearly the refereeing process must be supported. We know of no rigorous evidence that even very brief embargo periods cause scientific journal

subscriptions to decline. High-quality research universities will continue to subscribe to top-quality refereed journals; their researchers simply cannot wait six months or a year to access the literature. The evidence is that that public access has little impact on subscription revenue and is thus fully consistent with ensuring that refereeing of the literature continues.

We support public access rather than open access because an explicit tradeoff between having access to all scholarly journal articles after no more than one year's delay is preferable to running even a small risk that immediate access would damage the refereeing process. In the long run, it will be incumbent on any journal insisting that access be delayed to produce evidence that the harm done to science by delayed access is less than the harm that would be done to science if immediate access were provided. More and more scholarly journals have changed their practices to permit immediate posting on publicly accessible Web sites in explicit recognition that such access benefits science and does not harm the economics of journals or the institution of refereeing.

Concluding Comments

Federal legislation is required to ensure that there is full and free public access to scholarly articles arising out of federally funded research and that these works are preserved and remain available to future generations. Such legislation will increase access to researchers, teachers, students, businesses and members of the public. We urge the passage of legislation meeting these needs.

Mr. CLAY. From a Missouri Tiger to a Kansas Jayhawk, thank you, too. [Laughter.]

Ms. Nancarrow, you are recognized for 5 minutes.

STATEMENT OF CATHERINE NANCARROW

Ms. NANCARROW. Thank you, Mr. Chairman. It is a privilege to testify today before the subcommittee about the importance of public access to the results of federally funded research.

I am speaking on behalf of the Public Library of Science [PLoS]. PLoS is a non-profit publisher of peer-reviewed journals. But what makes PLoS different from the bulk of journal publishers is that every article we publish is open access. Each is freely and publicly available online as soon as it is published.

My name is Catherine Nancarrow, and I am the managing editor of PLoS's community journal program. I have over 25 years of experience in publishing, and I have managed a number of peer-reviewed medical and bioscience journals. In 2004, I was delighted to join PLoS, because of its mission to drive a transition toward comprehensive public access to all research articles.

Policies promoting public access have been embraced by many organizations beyond PLoS. Yet concerns have been expressed that they will be detrimental to the scholarly publishing enterprise.

My goal today is to make three key points. PLoS has shown that open access journals can be published according to the highest standards. We have shown that open access publishing is economically sustainable. And finally, the real benefit of immediate public access is that it transforms the research literature into a profoundly powerful resource for research and education.

To address the point about quality, PLoS has consistently adhered to the highest standards of editorial integrity and publishing ethics. We knew that we would only develop broader confidence in open access publishing if the quality of the articles that we publish is of the highest standard.

Seven years from when we launched PLoS Biology, our journals are highly regarded as trusted sources of research information and are desirable venues for researchers to publish their best work. Our journals have international editorial boards comprised of leading researchers across a range of disciplines, are featured in leading blogs and media outlets and receive substantial numbers of submissions each month and continue to grow.

In addition, many of our journal articles are highly cited, another indication of their significance to the research community.

To address the point of financial viability, let me briefly explain our business model. Whereas most publishers charge a fee to access their content, PLoS charges a fee to publish in its journals. In this way, the cost of publishing can be recovered before publication and the content can therefore be made freely and publicly accessible as soon as it is published.

Using this model, PLoS has progressed steadily toward sustainability and posted its first two profitable quarters in Q1 and Q2 of 2010. In doing so, we will be on target to make a modest profit.

This achievement represents a landmark for PLoS, but also for open access publishing as a whole. As well as being economically sustainable as an organization, our individual community journals

are each fully self-sufficient. They represent models for how typical academic journals can maintain high standards of publishing and achieve immediate public access supported by publication fees.

This is relevant to all publishers considering a move to open access, whether commercial, not-for-profit, university presses or scientific societies. PLoS is not alone in demonstrating the economic success of open access publishing, however. Two large commercial publishers, BioMed Central and Hindawi Publishing, have also shown that open access publishing, based on the publication fee model, is sustainable in environments where public policies have been put in place by national funders, such as the Wellcome Trust and the Research Councils UK. A prominent example is Springer, who bought BioMed Central in 2008 and continues to expand their open access publishing operation.

Beyond publishers, there are demonstrable and critical commitments to open access from the other key stakeholders in publishing: funders, institutions, libraries, policymakers, and the research community. Just last week, UNESCO announced "scientific information is both a researcher's greatest output and technological innovation's most important resource. UNESCO promotes open access."

I will end by highlighting two examples of how researchers have made the most of public and open access to PLoS articles. Professor David Shotton from Oxford University reworked an article about a tropical disease caused by Leptospira infection. He linked various terms in the article to other sources of information and data, enhanced the figure to provide moveable interactive maps and enriched tables with downloadable data. A series of editorials in PLoS Computational Biology has been translated into Chinese, repurposed into a series of video presentations and developed into a graduate level course curriculum.

These are just first steps, but they show how public access promotes creative re-use of content and transforms the literature into a more powerful resource for research and teaching. With the elimination of all barriers to access, our use of the literature is only limited by our imagination.

Thank you, and I am happy to take any questions you might have.

[The prepared statement of Ms. Nancarrow follows:]

Statement of

Catherine Nancarrow on behalf of

Public Library of Science (PLoS)

Before the

Subcommittee on Information Policy, the Census and National Archives

Committee on Oversight and Government Reform

Regarding Public Access to Publicly-Funded Research

July 29, 2010

First, I would like to express my thanks to Chairman Clay, Ranking Member McHenry, and members of the House Oversight and Government Reform Subcommittee on Information policy, The Census and National Archives – for the opportunity to testify today on the important issue of public access to the results of federally funded research.

I am speaking on behalf of the Public Library of Science or PLoS. PLoS is a non-profit publisher of peer-reviewed journals, but what makes PLoS different from the bulk of journals publishers is that every article we publish is open access; each is freely and publicly available on line as soon as it is published.

My name is Catherine Nancarrow and I am the Managing Editor of PLoS' community journal program. I have over 25 years of experience in STM (scientific, technical, medical) publishing during which I have managed a number of peer-reviewed medical and bioscience journals including the *Western Journal of Medicine* and the *Journal of Immunology,* as well as multivolume health science texts and hand books. In 2004, I was delighted to have the opportunity to join PLoS. I jumped at the chance because of its mission to drive a transition towards comprehensive public access to all research articles.

Policies promoting public access have been embraced by many organizations beyond PLoS, yet concerns have been expressed that they will be detrimental

to the scholarly publishing enterprise. My goal today is to make three key points:

1) PLoS has shown that open-access journals can be published according to the highest standards
2) We have shown that open-access publishing is economically sustainable, and
3) Finally, the real benefit of immediate public access is that the ability to access and reuse journal articles transforms research literature into a profoundly powerful resource for research and education.

To address the point about quality, I need to provide more background about PLoS. PLoS became a publisher in 2003, when open access publishing was still a new idea. At that time, most journals charged a subscription for access, but we (and one or two other pioneers) proposed a different business model. The idea was that if you could recover all costs of publishing up front, there is no need for a subscription. The journals and the articles they contain can then be publicly accessible as soon as the work is published.

Our goal was to show that this approach could work. To do so, PLoS has launched three types of journals – seven in total – since 2003 in an effort to build a sustainable operation. Throughout its history, PLoS has adhered to the highest standards of editorial integrity and publishing ethics, because we knew that we would only develop broader confidence in open access publishing if the quality of the articles that we publish is of the highest standard.

Seven years from when we launched PLoS Biology, our journals are highly regarded as trusted sources of research information and are desirable venues for researchers to publish their work.

Our journals:

- Have international editorial boards comprised of leading researchers across a range of disciplines.
- Are featured in leading popular and science blogs and media outlets.
- Receive substantial numbers of submissions each month and continue to grow.

In addition, many of our journal articles are highly cited, another indication of their significance for the research community.

To address the point of financial viability, PLoS has progressed steadily towards sustainability, and posted its first two profitable quarters in Q1 and Q2 of this year. We are well on target to make a modest profit for the first time this year. This achievement represents a landmark for PLoS, but also for open access publishing as a whole. Further information about PLoS's financial position and progress during 2009 is available in the PLoS Progress Update, which has been provided as a supplement to this testimony.

As well as being economically sustainable as an organization, our individual community journals are also fully self-sufficient. The publication fees we obtain cover all the costs of these journals, and in this way they represent

models for how typical academic journals can maintain high standards of publishing and achieve immediate public access supported by publication fees. This is relevant to all publishers considering a move to open access whether commercial, not-for-profit, university presses, of scientific societies. We are committed to collaborating with and supporting the efforts of other publishers who wish to explore the same publishing model.

PLoS is not alone when it comes to the economic success of open access publishing. Two large commercial publishers – BioMed Central based in London UK, and Hindawi Publishing based in Cairo, Egypt - have also shown that open access publishing based on the publication fee model is successful and sustainable in environments where public policies have been put in place by National funders such as the Wellcome Trust http://www.wellcome.ac.uk/About-us/Policy/Spotlight-issues/Open-access/index.htm and Research Councils UK http://www.rcuk.ac.uk/access/default.htm. Other publishing houses are developing open access publishing programs. A prominent example is the case of Springer who bought BioMed Central in 2008 and is continuing to expand their open access publishing operation.

Given such progress over recent years, it's fair to say that open access publishing is now firmly part of the publishing landscape, and that it is continuing to grow rapidly.

In addition to the actions of publishers, there is demonstrable and critical commitment to open access from the other key stakeholders in publishing – funders, institutions, libraries, policy makers and the research community. This commitment is now essential to drive towards comprehensive public access.

There also is demonstrable and critical commitment to open access from the other key stakeholders in publishing – funders, institutions, libraries, policy makers and the research community.
Just last week, UNESCO announced that "Scientific information is both a researcher's greatest output and technological innovation's most important resource. UNESCO promotes open access.
"http://portal.unesco.org/ci/en/ev.php-URL_ID=1657&URL_DO=DO_TOPIC&URL_SECTION=201.html

To the final point about the benefits of immediate public access, we have examples of what is possible when the barriers to access and reuse are removed. Public access promotes and encourages global knowledge flow, and accelerates the pace of research and innovation.

Imagine for example that your life's work is to understand the pathogenesis of a tropical disease and the effects it has on particular populations. Now imagine a web resource that assembles key literature on this disease and allows you to mine this literature for geographical information about disease

outbreaks. And consider the potential if you then could develop a tool that provides a graphical and dynamic output of this information.

Right now, you could do none of this, because only a minority of the literature is publicly accessible and copyright restrictions would require you to seek permission from the various publishers involved. But with open access to the literature, and the elimination of barriers to use and reuse, we are only limited by our imagination.

I will end by highlighting just a few examples of how researchers have made the most of public and open access to PLoS articles:

- Oxford University Professor David Shotton re-worked a research article about a tropical disease caused by Leptospira infection. He linked various terms in the article to other sources of information and data, enhanced the figures to provide moveable interactive maps, and enriched tables with downloadable data. Such approaches could be developed to enhance entire collections of articles which could allow content to be embedded and explored within a rich network of information. http://dx.doi.org/10.1371/journal.pntd.0000228.x001
- A series of influential editorials in PLoS Computational Biology has been translated in Chinese, repurposed into a series of video presentations, and developed into a course curriculum for professional development at a graduate level. . (http://collections.plos.org/ploscompbiol/tensimplerules.php).

- The NIH public literature archive PubMed Central the vast corpus of publicly accessible literature (including all the content published by PLoS) is being enriched by connections with genetic and molecular databases.

These are just first steps, but they show clearly how public access promotes creative reuse of content and transforms the literature into a more powerful resource for research and teaching. With the elimination of all barriers to access, our use of the literature is only limited by our imagination.

Thank you once again for providing me with the opportunity to speak about this very important issue.

Creative reuse of an OA article demonstrates the power of semantic enhancement.

Taking advantage of the free re-use opportunities offered with the Creative Commons Attribution License, scientist Prof. David Shotton re-worked a research article to add semantic value. Featured here are some of the enhancements made, which could lead to developments in mainstream journal publishing in the future, demonstrating that Open Access can help to move both science and the publishing process forward by facilitating innovation.

Article published in *PLoS Neglected Tropical Diseases*:
http://www.plosntds.org/doi/pntd.0000228

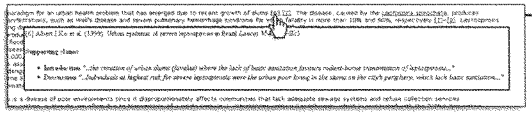
Creative reuse - Semantically Enhanced Version:
http://dx.doi.org/10.1371/journal.pntd.0000228.x001

Review published in *PLoS Computational Biology*:
Adventures in Semantic Publishing: Semantic Enhancements of a Research Article
http://www.ploscompbiol.org/doi/pcbi.1000361

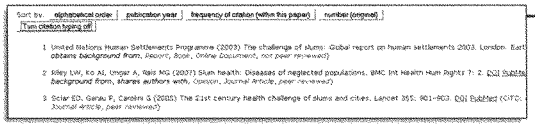
SEMANTICALLY ENHANCED VERSION OF A RESEARCH ARTICLE FROM PLOS NEGLECTED TROPICAL DISEASES

Impact of Environment and Social Gradient on *Leptospira* Infection in Urban Slums.

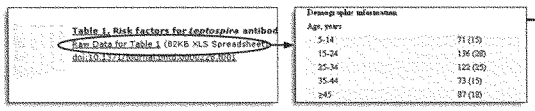
Document summary with link: Examples of a variety of summarized content in the paper, which provide a quick and easy analysis of the key points.



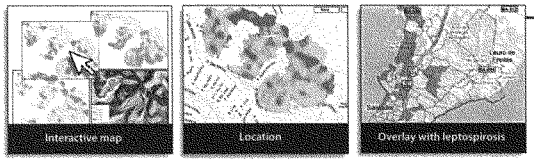
To permit Citations in Context: An exemplar reference [Ref 6], when moused over, produces a popup containing the cited extract, allowing instant access to the relevant information.



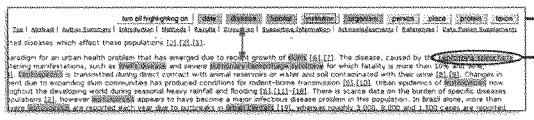
Re-orderable reference list: References can be re-ordered by importance, number of times they appear, alphabetically, or by publication date. In addition, a citation "type" (e.g. obtains background from, confirms, shares authors with, Research Paper, peer reviewed) is added to each reference.



Tables convert to Excel: Along with the standard format for viewing tables online, this enhanced article also offers the raw data to download tables directly into Excel, for further research and re-use.



Interactive map: Originally in a static format, these moveable maps allow the reader to superimpose the data maps over geographical maps on Google, helping the reader to more quickly understand and evaluate the information in the wider context.



Colored Tabs: Click on a colored tab to view the corresponding highlighted text.

Links: to references and external sites

Message from the Founders

Why PLoS Became a Publisher

Patrick O. Brown, Michael B. Eisen, Harold E. Varmus

Communication among scientists has undergone a revolution in the last decade, with the movement of scientific publication to a digital medium and the emergence of the Internet as the primary means for distributing information. Millions of articles are, in principle, just a mouse click away from our computers. For many of us, PDFs have replaced printed journals as the primary form in which we read about the work of our colleagues.

Yet we have barely begun to realize the potential of this technological change. For practicing scientists, it provides myriad opportunities to expand and improve the ways we can use the scientific literature. Equally important, it is now possible to make our treasury of scientific information available to a much wider audience, including millions of students, teachers, physicians, scientists, and other potential readers, who do not have access to a research library that can afford to pay for journal subscriptions

We founded the Public Library of Science three years ago to work toward realizing these opportunities. We began as a grassroots organization of scientists, advocating the establishment and growth of online public libraries of science, such as the National Institutes of Health's PubMed Central, to provide free and unrestricted access to the scientific literature. Today, with the launch of *PLoS Biology*, we take on a new role as publishers, to demonstrate that high-quality journals can flourish without charging for access.

Open Access

PLoS Biology, and every PLoS journal to follow, will be an open-access publication—everything we publish will immediately be freely available to anyone, anywhere, to download, print, distribute, read, and use without charge or other restrictions, as long as proper attribution of authorship is maintained. Our open-access journals will retain all of the qualities we value in scientific journals—high standards of quality and integrity, rigorous and fair peer-review, expert editorial oversight, high production standards, a distinctive identity, and independence Although most readers will be satisfied with the free and unrestricted use of the online edition (including the right to print their own copies), a printed edition of *PLoS Biology* will be made available, for the cost of printing and distribution, to readers who prefer the convenience and browseability of the traditional paper format. And the full contents of every issue will immediately be placed in the National Library of Medicine's public online archive, PubMed Central, guaranteeing their permanent preservation and free accessibility

Our aim is to catalyze a revolution in scientific publishing by providing a compelling demonstration of the value and feasibility of open-access publication. If we succeed, everyone who has access to a computer and an Internet connection will be a keystroke away from our living treasury of scientific and medical knowledge. This online public library of science will form a valuable resource for science education, lead to more informed healthcare decisions by doctors and patients, level the playing field for scientists in smaller or less wealthy institutions, and ensure that no one will be unable to read an important paper just because his or her institution does not subscribe to a particular journal.

Open access will also enable scientists to begin transforming the scientific literature into something far more useful than the electronic equivalent of millions of individual articles in rows of journals on library shelves. The ability to search, in an instant, an entire scientific library for particular terms or concepts, for methods, data, and images—and instantly retrieve the results—is only the beginning. Freeing the information in the scientific literature from the fixed sequence of pages and the arbitrary boundaries drawn by journals or publishers—the electronic vestiges of paper publication—opens up myriad new possibilities for navigating, integrating, "mining," annotating, and mapping connections in the high-dimensional space of scientific knowledge.

Consider how the open availability and freedom to use the complete archive of published DNA sequences in the GenBank, EMBL, and DDBJ databases inspired and enabled scientists to transform a collection of individual sequences into something incomparably richer. With great foresight, it was decided in the early 1980s that published DNA sequences should be deposited in a central repository, in a common format, where they could be freely accessed and used by anyone. Simply giving scientists free and unrestricted access to the raw sequences led them to develop the powerful methods, tools, and resources that have made the whole much greater than the sum of the individual sequences. Just one of the resulting software tools—BLAST—performs 500 trillion sequence comparisons annually! Imagine how impoverished biology and medicine would be today if published DNA sequences were treated like virtually every other kind of research publication—with no comprehensive database searches and no ability to freely download, reorganize, and reanalyze sequences. Now imagine the possibilities if the same creative explosion that was fueled by open access to DNA sequences were to occur for the much larger body of published scientific results.

Paying the Bill for Open Access

The benefits of open access are incontestable. The questions and concerns that remain focus on finances. As everyone acknowledges, publishing a scientific journal costs money—the more rigorous the peer review, the more efficient and expert the editorial oversight, the more added features and the higher the production standards, the greater the cost to publishers. Most journals today depend on subscriptions and site-licensing fees for most of their revenue. Since these access tolls are incompatible with open access, how will newly formed open-access journals pay their bills, and how will the traditional journals that have served the scientific community for many years survive in an open-access world?

Because publishing is an integral part of the research process, a natural alternative to the subscription model is to consider the significant but relatively small costs of open-access publication as one of the fundamental costs of doing research. The institutions that sponsor research intend for the results to be made available to the scientific community and the public. If these research sponsors also paid the essential costs of publication—amounting, by most estimates, to less than 1% of the total spent on sponsored research (statistics found at http://dx.doi.org/10.1371/journal.pbio.0000036.sd001)—we would retain a robust and competitive publishing industry and gain the benefit of universal open access.

The subscription model—in which the publishers own the works they publish and dictate the conditions under which they can be accessed or used—is sometimes presented as the only possible way to pay for scientific publishing. This pay-for-access model was well suited to a world in which the most efficient way to record and transmit scientific information on a large scale was by printing and distributing scientific journals. When each incremental copy represented a significant expense to the publisher, any sustainable business model depended on recovering the cost for each copy—the recipients of the information had to pay for access. But the essential rationale of the pay-for-access model has disappeared, now that electronic publication and Internet distribution have become routine. Instead, this business model is what stands in the way of all the benefits of open access.

Asking research sponsors to pay for publication of the research they support may seem to impose new financial burdens on the government agencies, foundations, universities, and companies that sponsor research. But these organizations already pay most of the costs of scientific publishing—a huge fraction of the US$9 billion annual revenue of scientific, medical, and technology journals comes from subscriptions, site licenses, and publication fees ultimately billed to grants or employers. Much of the rest is borne by society in the form of increments to university tuitions, healthcare costs, including drug prices; and state and federal taxes that subsidize healthcare, libraries, and education. Surely the cost of open-access digital publishing cannot, in total, be more than we are already paying under the subscription and licensing model. By simply changing the way we support the scientific publishing enterprise, the scientific community and public would preserve everything we value in scientific publishing and gain all of the benefits of open access.

There are reasons to believe that open-access publishing would cost significantly less than the current system. Today, each journal has a monopoly on a resource vital to scientists—the unique collection of articles it has published. Anyone who depends on the information in a specific article has no choice but to pay whatever price the publisher asks (or find a colleague or library that has done so). Because scientists are so dependent on ready access to previously published work, publishers are able to set their prices with little fear of subscription cancellations. Indeed, journal prices have been rising at a rate well in excess of inflation, straining the budgets of universities, hospitals, and research institutions. Open access would eliminate monopolies over essential published results, diminishing profit margins and creating a more efficient market for scientific publishing—a market in which publishers would compete to provide the best value to authors (high quality, selectivity, prestige, a large and appreciative readership) at the best price.

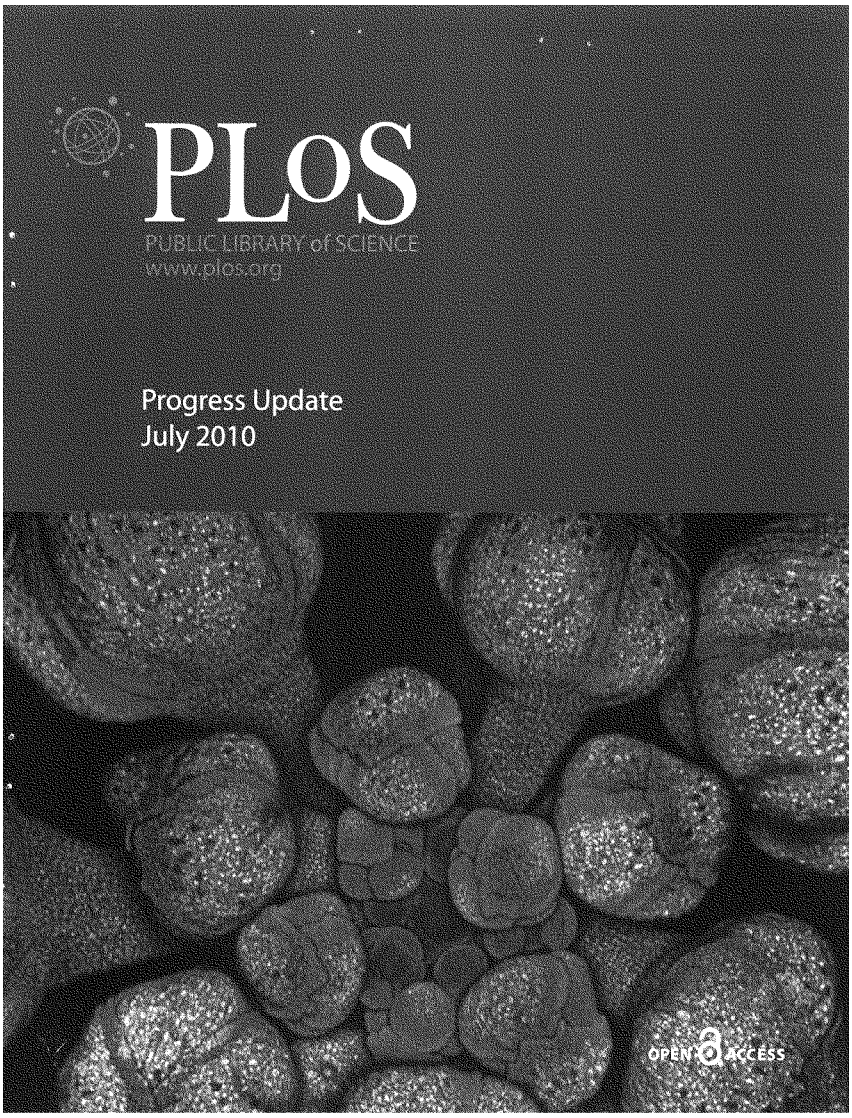
Joining Forces

In recent months, we have witnessed a remarkable surge of awareness and support for open-access publication, both within the scientific community and in the public at large, exemplified by recent newspaper articles and editorials supporting PLoS and open access; by the recent introduction of the Public Access to Science Act in the United States Congress; by the Bethesda Workshop on Open Access; and by public statements of support from organizations as diverse as the NIH Council of Public Representatives, the Association of Research Libraries, and the Susan G. Komen Breast Cancer Foundation. Achieving universal open access will require action from funding agencies and institutions.

The Howard Hughes Medical Institute, the largest private sponsor of biomedical research in the United States, has already taken a leading role in promoting open access. They will provide each of their investigators with supplemental funds to cover the costs of publishing in open-access journals like *PLoS Biology*. Other major institutional sponsors of biomedical research are actively considering similar policies.

Private foundations with a commitment to science and education have contributed generously to this cause. Like any new business, PLoS needed to raise funds to cover our start-up costs. A generous grant from the Gordon and Betty Moore Foundation enabled PLoS to launch our nonprofit publishing venture. Other individuals and organizations, notably the Irving A. Hansen Foundation, also provided generous and welcome support. These start-up funds made it possible for us to assemble an outstanding editorial board and staff, who have today accomplished the extraordinary feat of launching a new publisher and a premiere journal from scratch in less than nine months.

The opposition of most established journals to open access has left it to new journals like *PLoS Biology* and BioMed Central's *Journal of Biology* to lead the way. These new journals face a double challenge. First, we are introducing an unfamiliar model—open-access publication. Second, any new journal, even one with the stringent standards and the extraordinary editorial team of *PLoS Biology*, must begin without the established "brand name" of the older journals, which, like a designer logo, elevates the perceived status of the articles that bear it. With all that is at stake in the choice of a journal in which to publish—career advancement, grant support, attracting good students and fellows—scientists who believe in the principle of open access and wish to support it are confronted with a difficult dilemma. We applaud the courage and pioneering spirit of the authors who have chosen to send to a fledgling journal the outstanding articles you will read in the premiere issues of *PLoS Biology*. In the end, it's the contributions of these authors that will make *PLoS Biology* a success. ■


PLoS
PUBLIC LIBRARY of SCIENCE
www.plos.org
Progress Update
July 2010
OPEN ACCESS

2009: The Year According to PLoS

This progress update covers the highlights of our 2009 fiscal year, which corresponds to calendar year 2009. We also include some information about what we are working on in 2010.

Highlights:

1. Message from the Founders
2. Publishing Highlights
3. The Evolving OA Landscape
4. Influential Research
5. Customer Service
6. Financial Performance
7. 2010 and Beyond
8. Major Support in 2009
9. Board of Directors, Management

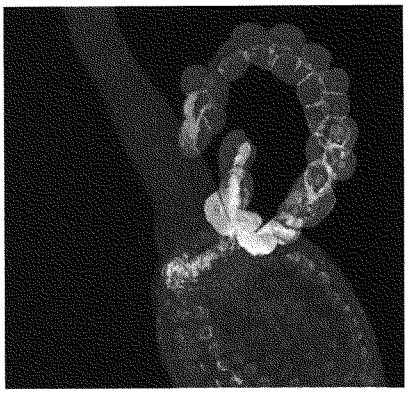
Download our first PLoS Progress Report, released last year, to read more about our mission, our achievements, and our hopes for the future.

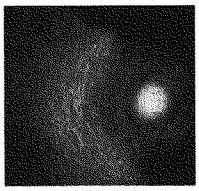
1. Message from the Founders

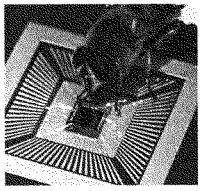
Since its conception in 2000, PLoS's mission has been to establish more open, efficient, and effective ways to communicate new ideas and discoveries, so that they reach and engage everyone who has an interest in science or medicine. The foundation of this mission is to make the world's treasury of scientific and medical information a public resource.

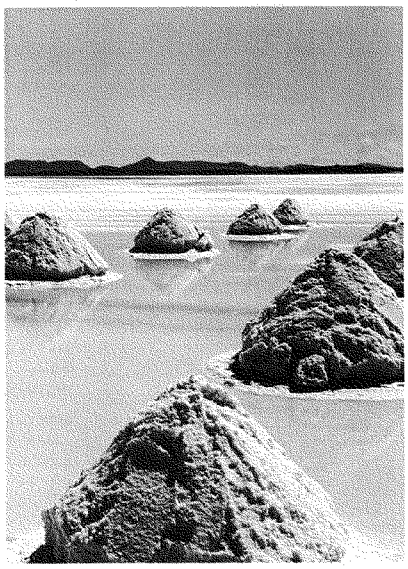
When we became a publisher in 2002, our strategy for achieving this goal was to develop a successful, sustainable, and scalable model for open-access (OA) publishing. While the struggle to achieve universal open access is far from over, thanks to our dedicated staff, farsighted supporters, and the thousands of scientists who have published their papers in PLoS journals, 2009 saw us come closer than ever before in meeting this ambitious vision.

Harold E. Varmus
Patrick O. Brown
Michael B. Eisen









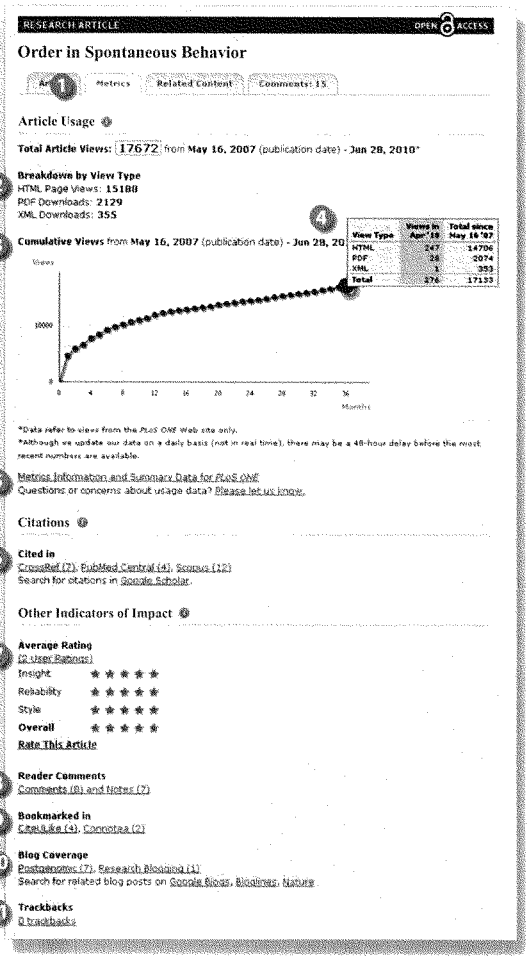
OPEN ACCESS

2. Publishing Highlights

New Ways to Measure Research Impact

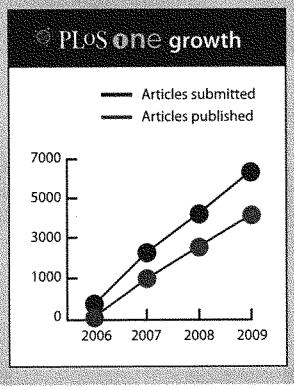
In 2009, PLoS became the first publisher to place transparent and comprehensive information (online usage, citations, social bookmarks, notes, comments, ratings, and blog coverage) about the usage and reach of published articles onto the articles themselves, so that the entire research community has access to new tools with which to assess research impact. These measures for evaluating articles are called Article-Level Metrics and they have been extremely well received by the community, where they have generated lively debate and concrete analysis of the dataset.

1. **Metrics tab** - this tab contains summary information for every Article-Level Metric that we track.
2. **Breakdown by View Type** - show total HTML page views, PDF downloads, and XML downloads since publication.
3. **Cumulative Views** - this is a graph that shows the sum of the three view types cumulatively over time.
4. **Usage Graph Functionality** - a monthly data box appears when you hover over one of the blue points on the graph.
5. **Link to Tables** - topic-based summary data for each journal.
6. **Cited in** - the number of articles that have cited this PLoS article as recorded by CrossRef, PubMed Central, and Scopus. Links to that information.
7. **Ratings** - this indicates the average user ratings that this article has received in four categories.
8. **Comments and Notes** - users can leave a comment or note on a specific piece of text or on the entire article. Once this has been left, it forms a discussion thread to which other users can reply.
9. **Bookmarked in** - this is a count of how many bookmarks have been made to this article by users of the CiteULike and Connotea "social bookmarking" services.
10. **Blog Coverage** - this is a count of how many blog postings refer to this article, as indexed by the Postgenomic, Nature Blogs, ResearchBlogging.org, and Blogline services.
11. **Trackbacks** - the number of trackbacks that have been made to this article by external sites.



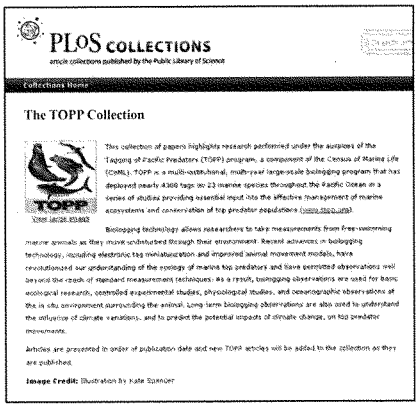
PLoS ONE Innovations

In 2009, *PLoS ONE* won the ALPSP award for Publishing Innovation for combining "the traditional values of the journal with innovative online features to create an inclusive and efficient publication channel. It is bold and successful and shaping the future of publishing". *PLoS ONE's* innovative approach has resonated strongly with researchers, who are submitting articles in ever-increasing numbers.



A Single Publishing Platform

When *PLoS Biology* moved to PLoS's open-source publishing platform (Ambra) in May 2009, it marked the completion of a two-year project involving the migration of over 9,000 articles. By centralizing PLoS content on a platform created by us, we were able to implement cross-journal features such as search and collections of articles on different topics. We could also ensure that all articles had the same online user tools, including notes, comments, and ratings.



3. The Evolving OA Landscape

2009 was a year for "breathtaking momentum in the right direction" according to OA thought leader Peter Suber in his "open access in 2009" round up. There was an average of five university OA mandates (a requirement from the university for researchers to make their work publicly accessible) and more than one funding agency mandate every month for the entire year from organizations such as MIT, the Chinese Academy of Sciences, the University of Pretoria, and the National Center for Atmospheric Research. Many of them were announced during Open Access Week, which is a major advocacy campaign that PLoS helps to organize each year.

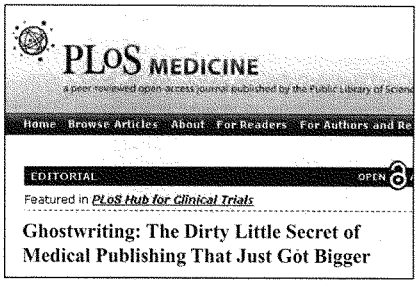
In addition, the Compact for Open-Access Publishing Equity (COPE) was formed, and its members include illustrious institutions such as Harvard, MIT, Memorial Sloan-Kettering, Columbia, and others. Amongst the goals of COPE is the establishment of funds to help cover the publication fees that support many OA journals.

4. Influential Research

During 2009, the PLoS journals continued to hit the headlines by publishing outstanding research along with provocative opinion and commentary.

Raising Standards of Publishing Integrity

In 2009, *PLoS Medicine* restated its mission[1], and realigned its editorial policies to reflect more closely the world's health priorities. In July, demonstrating the editors' commitment to raising standards of publishing integrity, *PLoS Medicine* and *The New York Times* intervened successfully in a court case about ghostwriting. The judge agreed to make public 1,500 documents (available on the *PLoS Medicine* Web site[2]) that showed how Wyeth strategically placed articles written by unattributed writers but with academics listed as "authors" in the academic literature to promote the hormone therapy drug Prempro. *PLoS Medicine* continues to campaign against practices such as ghostwriting that subvert scholarly publishing, and to promote the highest standards of reporting, for example, in its Guidelines and Guidance section[3]. In addition to a diverse range of magazine articles, the journal also commissioned a series on "packages of care" for mental health disorders in low- and middle-income countries[4].

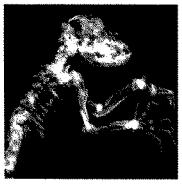


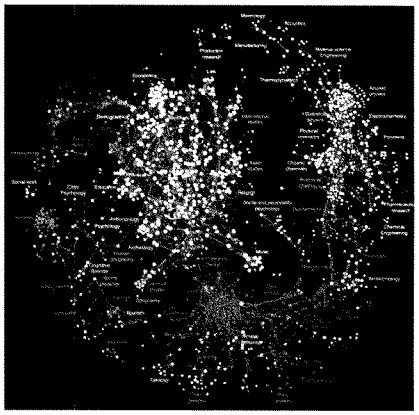
The New York Times

The documents on ghostwriting were uncovered by lawyers suing Wyeth and were made public after a request in court from PLoS Medicine, a medical journal from the Public Library of Science, and The New York Times.

PLoS ONE in the News

More than 200 articles published in *PLoS ONE* during 2009 were covered by international media and bloggers. *PLoS ONE* continued to publish strong research in the area of paleontology[5], including articles about a complete fossil of a primate skeleton named *Darwinius masillae*[6], and three mid-Cretaceous dinosaurs discovered in Australia[7]. Other research highlights included articles on giant orb-weaving spiders[8], mobile phone-based clinical microscopy[9], and creating high-resolution maps of science using clickstream data[10].



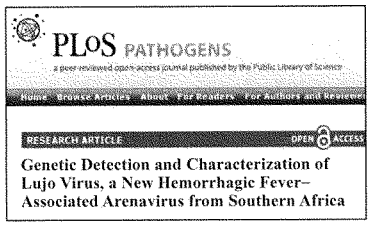


Research Highlights from the PLoS Community Journals

PLoS Computational Biology—Parkinson's drugs show promise against drug-resistant tuberculosis[11]. Researchers used computer models and lab experiments to look for established drugs that might be of use in treating resistant forms of tuberculosis. They found that the active component in two agents effective against Parkinson's disease also block the multiple-drug resistant tuberculosis bacterium.

PLoS Genetics—Link between vitamin D deficiency and increased risk of multiple sclerosis[12]. Researchers determined a direct interaction between vitamin D and the activity of a gene affected by a common genetic variant that influences a person's risk of developing multiple sclerosis. The work has practical implications for studies of disease mechanisms and prevention.

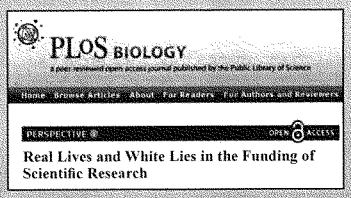
PLoS Pathogens—New arenavirus identified[13]. A multi-institutional research team identified Lujo virus (LUJV), a new member of the family Arenaviridae and the first hemorrhagic fever–associated arenavirus from the Old World to be discovered in three decades.



PLoS Neglected Tropical Diseases—The feasibility of onchocerciasis elimination in endemic areas in Africa[14]. This study provided empirical evidence that elimination of onchocerciasis with ivermectin treatment is feasible in some endemic foci in Africa. The African Programme for Onchocerciasis Control has adopted an additional objective to assess progress towards elimination endpoints in all onchocerciasis control projects and to guide countries on cessation of treatment where possible.

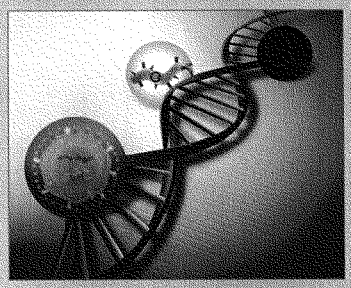
The Funding of Scientific Research—An Essay That Inspired Debate

In 2009, Professor Peter Lawrence of the University of Cambridge, United Kingdom, wrote a widely discussed Essay[15] proposing that "the granting system turns young scientists into bureaucrats and then betrays them". This article in *PLoS Biology* has accrued many comments and is one of the most discussed articles we have published. The article was also widely covered in the mainstream media, and led to a question in the UK Parliament.

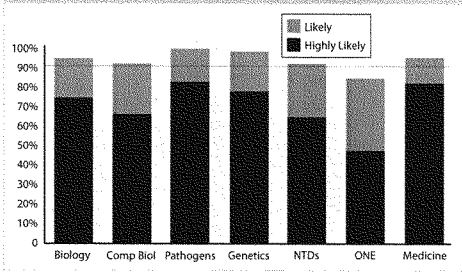


Genomics and Emerging Infectious Disease

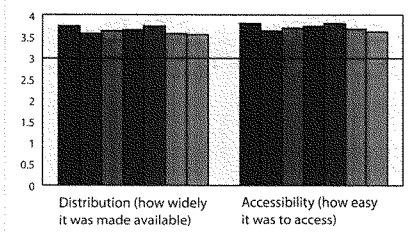
PLoS Biology also led a collaborative project amongst the PLoS journals in 2009 to publish an outstanding collection of Essays, Perspectives, and Reviews[16] on the part that genomics is playing in our understanding of emerging infectious disease. The collection was produced with support from Google.org, and was the most ambitious cross-journal article collection that PLoS has published to date. All of the PLoS article collections are now accessible through a single Web page[17].



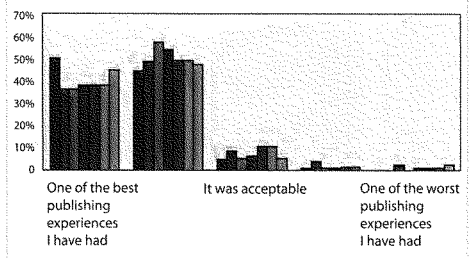
Majority are "likely" or "highly likely" to submit again to PLoS



Levels of enthusiasm for distribution and access are very high



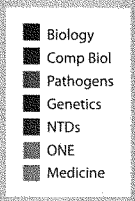
Overall satisfaction with publishing experience is very good



5. Customer Service

Author Satisfaction Survey

In 2009, we conducted our first comprehensive survey of authors about all aspects of our service. The survey covered published and rejected authors in 2008, and we were pleased to report that overall levels of satisfaction are very high. An overwhelming majority of published authors are likely to publish with us again and demonstrated very high levels of satisfaction with the open access and distribution of their published work and the overall publishing experience with PLoS. Please view this PowerPoint slide show with audio commentary to find out more. This research will be repeated annually as we continually seek to improve our services for readers and authors.



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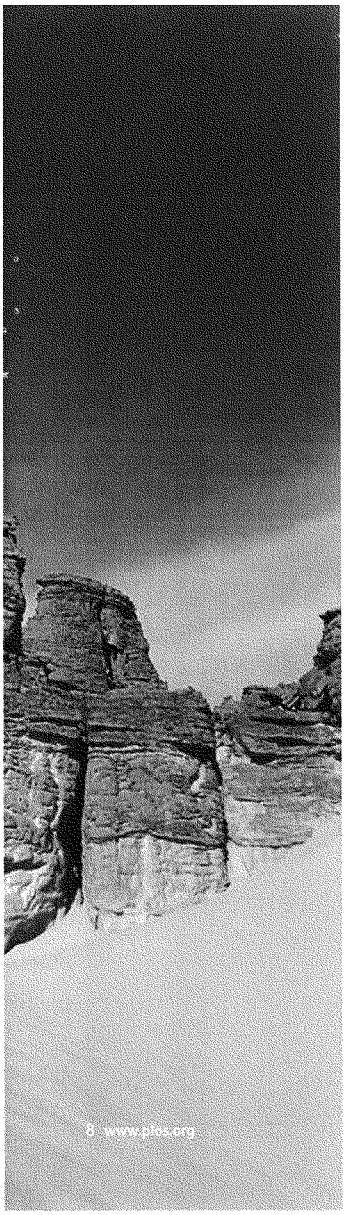


6. Financial Performance

PLoS continued on its path towards operating profitability in 2009, exceeding plan expectations on all fronts. Total revenues for the period grew to $9.4MM—a 36% increase over 2008 levels—fueled mainly by strong growth in publishing volumes. Consistent with our sustainability strategy to achieve operating profitability in 2010, operating revenues increased 45% over 2008 levels ($8.9MM) while expenses increased only 24% over the same period, substantially narrowing our operating gap. Public support for the year was $0.5MM, slightly lower than the previous year but consistent with expectations as we fund more of our growth through our publishing operations. PLoS posted its first profitable quarter in Q1 2010 due to strong growth in publishing activity, and we anticipate meeting or exceeding our financial targets for 2010.

Income Statement ($000's)

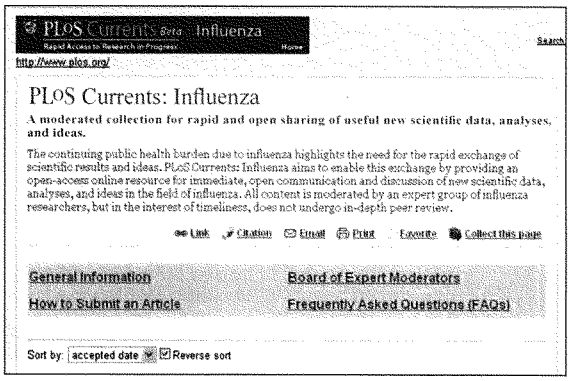
12 months ended December 31, 2009

	2009	2008
OPERATING REVENUES		
Net Publication Fee Revenue	$8,390	$5,476
Advertising Revenue	192	183
Memberships	296	291
Interest & Other Income	21	193
Total Operating Revenues	**$8,899**	**$6,142**
OPERATING EXPENSES		
Direct Expenses	$5,372	$4,555
Operating Expenses	4,337	3,254
Advertising & Marketing	74	63
Total Expenses	**$9,783**	**$7,872**
Operating Income/(Loss)	**($884)**	**($1,730)**
PUBLIC SUPPORT		
Grants	$497	$770
Less: Fundraising Expense	121	59
Net Public Support	**$376**	**$711**
Net Income/(Loss)	**($508)**	**($1,019)**

7. 2010 and Beyond

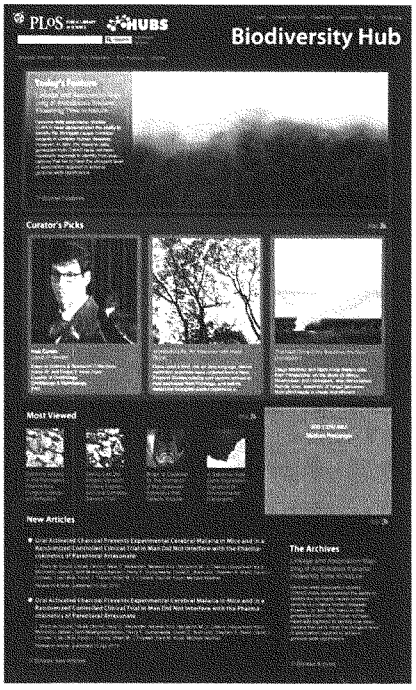
PLoS Currents

In August 2009, Harold Varmus (the Nobel Prize–winning co-founder of PLoS) announced the launch of PLoS Currents, a series of new and experimental Web sites for the rapid communication of research results and ideas. The first topic covered by Currents was Influenza in response to the worldwide H1N1 influenza outbreak. PLoS Currents submissions are vetted by expert moderators and hosted on the Google knol platform. Contributions are also citable and are archived in PubMed Central. We are expanding the series in 2010 and will announce further details on the PLoS blog.



PLoS Hubs

Later this year, PLoS will also launch a prototype version of the PLoS Hub for Biodiversity, a resource that will aggregate relevant articles from a range of open-access sources, including our own journal Web sites and PubMed Central. Biodiversity is a very broad interdisciplinary topic with data, analyses, and ideas currently spread across many locations. The aims of this Web site will be to create a place to share the latest findings, to connect researchers who have complementary interests and ideas, and to accelerate the pace of research and discovery. We're collaborating with a number of different organizations to create this new site, including the Census of Marine Life, the California Academy of Sciences, the Natural History Museum, London, the Consortium for the Barcode of Life, the Encyclopedia of Life, and the Biodiversity Heritage Library.



Mock-up of Biodiversity Hub home page. Final version may vary.

Research Impact

Although PLoS is pleased to have placed comprehensive usage, reach, and impact data on each article, we can only unlock the true potential of the Article-Level Metrics program when we open the code to the world. Once this is done, others can build and improve on what we started. In the future, we hope that these measures will be adopted by other publishers so that eventually many of us operate with a similar level of transparency that will be of benefit to all scientists and their careers, and will accelerate scientific progress.

OA Landscape

In the United States, the Federal Research Public Access Act (FRPAA), which promises to strengthen the National Institutes of Health (NIH) policy and extend it across the federal government, was reintroduced into the House, and the Obama administration issued a call for comments from the community on how best to make this happen.

New Manuscript Submission System

The rapid growth of PLoS means that we need to overhaul some of our systems and functionality in 2010. In particular, the increase in submission volumes across all titles, and particularly on *PLoS ONE*, means that we need a new manuscript submission system. We have partnered with industry-leading supplier Aries to improve our capabilities in this area with a system called PLoS Editorial Manager.

PLoS Medicine iPhone App *PLoS iPad App*

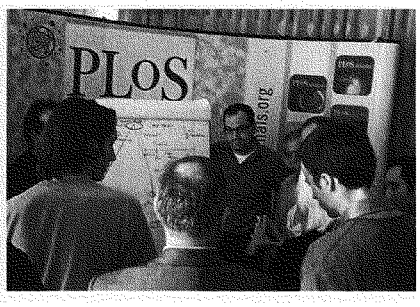
Increased Discoverability

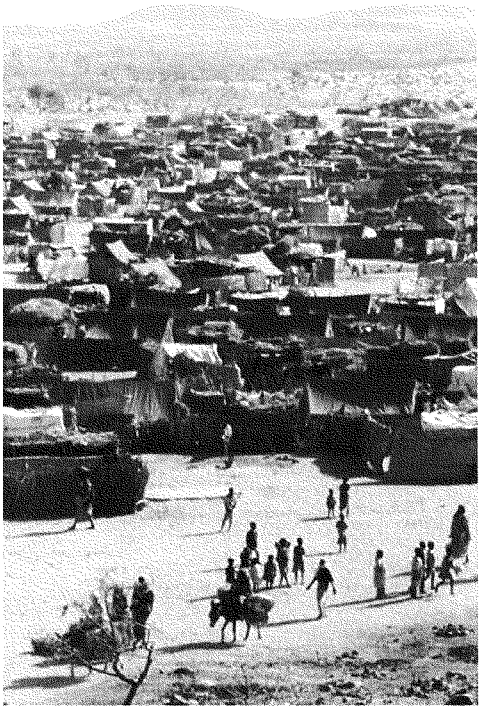
More PLoS articles in the world means our audiences need new ways to discover our content, which is another good reason why we improved our search functionality.

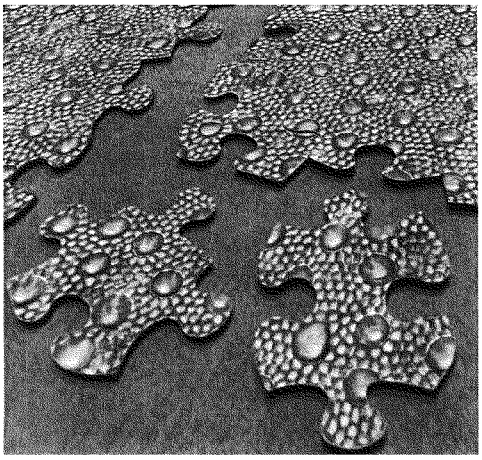
Members of the development community used our content to help us go mobile. They created our first ever iPhone application, which we launched for *PLoS Medicine*, and an iPad application for all of our journals.

PLoS Forum

In March 2010, PLoS held the first PLoS Forum in San Francisco, California, US. Over 70 invited thought leaders came together to brainstorm about the future of scientific communication. The lively and creative discussions will help to inform PLoS's longer term ambitions for transforming the ways we present and use new research findings.







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Page 2. David C. O'Carroll. *PLoS Computational Biology*. 2009. 5(11).
Page 2: Luca Galuzzi. *PLoS Biology*. 7(12).
Page 4. Kate Spencer. PLoS Collections. 2009.
Page 5. Jens L. Franzen et al. *PLoS ONE*. 2009. 4(5).
Page 5: Johan Bollen et al. *PLoS ONE*. 2009. 4(3).
Page 6. Sarah L. Kinnings et al. *PLoS Computational Biology*. 2009. 5(7).
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Page 12. Adrian H. Elcock. *PLoS Computational Biology*. 2010. 6(3).

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15. www.plosbiology.org/doi/pbio.1000197
16. http://tinyurl.com/pbio-geid
17. www.ploscollections.org

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Mr. CLAY. Thank you, Ms. Nancarrow. I thank the entire panel for their testimony.

Let me ask a panel-wide question. We can start with Dr. Roberts. Are you concerned that open access would affect the peer review process?

Mr. ROBERTS. Not at all. In fact, it is already clear that it has no effect on the peer review process. For many years, I was chief editor of Nucleic Acids Research, the first journal to go from being subscription based to being open access. We saw absolutely no difference between the willingness of reviewers to come and review for us when we were a subscription based journal or when we were an open access journal.

I for instance review frequently for the PLoS journals at no charge. Contrary to what you may have heard earlier, reviewers don't get paid. Reviewers do it for free. I have a paper in my briefcase at the moment from PLoS Genetics that I am reviewing.

It is unrelated, peer review is unrelated to whether you are looking at subscription journals or whether they are open access journals. We do peer review as scientists because we feel this is a very important part of our service to science.

Mr. CLAY. Wow. Thank you for that response.

Ms. Terry.

Ms. TERRY. I agree completely with that. I too am a reviewer, for free, as well. I think that what we are looking for is an ecosystem that allows a greater enhancement of publishing overall. You have heard some of those things here today. In addition to the immediate peer reviewers of articles, articles that are widely disseminated, are able to be integrated into technologies, into diagnostics, etc., and transformed more quickly.

I think the community itself, the scientists, want to do excellent work and want to hear from their peers, not just in a formal process and in a somewhat antiquated publishing system, but in a broader one that takes into account innovation and the technologies that are making the Internet really successful in disseminating all these augmented and annotated resources.

Mr. CLAY. Thank you.

Mr. Maxwell, how does open access affect us?

Mr. MAXWELL. I think as we have already heard, that there are peer review processes in open access journals as well as in proprietary journals. I want to make one slightly different point, and that is that the greater the public access to the material, the more likely it is that people will find problems with it or make suggestions about it. And it is not a two or three people reading of a particular article. When it gets out and available, more people can see it and more people can discover things that they can buildupon, or things that they can criticize.

Mr. CLAY. So that means the information could actually be enhanced?

Mr. MAXWELL. Absolutely.

Mr. CLAY. I see.

Mr. MAXWELL. And sometimes I think that is an underrated part of what happens in the Internet. Now, that is not to deny that there is a lot of garbage out there. We know that. But as people

have said repeatedly, sunshine is the best disinfectant. It is better to have people able to have access and comment than to withhold.

Mr. CLAY. Professor Colamarino, any comment?

Ms. COLAMARINO. Thank you. I think that our publishers here can speak to this a little bit better, but as far as I am concerned, it shouldn't have an impact. In fact, as Dr. Roberts already mentioned, and it wasn't brought up, I don't believe, on the earlier panels, reviewers are not actually paid. It is a public service work that they do.

I also want to echo what Mr. Maxwell said, which is what I was going to say, which is that science is self-correcting. So in fact, there is further review once the article gets out there. That review is done by the broader community. That is how science gets used. It is very iterative. So it actually is furthered with open access.

Mr. CLAY. Thank you.

Dr. Shulenburger.

Dr. SHULENBURGER. I completely agree. We have had considerable experience with public access, as well as open access. We don't see journals declining in numbers. In fact, the journals are a very healthy ecosystem. They are increasing in numbers very rapidly now. Thus I am confident that subscription-based journals will continue. That has been the experience under NIH, and I think we will see, as NIH's experience gets longer, that will be the case.

But as healthy as this ecosystem is, and the fact that it depends upon free labor for review and only pays to organize those reviews, I am confident we will develop models that will continue it into the future. We must.

Mr. CLAY. Thank you.

Ms. Nancarrow, will open access have a negative impact on peer review?

Ms. NANCARROW. Absolutely not. I can say that both as an editor of having been in subscription based journals prior to coming to PLoS. But I have to say that one of the hallmarks of peer review, or the journals' responsibility, is qualitative and quantitative and a peer review of excellence. And I think PLoS has shown that all of our journals provide, in fact, many of our authors would say it is extremely rigorous peer review. We owe a huge debt of gratitude to the scientists who do dedicate their time to it and ensure the heathy assessment of the science that we publish.

Mr. CLAY. Thank you so much.

I guess I can direct this to the panel, or maybe Dr. Shulenburger could respond. Could you give your opinion as to how you believe open access would affect students and those researchers working on projects?

Dr. SHULENBURGER. In order to do the best science, in order not to repeat yourself, you have to know what has been done before. And you only know that if the material is available, is published, and you can get to it as a researchers. Much of our training of doctoral students is done as they do research. Having that material fully available to them makes a difference.

But I want to repeat what I said earlier. We think of this as distant material. I have had a great many of my undergraduates who went to the literature and used it. Those community college students would use it, their faculty would use it. Maybe not daily, but

the best of them have potentials to win Nobel prizes some day. We just simply need to put before them material that will keep them challenged and make the most of their talents.

Mr. CLAY. Anyone else on how to impact students? Dr. Roberts.

Mr. ROBERTS. As I said, when I was at the Intel Science Fair, I was absolutely astonished at the level at which these students work. These are 17, 18 year olds. A colleague of mine at New England Biolabs has a daughter who is now 18. When she was 16, she was doing science fair projects that were only possible because she had access to the Internet through our company and to literature through our company. At her high school, she had no access to this. High schools can't afford access to the literature.

And I think we often do a great disservice to our students by denying them access to the resources they need. We often think they are not ready for it. We are wrong. These good students, they need access to this material. And they are the future. This is the future of science. This is where we are going. We have to do everything possible to put them in touch with the information.

Mr. CLAY. Thank you for that response.

Let me ask Professor Colamarino, the NIH policy provides the public with access to medical research. How would expanding the policy to other areas of science help patients with information that would be relevant to their illnesses?

Ms. COLAMARINO. There are many Federal programs that fund research beyond just the NIH. And I think success in tackling these very complex disorders is only going to come from using a very integrative approach to examining the data. Speaking specifically about autism, which is a very complex biological and behavioral disorder, you need to have information from everything that ranges not just from the biomedical to, say, the psychological to the educational as well.

Mr. CLAY. Some say that granting access to STM articles does not help the non-professional, such as patients and their families. How do you respond to that?

Ms. COLAMARINO. I travel this country, sometimes up to 90 percent of the time, meeting with these families and lecturing to them. I have found them to be nothing but sophisticated in their ability to interpret and read these papers. In the instances where they have questions, they print them out and they bring them to their care providers. This is, the families are starved for information. This would very much help provide them with what they are missing.

Mr. CLAY. Mr. Maxwell.

Mr. MAXWELL. When you asked about the extension of this policy more broadly, it is very important to recognize that while experts are very valuable and need to be looked to, there is information, experience, expertise available far beyond those people we would designate as an expert in a particular area. That is one of the real advantages of thinking about broad access. Because we can't know in advance who is going to make this discovery, who is going to buildupon it, who is going to have some entrepreneurial take on it to create a new business.

We don't know that in advance. If we simply say, "if you can afford it, you can get it," or "if you are an expert you can get it." That

misses the real point of openness, which is to open to a broad and democratic group of people who can take the information and make it more valuable.

Mr. CLAY. Which takes me to my next question. Ms. Terry, several witnesses have referred to access to research data. I understand that access to data is very different and that publishers agree that data should be made available. Can you explain how this is different from access to journal articles? And should we be focusing on ensuring that data resulting from Government-funded research is made available?

Ms. TERRY. Thanks very much for that question. I think we should be doing both. And the reason for that is the articles themselves are the distillation of the research data that has been done by intelligent people who are experts in a certain way. And I completely agree with Mr. Maxwell that then those need to be released into the ecosystem that will allow them to be enhanced more greatly.

The data itself, from publicly funded research as well, should be shared broadly, including, I would say, anything that touches a patient. So, clinical trial data, biospecimen data, etc. But we really need both. Because there right now is way more information than we can ever, ever deal with. And we need to have the hearts and mind of all the individuals who care from every discipline looking at this data and looking at these research articles.

Mr. CLAY. Let me just make an editorial comment. I hear witnesses all the time. I have never had a witness come in and admit that they committed a crime. You admitted that you stole information and I guess you were driven by passion and a love. I have to compliment you on your being so straightforward and forthcoming.

Dr. Shulenburger, some have argued that in the current STM publishing model, the American public is taxed twice, once to provide the billions of dollars for the research and again to provide the hundreds of thousands of dollars for public institutions to buy back access to the results of that research. Can you explain what is meant by this argument?

Dr. SHULENBURGER. I think it is at least partially true. Public institutions are indeed funded by tax dollars as the research is. The cost of that research has risen to a point that we can't afford it, as you have heard, can't make it available to our own scientists.

I said partially true, the journal publishers certainly add value. But they don't add sufficient value to justify keeping the articles that are produced behind gates for the entirety of the article's life. And that is the current situation. What we are asking for is, remove that tax after a year. Let the journal publishers make their return during the embargo period and then let's make sure that the public has full access to that which they paid for.

Mr. CLAY. Thank you.

Ms. Nancarrow, are the reports generally in a usable form for the general public?

Ms. NANCARROW. The reports meaning? I am sorry, Mr. Chairman, to what do you refer in terms of the reports?

Mr. CLAY. The research. The publishers' reports.

Ms. NANCARROW. The published reports. I am sorry, could you repeat the question?

Mr. CLAY. Basically, it is the published reports that they provide to the public. Are they in useable form?

Ms. NANCARROW. I think it depends on the type of submission that we receive. But generally, they are in an understandable form to an expert panel. But they are, I think, to quote Ms. Terry, there is an interpretive process that occurs after that.

Mr. CLAY. Ms. Terry.

Ms. TERRY. I would also say that the output of all these journals is understandable. And certainly to a certain degree, there are opportunities then to understand further. I certainly learned a lot reading 400 articles on pseudoxanthoma elasticum, something, as my husband says, we didn't know a gene from a hubcap when we started.

But all of this information has with it the ability to understand using dictionaries, encyclopedias and other experts. So it is in a usable form, and we are using it every day, hundreds of thousands of us.

Mr. CLAY. So you have to decipher and interpret?

Ms. TERRY. Sure. Just like if I read my auto repair manual, I occasionally have to look up a word. But I can learn, and so can the general public.

Mr. CLAY. Thank you. And let me thank this panel for your testimony, for your indulgence with this committee. You certainly bring a different perspective to this committee.

I appreciate your service, appreciate your coming in. This panel is dismissed.

Our final panel consists of one witness, Dr. David Lipman of the National Institutes of Health. Dr. Lipman is the Director of the National Center for Biotechnology Information, a Division of the National Library of Medicine at the National Institutes of Health. Appointed in 1989, he is overseeing the development of NCBI as a nationally and internationally recognized resource for molecular biology information.

Dr. Lipman is an elected member of the National Academy of Sciences, the Institute of Medicine and the American Academy of Arts and Sciences, just to name a few. Welcome, Dr. Lipman.

It is the policy of this subcommittee to swear in all witnesses. I would ask you to rise and raise your right hand.

[Witness sworn.]

Mr. CLAY. Thank you, and you may be seated. Let the record reflect that the witness answered in the affirmative. We will allow you 5 minutes to make an opening statement, Dr. Lipman.

STATEMENT OF DAVID J. LIPMAN, M.D., DIRECTOR, NATIONAL CENTER FOR BIOTECHNOLOGY INFORMATION, NATIONAL LIBRARY OF MEDICINE, NATIONAL INSTITUTES OF HEALTH, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

Dr. LIPMAN. Chairman Clay, it is my pleasure to testify before you today. My name is David Lipman. I am the Director of the National Center for Biotechnology Information [NCBI], at the National Library of Medicine, within the National Institutes of Health, an agency of the Department of Health and Human Services.

NCBI was established by Congress in 1988 as a national resource for molecular biology information. NCBI maintains more than 40 data bases, including GenBank, the data base of all known DNA sequences, and PubMed Central [PMC], the archive of journal articles in the biomedical sciences. PMC is also the repository for NIH-funded articles submitted in compliance with the NIH public access policy.

We launched PMC 10 years ago in collaboration with a number of publishers who deposited their journal articles in PMC to make them more widely accessible. Our experience has illustrated the benefits that a central repository could have, not only for scientists, but for doctors, researchers and the general public as well.

In 2005, NIH announced a voluntary public access policy. The policy requested recipients of NIH funding to deposit a copy of their peer-reviewed manuscripts in PMC. The policy permitted delay of public availability of the article for up to 12 months after publication. However, compliance was only at 5 percent.

To improve compliance, Congress in the Consolidated Appropriations Act for fiscal year 2008 instructed NIH to make the public access policy mandatory. This had a dramatic effect on compliance. Of the 88,000 NIH-funded articles published in 2009, 70 percent have been submitted to PMC and that figure continues to grow.

With increased content has come increased usage. On a typical weekday, 740,000 articles are retrieved by 420,000 different users. Last year, 99 percent of the articles in PMC were downloaded at least once, and 28 percent were retrieved more than 100 times. Annual operating costs for the public access system are approximately $3.5 million to $4 million per year, which represents a small fraction of NIH's budget authority of $30 billion per year. Our costs are low because of the infrastructure and expertise that the National Library of Medicine has developed over many years.

The success of the NIH model has stimulated similar efforts in other countries. Major biomedical funding organization in the U.K. and Canada, for example, have public access policies similar to NIH's, and both countries use PMC software for their repositories. This collaboration expands access for U.S. users to research done worldwide.

But to look at PMC as just a repository for scientific articles is to miss the bigger picture. PMC is an integral part of a larger information infrastructure that is accelerating discovery. Articles in PMC are entry points into a vast body of biomedical information maintained by NCBI and the Library of Medicine. Every day, users download over 13 trillion bytes of data, which is equivalent to all the books in the Library of Congress.

Interpreting these data requires access to the underlying knowledge that is embodied in scientific articles. By having PMC articles integrated with our other data bases, we are able to create linkages among these resources that can advance scientific discovery. For example, during the recent flu pandemic, NCBI was the major site for collecting all flu sequences. Within months, we had over 20,000 viral sequences from around the world.

Through use of our system, a researcher could read an article on drug resistant variants of the flu virus, and with the click of a mouse, compare new isolates to all other flu variants to gain new

insights into flu epidemiology. As this example illustrates, PMC and the NIH public access policy ensure that the knowledge that is generated by the Government's investment in research enables continued progress in biomedical science, having a comprehensive resource that integrates knowledge and data, speeds the discovery process that is critical for improving human health.

Thank you for the opportunity to present our experiences to you. I would be happy to answer any questions you might have.

[The prepared statement of Dr. Lipman follows:]

Testimony before the
Subcommittee on Information Policy, Census and National Archives
Committee on Oversight and Government Reform
United States House of Representatives

Public Access to Federally-Funded Research

Statement of
David J. Lipman, M.D.

Director
National Center for Biotechnology Information
National Library of Medicine
National Institutes of Health
U.S. Department of Health and Human Services

For Release on Delivery
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Mr. Chairman, members of the Subcommittee, it is my pleasure to testify before you today. My name is David J. Lipman. I am the Director of the National Center for Biotechnology Information (NCBI), which is part of the National Library of Medicine (NLM) at the National Institutes of Health (NIH), an agency of the Department of Health and Human Services. NCBI was chartered by Congress in 1988 to employ computer systems to collect and disseminate the results of biotechnology research, and we have been doing so ever since. NCBI is the home of more than 40 free and Internet-accessible databases, including GenBank, the database of all publicly available DNA sequences. It is also the home of dbGaP, a research database of studies that investigate the links between genetic variations and diseases. And, closer to the theme of today's hearing, NCBI is the home of PubMed Central – the publicly accessible, online archive of peer-reviewed biomedical sciences literature and the repository for NIH-funded papers submitted in compliance with the NIH Public Access Policy.

NIH has operated PubMed Central for more than a decade and has had a Public Access Policy in place for the last five years. During this time, NIH has gained considerable experience that I would like to share with you today as the subcommittee considers legislation to expand public access policies to other Federal science agencies and examines the systems and processes that might be put in place to do so. Our experience has demonstrated that policies such as the NIH Public Access Policy and repositories such as PubMed Central are important elements of efforts to develop an information infrastructure that will advance basic science, accelerate its application to solving today's problems, and satisfy a growing public desire for transparency and access to scientific information.

In launching PubMed Central in 2000, NIH aimed to follow the successful example of the Human Genome Project and promote scientific discovery by taking advantage of opportunities created by information technology and the Internet. Development of a digital archive of biomedical journal articles was seen as a way to improve access to cutting-edge research and to provide a long-term, stable repository of the scientific literature that researchers could continue to draw on in their work, recognizing the cumulative nature of science. From the beginning, we were fortunate to have the collaboration of a number of publishers who offered to deposit their journals in PubMed Central to make them widely accessible. As PubMed Central grew, we gained considerable experience in building and operating a digital repository for journal articles. Among the highlights of these efforts was establishment of a structured digital format for representing journal articles – the NLM DTD. The format has been adopted by some major publishers and libraries, including the Library of Congress, the British Library, and HighWire Press, and is in the process of becoming a standard recognized by the National Information Standards Organization.

Early experience with PubMed Central illustrated the benefits that a centralized repository of the biomedical literature could have, not only for scientists, but for medical practitioners, companies involved in the development of medical products and services, and the public. Without a resource like PubMed Central, the general public does not have ready access to much of the biomedical literature, and even large academic institutions and drug and device companies can lack access to the broad set of journals that might be relevant to their efforts. It also became apparent that PubMed Central could serve as an institutional archive for articles describing the research that results from NIH funding – articles for which no other systematic archive had been assembled. In 2005, NIH announced its first public access policy. The policy

was viewed as a way to keep a central archive of NIH-funded research publications and preserve vital medical research results and information for years to come; to advance science by creating an information resource that would make it easier for scientists to mine medical research publications; to help NIH better manage its research investment; and to provide ready access to NIH-funded published research for patients, families, health professionals, scientists, teachers, and students. This initial policy was voluntary. Specifically, the policy *requested* recipients of NIH funding to deposit a copy of their peer-reviewed manuscripts in PubMed Central upon acceptance for publication. They were permitted to delay public availability of the article in PubMed Central for as long as 12 months after the official date of publication.

Only some 5% of the articles that were subject to the initial policy were voluntarily submitted by their authors. Other NIH-funded articles were received directly from journals that participated in PubMed Central, but still only 19% of the articles subject to the NIH Public Access Policy between May 2005 and December 2007 were included in PubMed Central. To improve compliance, Congress, as part of the Consolidated Appropriations Act for FY 2008, instructed NIH to make the public access policy mandatory, which it did starting in April 2008. As of that date NIH-funded researchers have been *required* to submit copies of their peer reviewed journal articles to PubMed Central upon acceptance for publication. As with the voluntary policy, up to a 12-month delay for public access to the articles can be requested.

The transition to a mandatory policy has had a dramatic effect on the deposit of papers into PubMed Central. Of the estimated 88,000 NIH-funded articles published in 2009, approximately 70% have been submitted to PubMed Central. That figure continues to climb as NIH works with the research community to promote awareness of the policy, improves its ability

to track papers resulting from NIH research awards, and develops new systems to assist sponsored research offices at universities and medical research centers in tracking their compliance with the policy

NIH has also taken steps to simplify the submission process for authors. For articles that are published in a journal that participates in PubMed Central, the authors need to do nothing once their article has been accepted for publication. The publisher directly deposits the author's final article into PubMed Central. For articles that are not published in participating journals, authors submit the articles themselves using the NIH Manuscript Submission System, a process that takes only about 10 minutes. At present, more than 900 journals have formal agreements with PubMed Central to deposit the published version of all NIH-funded articles in PubMed Central, a number that has doubled in the 2 years since the policy became mandatory. As a result of these arrangements, approximately 40% of the articles submitted to PubMed Central in 2009 were deposited directly by the publisher, with no additional intervention by the author. That percentage is expected to continue to climb as more journals make arrangements for submitting articles on behalf of their authors.

As a result of these efforts, PubMed Central has continued to grow. Between April 2008 (when the policy became mandatory) and June 2010, approximately 700,000 articles were added to PubMed Central, bringing the total content of the archive to more than 2 million full-text articles. Of those 700,000 added articles, approximately 130,000 report on NIH-funded research. With increased content has come increased usage. In the two years between March 2008 and March 2010, the monthly number of articles retrieved from PubMed Central doubled from 10 million to 20 million. On a typical weekday in March 2010, some 420,000 different users

retrieved 740,000 articles from PubMed Central. Those visitors included more than 2,800 users from Missouri, 21,000 users from California, and 4,800 users from North Carolina. And they access a significant portion of the available content. Last year, 99% of the articles in PubMed Central were downloaded at least once, and 28% were downloaded more than 100 times.

Although we can collect only aggregated information about users of PubMed Central, we can infer they represent a mix of people from the education and business sectors, as well as private citizens. Based on the type of Internet domain from which they access PubMed Central (e.g., .com, .edu, .net, .gov), we estimate that approximately 25% of our users are from universities, 40% are private citizens or those using personal Internet accounts, and 17% are from companies (the remainder consists of government users or others). These kinds of numbers support the notion that PubMed Central has become a broad-based repository for researchers, students, clinicians, entrepreneurs, patients and their families.

The success of the NIH model has stimulated similar efforts in other countries. Major biomedical research funding organizations in the United Kingdom, including the Wellcome Trust, Medical Research Council, and National Institute for Health Research, have access policies similar to NIH's that require funded authors to ensure that articles are publicly accessible. The Canadian Institutes of Health Research also requires funded researchers to ensure that research papers are publicly accessible. In both the U.K. and Canada, funding agencies are using a portable version of the PubMed Central software (developed by NLM) to build their repositories. NIH's collaboration with these organizations has demonstrated the capability to establish interoperable archives at other sites. It has also expanded the access that

users in the United States have to research results resulting from the growing amounts of biomedical research that are conducted in other countries.

But to look at PubMed Central as just a repository for scientific articles is to miss the bigger picture. PubMed Central has become an integral part of a larger information infrastructure that is accelerating scientific discovery in the biomedical sciences. Articles contained in PubMed Central are another entry point into the larger body of biomedical information that is maintained by NCBI and NLM. As noted above, NCBI produces more than 40 databases, including GenBank and dbGaP. NCBI and NLM also maintain information about small, biologically significant molecules that are assayed through the NIH Molecular Libraries program, information about the results of clinical trials – the result of recent legislation – and 3-dimensional structures of proteins. Every day, users download over 13 trillion bytes of data from NCBI – equivalent to all the books in the Library of Congress. Interpreting and understanding this data requires access to the knowledge that is embodied in scientific articles. By having journal articles in PubMed Central in a machine readable format, we are able to create linkages among these resources that can aid and advance scientific discovery. For example, during the recent H1N1 flu pandemic, NCBI was the major site for collecting all of the known flu sequences. Within months, NCBI had over 20,000 sequences from around the world. Taking advantage of the deep integration among NCBI systems, a researcher reading a paper on the spread of drug-resistant variants of the flu sequences could, with the click of a mouse, compare the new isolates to all other flu variants and gain insight into the epidemiological consequences. With equal ease, the researcher could map the variant viral proteins to known 3D protein structures to see how the mutations affect binding of the antiviral drug.

Already, a significant fraction of the users who access data from an NCBI database on any given day also retrieve articles from PubMed Central and vice-versa. More than 17% of dbGaP users (for studying the genetic basis of disease), for example, also use PubMed Central. This type of iteration between the literature and data increasingly reflects the way that research in biomedical sciences is done, as biomedical science becomes an ever more data-intensive science. This interoperability is difficult to achieve if the literature – the knowledge – is widely dispersed and unconnected to other databases of biomedical information.

Furthermore, because the searching and navigating among databases takes place within our integrated database structure, we are able to continually refine our information systems to make them more helpful to our users. We can examine on a regular basis how the system is used and how users navigate from one database to another, and we can improve the systems to help users find the information they are looking for. For example, NCBI recently began adding what we call "discovery ads" to pages in PubMed Central. These ads, placed adjacent to an appropriate passage in the text, provide references to other related articles that are indexed in NLM's PubMed database of more than 16 million journal abstracts. Since adding this capability, we have almost doubled – in a 1-year period – the rate at which users move from PubMed Central to PubMed as they review the scientific literature. Links from PubMed Central to other NCBI databases connect users to related data.

Equally important, we are able to do these activities cost-effectively. Startup costs for developing the system that handles articles submitted under the NIH Public Access Policy were about $500,000. Annual operating costs for the system, including ingest of articles, refinement of the submission system and search tools, staffing of a help desk and a central coordinating

office for NIH, are approximately $3.5-$4.0 million per year. This represents a small fraction of NIH's budget authority of more than $30 billion per year. We keep our costs low because of the incredibly skilled staff we have assembled at NCBI and because we can leverage NLM's existing infrastructure and services, as well as many other resources available at NIH.

In summary, our experience with PubMed Central and the NIH Public Access Policy show that such approaches can be a cost-effective means to enhance access to the results of scientific research – in particular federally funded research – to preserve and increase the use of research results, and to enhance scientific discovery. The NIH Public Access Policy is a critical element of the agency's efforts to enhance opportunities for scientific discovery. It ensures that the scientific knowledge that is generated by the Government's investment in biomedical research and that is documented in peer reviewed articles is integrated into the information infrastructure that has become fundamental to continued progress in biomedical science. Having a comprehensive resource that integrates knowledge and data speeds the discovery process that is critical for improving human health.

Thank you for the opportunity to present our experiences to you. I would be happy to answer any questions you might have.

Mr. CLAY. Thank you, Dr. Lipman.

Let me ask you, why is it important for there to be Government-run data bases of federally funded research articles? For example, what do you think about requiring the Government to link to the original journal's Web site in order to read the articles?

Dr. LIPMAN. Well, our experience, I think we found several important advantages of having the actual content available at the National Library of Medicine. For one thing, the Library of Medicine has been archiving the literature for 150 years. The historical record is that archiving is done by libraries, not by publishers. So this is very precious information, and we really need to have long-term archiving.

Two, when the content is not being used directly on your site, when there are problems, problems with the underlying data, problems in terms of being able to connect to other kinds of information, we just can't find that out. The reason why so many Web sites really find it valuable to mine the way people use their Web site is they can improve it by seeing how it is being used.

We have been doing this for several years. We call it our discovery initiative. We can provide quantitative information on how users improve their use of the resource by us being able to follow what they are doing and actually train the system instead of trying to train the users. So that is just a few of the reasons why we find it really critical that the archive be available.

In addition, our outside advisors, we did try a link out option for a period of time in the beginning of PubMed Central, probably about 10 years ago, actually at the start. We had a number of problems with doing that, and they ultimately advised us to stop that option because of the problems that we faced.

Mr. CLAY. Out of curiosity, have you been able to digitize and make that 150 years worth of research and knowledge accessible to the public?

Dr. LIPMAN. That is a very exciting prospect. But we have begun some of that. I will say one thing, our initial advisors in PubMed Central said, the information in the older articles is very valuable. What about the participating publishers, the publishers, and there are quite a few, hundreds of them, hundreds of journals voluntarily, even before the public access policy, were collaborating with us in doing this. We worked with them and the British government, the Wellcome Trust and the British Government provided funds for us to digitize articles going back to the 1800's. This included articles from the American Society of Microbiology, where there was tremendously interesting data on the Spanish flu from 1918 and other diseases where, while they didn't have the molecular biology methods, they did have doctors' observations and epidemiological data that has proved valuable.

So that is a great point. And to the extent that we have been able to do this, we have found it has been tremendously beneficial.

Mr. CLAY. Wonderful. Doctor, I understand that it has only been a few years. But how has the NIH policy affected research, and how do you believe it has affected publishing?

Dr. LIPMAN. I don't know how to say this the right way, but 10 years ago, when we were starting PubMed Central, we heard a lot

of the same concerns that the publishers raised. Ten years has gone by and a lot of those things didn't happen.

So we heard those same things again 5 years ago when there was the start of the public access policy. Now it has been in full force in a mandatory form for 2 years. And at least we are not aware of dramatic changes because of that.

On the other hand, as we said, we have a heck of a lot more articles that are now being intensively used by people around the United States. We are seeing a lot of benefits already, at least in terms of usage. It takes a while before that translates into differences in health care and so forth. But usage has to come first.

Mr. CLAY. So I would assume the scientific community is no different than the rest of American society, we tend to resist change initially, and then after the initial shock and they get over it, then they embrace the change. Have you see widespread use and increasing use of your site?

Dr. LIPMAN. Yes, actually there has been about a doubling, I think, for many aspects of usage just since 2008. So yes, we do see an increased use. And actually, I would make an important point, that as more data, more articles are in PubMed Central, we see a concomitant increase in usage. It is sort of proportional. We find that for all of our data bases, the more comprehensive they are, the more the usage is. They just track right along with each other.

Mr. CLAY. If the platform used to support PubMed Central is portable, can other agencies use this to establish their own repositories?

Dr. LIPMAN. Thank you for that question. Absolutely, we would be pleased to help any agency in that manner. Frankly, the expertise that the Library of Medicine has had over 10 years of doing this, I think, could be used in many ways to help the other agencies from simply consulting in advice to using software like PubMed Central, to even having the Library of Medicine do the first phase of the creation of the Government-wide archive. In other words, the sort of librarian aspect of getting the content from publishers or from authors, making sure it is in a stable, uniform digital format, and then providing at least simple forms of retrieval across it all. We could do that and I think we could do it very cost effectively. We could project those costs.

But then for domain-specific usage, things that are very important for some areas of physics or meteorology or other areas outside of our expertise, those articles could be pulled into an agency-specific, domain-specific archive. So I think there is a whole range of ways that the experience of the Library of Medicine could be used to make this succeed.

Mr. CLAY. Thank you for that response. Last question. Can you describe the process by which researchers submit their work to NIH? Is it a difficult process to comply with?

Dr. LIPMAN. Right now, there are 900 journals that have arrangements with the Library of Medicine so that the content comes in automatically. They have it in one digital form, we convert it into our format. And the author doesn't really need to do anything. That is about 40 percent of the articles.

For the 60 percent remaining, the author does have to upload the manuscript to our site. But that process takes about 10 minutes.

So I would say 10 minutes in the course of 6 months of research, I would say that is reasonably easy.

Mr. CLAY. Pretty reasonable.

Let me thank you, and thank all of the witnesses on all three panels who indulged us today, who gave of their time to come. I will say that public access to federally funded research was a different topic for me, but I certainly learned a little today.

And with that, this hearing is adjourned. Thank you.

[Whereupon, at 5:18 p.m., the subcommittee was adjourned.]

[Additional information submitted for the hearing record follows:]

ASSOCIATION OF SOUTHEASTERN RESEARCH LIBRARIES

Thursday, July 15, 2010

Chairman Edolphus Towns
Committee on Oversight and Government Reform
U.S. House of Representatives
2157 Rayburn House Office Building
Washington, D.C. 20515

Chairman Wm. Lacy Clay
Information Policy, Census and National Archives Subcommittee
Committee on Oversight and Government Reform
U.S. House of Representatives
2157 Rayburn House Office Building
Washington, D.C. 20515

Dear Chairman Towns and Chairman Clay:

The Association of Southeastern Research Libraries (ASERL), comprising the 38 largest university research libraries in the Southeast, including major research institutions from Virginia to Florida, Georgia to Mississippi, and Louisiana to Kentucky, seeks your support for the Federal Research Public Access Act (FRPAA – H.R. 5037), recently introduced into the House by Rep. Mike Doyle (D-PA) and a suite of bipartisan cosponsors, and subsequently referred to the Committee on Oversight and Government Reform.

Since 2004, our member libraries have supported the drive for public access to research articles derived from federally-supported research. American taxpayers have supported federally-funded research for decades, but today's economic constraints increasing impede access to the output of that research. We believe the results of these taxpayer investments ought to be made publicly available through an open access archive.

ASERL libraries do their best to provide access to results of this research as reported in academic journals; however it is simply not possible for any of our libraries to afford subscriptions to all of the titles that are required to make this information available to all of the communities they serve. The FRPAA legislation provides an important mechanism to supplement journal subscriptions by making this crucial layer of information broadly available to all types of academic institutions. This issue is particularly timely given the current economic climate, with steep budget cuts faced by colleges and universities all across the United States.

Further, we believe widespread access to the information contained in these reports is an essential, inseparable component of our nation's investment in science. The FRPAA proposal does not change the traditional peer review and scholarly publishing processes. It simply ensures reasonable public access to information that was funded by the American public. By broadening access to these data, we can stimulate further discovery and innovation, and advance the translation of this knowledge into public benefits.

ASERL believes passage of the Federal Research Public Access Act is clearly the right

1438 West Peachtree Street NW / Suite 200 / Atlanta, GA 30309-2955
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www.aserl.org

thing to do, and that these matters deserve to be heard openly. Many of ASERL's member institutions already have expressed support for the legislation. We urge your Committee to support a full hearing on this issue, and ultimately, to support the passage of the bill.

With kind regards,

John E. Ulmschneider
President, Board of Directors
Association of Southeastern Research Libraries
and
University Librarian, Virginia Commonwealth University Libraries

cc: Rep. Lynn A. Westmoreland, Georgia
Krista Boyd, Counsel, Committee on Oversight and Government Reform
Lars Hydle, Legislative Director for Representative Towns
Anthony Clark, COGR legislative staff
Heather Joseph, SPARC
ASERL Library Deans/Directors

THE ROCKEFELLER UNIVERSITY PRESS

QUALITY AND INTEGRITY

July 20, 2010

Congressman Wm. Lacy Clay
Chairman
Information Policy, Census, and National Archives Subcommittee
Committee on Oversight and Government Reform

Dear Congressman Clay,

Thank you for your invitation to testify before the Information Policy, Census, and National Archives Subcommittee of the Committee on Oversight and Government Reform. Unfortunately, I am unable to attend the hearing; however, I would like the Committee to know that The Rockefeller University Press strongly supports Federal initiatives to provide greater public access to scientific research articles.

As a biomedical research publisher, we understand that much of our content is generated through publicly funded research, that many of the scholars who carry out peer review are publicly funded, and that the public supports (either directly or indirectly) many of the institutions that buy our subscriptions. We thus feel an obligation to give something back to the public, and we release our content after six months under subscription control. We have done this since January, 2001, and our subscription revenues grew every year through 2009. We release all of our content, regardless of funding source, and we support initiatives such as the Federal Research Public Access Act (H.R. 5037) that seek to extend public access mandates to additional funding agencies.

Yours sincerely,

Mike Rossner, Ph.D.
Executive Director
The Rockefeller University Press

These comments are the opinion of the author and do not necessarily reflect the position of The Rockefeller University.

The Rockefeller University Press, 1114 First Avenue, 3rd Floor, New York, NY 10065
Tel.: 212-327-7938, Fax: 212-327-8587, E-mail: rupress@rockefeller.edu

Open Access to Federally-Funded Research and the Impact on the Nation's Graduate Students

Washington, D.C.
July 26, 2010

On behalf of graduate and professional students nationwide, the National Association of Graduate-Professional Students, Inc. (NAGPS) puts forth the following statements regarding the possibility of open access to research:

1. A primary goal of graduate students is to become professional researchers. Research for most is not a hobby, and not a job, but becomes a lifetime pursuit. Open access would enable their work to be explored free of charge by any interested party.

2. Graduate students working on major research projects need to be aware of related work to properly cite prior art, to assess the direction of the field, and to understand where their own work fits into a larger body of research. Open access would allow for timely access to recent work across the entire academic community. This can prevent graduate students from lacking access to a seminal article, from duplicating a prior conclusion, and can allow them to more efficiently work towards their own potentially groundbreaking findings.

3. In today's difficult job market, students need all the help they can get to market themselves amongst their peers. Open access would allow more people to read graduate students' publications, which could lead to a greater appreciation of their work, future citations, and publishing opportunities. Cultivating a community of researchers who appreciate their work is a core component of success in the post-graduation market.

4. Graduate students often serve as teaching assistants. Teaching courses which may be outside of their principal research area requires them to quickly and efficiently access a large body of research to perform their course duties. Open access would allow both teaching assistants and their undergraduate students the ability to freely, quickly, and easily access any pertinent academic research.

THE NATIONAL ASSOCIATION OF GRADUATE-PROFESSIONAL STUDENTS, INC. • PO BOX 96503 #36821 • WASHINGTON, DC 20090-6503

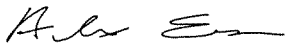
OFFICE: 202.596.9035 • URL: HTTP://WWW.NAGPS.ORG

5. Finally, as young researchers, graduate students are often involved in innovations on the cutting-edge, such as green energy initiatives, emergency response work, and internet and data policy. Open access could lead these research teams toward the next revolutionary breakthrough. Federally-funded research aims not just to help academics further their careers and publish papers, but to solve real-world problems that advance our country's science, technology, and policy.

Open access facilitates the openness, transparency, dissemination, and accessibility of research results. The potential of open access is to allow research paid for by government issued, taxpayer dollars, to be released from the paywalls that quarantine these results to only elite institutions. Instead, K-12, college, professional and graduate students, scientists, corporations, and the public will be able to freely obtain and share the most current results of the academic community.

Graduate students are intimately involved in reading, reviewing, creating, and publishing academic research. However, this pursuit is not only to attain a university professorship or a job at a top research firm, but to enhance humanity's understanding of science and our world, and to benefit society as a whole.

We urge Congress to take action to support open access.



Alex Evans
President & CEO, NAGPS
president@nagps.org

The National Association of Graduate-Professional Students, Inc. (NAGPS) represents the interests of 2.6 million graduate and professional students nationwide. NAGPS provides resources, support, and connections to member organizations, and advocates on their behalf, both locally and nationally.

For more information on NAGPS, visit http://nagps.org

Press Contact:

Patrick Gage Kelley
Director of Communications, NAGPS
communications@nagps.org
(716) 417.3926

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800-545-2433, ext. 2523
acrl@ala.org, http://www.acrl.org

July 27, 2010

Chairman Wm. Lacy Clay
Subcommittee on Information Policy, the Census and National Archives
Committee on Oversight and Government Reform
U.S. House of Representatives
2157 Rayburn House Office Building
Washington, D.C. 20515
Via fax: (202) 225-4784

Dear Chairman Clay,

On behalf of the Association of College and Research Libraries (ACRL) and the over 12,000 members we represent, we are writing in appreciation of the recent announcement that you will be holding a hearing on H.R. 5037, the Federal Research Public Access Act (FRPAA), which was introduced into the House on April 15 by Rep. Mike Doyle (R-PA). We are strong supporters of this bill and are grateful you will be exploring the issue of public access to federally funded research in an open hearing on Thursday, July 29.

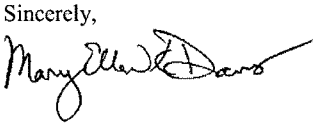
ACRL, a division of the American Library Association (ALA), is the only individual membership organization in North America that develops programs, products, and services to meet the unique needs of academic and research librarians. ACRL endorsed both the House and Senate versions of FRPAA, when they were introduced, as landmark events in the ongoing effort to establish public access to federally funded research. This legislation is an important step toward reforming a system of scholarly communication to be more responsive to the needs of the academy, reflecting the nature of scholarship and research as a public good.

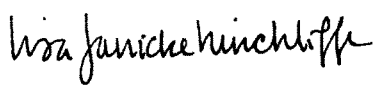
Thank you for being so responsive to the interests of academic libraries and those we serve – faculty, students, and the public – along with the many other stakeholders who have a vested interest in increasing access to knowledge. We believe an open hearing is an important step toward giving this bill full consideration. The bill balances the needs of all stakeholders in the research community and helps to create a level playing field where all interested citizens can access the results of publicly funded research equally.

We are pleased that this open hearing will provide an opportunity for all stakeholders to express their views. We expect the Committee will hear a broad range of perspectives on

the potential impact of opening up access to the results of the United States' more than $60 billion annual investment in scientific research. Thank you again.

Sincerely,





Mary Ellen K. Davis
ACRL Executive Director
mdavis@ala.org

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Associate Professor
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ljanicke@illinois.edu

cc: Krista Boyd, Counsel, Committee on Oversight and Government Reform (Krista.Boyd@mail.house.gov)

Anthony Clark, Professional Staff Member, Committee on Oversight and Government Reform, Subcommittee on Subcommittee on Information Policy, the Census and National Archives (Anthony.Clark@mail.house.gov)

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July 27, 2010

Ranking Member Patrick McHenry
Subcommittee on Information Policy, the Census and National Archives
Committee on Oversight and Government Reform
U.S. House of Representatives
2157 Rayburn House Office Building
Washington, D.C. 20515
Via fax: (202) 225-4784

Dear Ranking Member McHenry,

On behalf of the Association of College and Research Libraries (ACRL) and the over 12,000 members we represent, we are writing in appreciation of the recent announcement that you will be holding a hearing on H.R. 5037, the Federal Research Public Access Act (FRPAA), which was introduced into the House on April 15 by Rep. Mike Doyle (R-PA). We are strong supporters of this bill and are grateful you will be exploring the issue of public access to federally funded research in an open hearing on Thursday, July 29.

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Thank you for being so responsive to the interests of academic libraries and those we serve – faculty, students, and the public – along with the many other stakeholders who have a vested interest in increasing access to knowledge. We believe an open hearing is an important step toward giving this bill full consideration. The bill balances the needs of all stakeholders in the research community and helps to create a level playing field where all interested citizens can access the results of publicly funded research equally.

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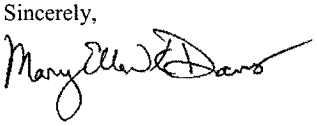

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mdavis@ala.org

Lisa Janicke Hinchliffe
ACRL President
Associate Professor
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ljanicke@illinois.edu

cc: Krista Boyd, Counsel, Committee on Oversight and Government Reform (Krista.Boyd@mail.house.gov)

Anthony Clark, Professional Staff Member, Committee on Oversight and Government Reform, Subcommittee on Subcommittee on Information Policy, the Census and National Archives (Anthony.Clark@mail.house.gov)

STATEMENT FOR THE RECORD
AMERICAN PHYSICAL SOCIETY
Committee on Oversight and Government Reform
Subcommittee on Information Policy, Census and National Archives
Hearing on "Public Access to Federally-Funded Research"
Thursday, July 29, 2010

Introduction

The American Physical Society (APS), established more than 110 years ago, is the nation's leading organization of research physicists, with more than 48,000 members in academia, national laboratories and industry. In accord with its mission, APS promotes "the advancement and diffusion of the knowledge of physics" and "strives to be the leading voice for physics and an authoritative source of physics information for the advancement of physics and the benefit of humanity." To those ends, APS publishes internationally recognized high-quality, cost-effective journals that benefit the physics community throughout the world.

APS supports the principles of Open Access provided that such a policy can permit the society to continue to publish peer-reviewed journals, conduct secure archiving and maintain the society's long-term financial stability, to the benefit of the scientific enterprise. APS was the first publisher to explicitly allow "Green Open Access" for all papers and has been a pioneer in providing electronic access to its Journals. If there were a financially viable way to do so APS would be prepared to make its entire journal content freely available on the Web, provided it could sustain the important work it does as a scientific publisher and a professional society.

In the view of APS, any successful and enduring open access policy must address two key issues: maintaining peer review and archiving. We address both issues in the balance of this statement.

Peer Review: Maintaining Scientific Credibility

Peer review is the cornerstone on which the scientific edifice is constructed. When scientists want to develop new ideas, they turn to peer reviewed journals to learn what has been done previously, and they must be able to trust that the previous work is sound. In an era in which vast amounts of un-refereed scientific literature is available on the Web, refereed journals take on special importance. They comprise subsets of the open literature that relevant scientific communities identified as sound, significant, and worthy of attention, dissemination and preservation.

Publishers manage the community's peer review process for the journals they publish. They also provide copyediting, full-text electronic formatting, electronic linking of references, sophisticated search capabilities, secure archiving and an online platform providing seamless access to a significant fraction of the literature.

APS publishes nine peer-reviewed journals. In 2009 they received 32,181 submissions, of which 18,343 were chosen for publication following careful peer review. Although APS is dominantly an American organization, it has extraordinary stature as an international publisher: approximately 78% of submissions, 73% of published papers and 67% of referees were from abroad.

The cost of producing the APS journals is currently covered by institutional subscriptions – as has long been the norm in many areas of scientific publishing – and APS has worked diligently to keep expenses low. Despite an annual growth rate of 5.2% in the number of articles it published during the period 2003-2009, APS employed efficiencies to keep its journal price increases below 3.5%/year, comparable to inflation. [APS notes that any marginal revenue it collects from its journals is spent entirely on public service activities such as physics education initiatives, public outreach, and nonpartisan studies of broad public interest.]

In an Open Access environment in which the costs of scientific peer review and publishing would be borne by authors rather than subscribers, the federal government would be the major underwriter for research it has supported. At a cost of $2,000 per article, which APS believes would be an industry-wide average, publishing the estimated 400,000 U.S.-authored articles in all science fields would carry an annual federal burden of $800 million.

The Scientific Record: Archiving Scientific Publications

Validation, publication and dissemination of research findings are well-recognized essential elements of the science enterprise. Archiving of scientific publications is often a forgotten component, but it is just as important, since advances in research rely heavily on the historical record of prior work not only within a given discipline, but also often across many disciplines. To be reliable, archives must be enduring, secure and free of tampering.

Prior to the era of electronic publishing, libraries – public, institutional and private – served as archival repositories of the printed record. They were distributed across the country, and, by virtue of their redundancy, in the aggregate they provided a high level of safety, security and freedom from the potential of political or social mischief.

The electronic age has altered the archival landscape. Today, access to research publications requires no more than access to a Website. An archive in New York can serve a user in Hawaii, and the ease of electronic access has eliminated the built-in redundancy that existed in the era of paper archiving.

In the new age of electronic publishing, some policy makers now argue that Federal agencies should serve as the guardians of scientific record. The advocates of such a structure assert that the Federal agencies that sponsor research have an obligation to maintain archives of the publications emanating from the research in order to provide guaranteed access for taxpayers who have paid the bills.

APS acknowledges the political appeal of such an argument, but it believes that pursuing such a course can lead to unintended, damaging consequences. Unlike libraries, Federal agencies have never had responsibility for archiving. Unlike a system of libraries that ensures redundancy and through that redundancy relative freedom from political tampering, a Federal agency is a single repository under the control of a single entity – the Executive Branch – which by its very nature is political and reflects the shifting winds of elections and ideologies.

Science, which is objective, should never be subservient to political philosophy, which is subjective. Giving a Federal agency the responsibility for archiving scientific publications opens the door to political meddling with the scientific record that could cause irreparable harm to the integrity of research.

Should policy makers decide that the Federal government must play an archiving role, they should place the responsibility with the Library of Congress, the *de facto* national library of the United States. The institution has a long-standing record of archiving the nation's print literature and performing that task immune from political pressure. Today, the Library of Congress is developing the capability of archiving electronic publications, and in the view of the APS, it should be the institution of choice for Federal archiving of scientific publications.

Innovative Public Access Solutions

APS believes there are a number of ways to enhance free or low-cost public access to scientific journals that place little or no onus on taxpayers. Although no one approach will serve the needs of all prospective readers, APS believes that a combination of approaches can cover everyone at an acceptable level. The following list is intended to be suggestive but not exhaustive.

- **Public Library Access** – Publishers could offer free on-site access to their journals at all U.S. public libraries, institutions that generally do not maintain subscriptions at the present time. APS has just pioneered such a program. With no charge to any participating public library, APS now provides readers with complete online, on-site access to its full range of journals: from the most recently published article on its date of publication back to the first issue of "The Physical Review" in 1893, a collection comprising more than 400,000 research papers.

- **Very Low-Cost, Read-Only, Limited-Term Article Rentals** – Publishers could offer readers access to all titles and abstracts with low-cost downloads of full articles (the iTunes model). APS and a number of other publishers have recently entered agreements with an entrepreneurial start-up firm, DeepDyve, to offer such a service.

- **Promotion of Institutional and Individual Repositories** – Websites maintained by individual scientists, institutions and topical interest groups (such as the very successful and long running arXiv.org, established in 1991) provide open avenues to significant parts of the scientific literature. Based on long-standing policies of friendly coexistence between many publishers and such providers, the open repositories can satisfy many of the demands of public access without damaging the viability of scientific journals

Conclusion

APS believes that a number of opportunities exist to enhance free public access to the scientific literature and is prepared to assist policymakers in developing the modalities. But APS expresses strong reservations about

1. Policies eliminating or drastically reducing subscription revenues that currently support scientific per review, absent an enduring underwriting substitute that is free from the vagaries of federal discretionary budgeting.

2. Policies establishing any federal scientific archive, except through the Library of Congress.

Non-profit scientific publishers play an extraordinarily important role in disseminating knowledge and maintaining the integrity of scientific research. Their track record of excellence extends back more than a century. Policy changes should be undertaken with extreme care to avoid placing such a successful enterprise at risk.

ALLIANCE FOR
taxpayer@ccess

July 29, 2010

The Honorable Representative Wm. Lacy Clay
Chairman, Information Policy, Census and National Archives Subcommittee
Committee on Oversight and Government Reform
U.S. House of Representatives
2157 Rayburn House Office Building
Washington, D.C. 20515
Via email: anthony.clark@mail.house.gov

Dear Chairman Clay;

On behalf of the more than 90 academic, consumer, research, patient and publisher organizations that comprise the Alliance for Taxpayer Access, thank you for convening the first open hearing on public access to federally funded research. This inclusive hearing ensures that a diverse range of perspectives is represented and is a key opportunity to explore the potential benefits of public access to the results of our nation's $60 billion annual investment in scientific research.

Timely public access to the most up-to-date results of scientific research matters to millions of Americans. It matters to researchers working on the latest advances in medicine, food safety, clean energy sources and climate change. It matters to teachers trying to ensure their students are given equitable access to the information they need to become our next generation of cutting-edge researchers. It matters to entrepreneurs and business owners of all sizes who are working to develop competitive products and services, and to grow businesses that can employ increasing numbers of Americans. It matters to parents who have a child diagnosed with a condition they are struggling to understand, who want to provide the best possible care and treatment to ensure their child's brightest future.

As taxpayers, we invest in scientific research with the expectation that this investment will accelerate our collective ability to advance all of these interests. We understand that it is only by sharing the results of what our research has found – and by allowing others to freely build upon them – that crucial insights, discoveries, cures, and innovations can be made. We recognize the unprecedented new opportunities that technology gives us to share information quickly and widely, and encourage the responsible use of these technologies to speed the translation of research into public benefits.

As scientists – and the public – operate in an increasingly digital world, it is in all of our interests to fully leverage the opportunities presented to us to share information that enhances our collective understanding of the world we live in, and to enable all citizens to more rapidly and fully benefit from this understanding. We believe that ensuring timely, barrier-free access to the results of the science and scholarship that our tax dollars underwrite will result in significant social and economic benefits to the public, and fully support policies that can turn this belief into a reality.

.../2

c/o SPARC • 21 Dupont Circle, NW • Washington, DC 20036 • Tel. 202 296 2296

The Alliance for Taxpayer Access thanks you for creating the opportunity for this important national conversation to take place, and for your leadership in advancing the understanding of the importance of public access to federally funded research.

Sincerely,

Heather Joseph, Spokesperson
(202) 296-2296 ext 157, heather@arl.org

ALLIANCE FOR
taxpayer@ccess
www.taxpayeraccess.org

The Alliance for Taxpayer Access (ATA) is a coalition of patient, academic, research, and publishing organizations that supports open public access to the results of federally funded research. The Alliance was formed in 2004 to urge that peer-reviewed articles stemming from taxpayer-funded research become fully accessible and available online at no extra cost to the American public. Details on the ATA may be found at http://www.taxpayeraccess.org.

AIDS Action Baltimore - MD
AIDS Vaccine Advocacy Coalition - NY
American Association of Law Libraries - DC
American Library Association - DC
American Medical Student Association - VA
Amherst College Library - MA
Arthritis Foundation - DC
Asian & Pacific Islander American Health Forum - DC
Association of Academic Health Sciences Libraries - WA
Association of Cancer Online Resources - NY
Association of College & Research Libraries - IL
Association of Maternal and Child Health Programs - DC
Association of Research Libraries - DC
Association of Southeastern Research Libraries - GA
Autism Speaks (formerly National Alliance for Autism Research) - DC
Autosomal Recessive Polycystic Kidney Disease and Congenital Hepatic Fibrosis Alliance (ARPKD/CHF Alliance) - PA
Barth Syndrome Foundation - FL
Boston College Libraries - MA
Boston Library Consortium - MA
Bowdoin College Library - ME
Bowling Green State University Libraries - OH
Carnegie Mellon University Libraries - PA
Chemists Without Borders - Canada
Chordoma Foundation - NC
Christopher Reeve Foundation - DC
Colorectal Cancer Coalition - DC
Committee for Economic Development - DC
Consumer Project on Technology (CPTech) - DC
CUNY – City College Libraries - NY
Cutaneous Lymphoma Foundation (formerly Mycosis Fungoides Foundation) - MI
Coalition for Heritable Disorders of Connective Tissue - DC
Colorado State University - CO
Conquer Fragile X Syndrome - FL
The Creutzfeldt-Jakob Disease (CJD) Foundation - OH
Cystinosis Research Network - IL
Denison University – William H. Doane Library - OH
Down Syndrome Treatment and Research Foundation - CA
Eastern Kentucky University Libraries - KY
Emory University Libraries - GA
Essential Action - DC
Facing Our Risk of Cancer Empowered (FORCE) - FL
Francis Countway Library of Medicine (Harvard Medical School) - MA
FreePatentsOnline
Genetic Alliance - DC
Global Neuroscience Initiative Foundation - WA
GNU EPrints - UK
Greater Western Library Alliance - MO
International Mosaic Down Syndrome Association (IMDSA) - TX
International Journal of Medical Sciences - MD
IP Justice - CA
IsoDicentric 15 Exchange, Advocacy and Support (IDEAS) - OR
Kent State University Libraries - OH
Linda Hall Library of Science, Engineering & Technology - MO
Loyola University Chicago Libraries - IL
Medical Education Online - MI
National Coalition for PKU & Allied Disorders - MA
National Fragile X Foundation - MI
National Tay-Sachs & Allied Diseases Association - MA
New England Biolabs - MA
New York State Higher Education Initiative (NYSHEI) - NY
Oberlin College - OH
Ohio Library and Information Network - OH
Parent Project Muscular Dystrophy - OH
Planetree - CT
Prader-Willi Syndrome Association - FL
Public Knowledge - DC
Public Library of Science - CA
Pseudoxanthoma Elasticum (PXE) International - DC
Scholarly Publishing and Academic Resources Coalition (SPARC) - DC
South Dakota State University, Hilton M. Briggs Library - SD
Special Libraries Association - VA
Spina Bifida Association of America - DC
Students for Free Culture - FL
Swarthmore College - PA
Tourette Syndrome Association - DC
Trinity University Coates Library - TX
Tufts University Libraries - MA
Universities Allied for Essential Medicines - NJ
University of Colorado at Boulder Libraries - CO
University of Connecticut Libraries - CT
University of Kansas - KS
University of New Hampshire - NH
University of Wisconsin – Madison Libraries - WI
University of Wisconsin Oshkosh – Forrest R. Polk Library - WI
Utah Academic Library Consortium - UT
Wayne State University College of Nursing - MI
Williams College Libraries - MA
Y-ME National Breast Cancer Organization -

c/o SPARC • 21 Dupont Circle, NW • Washington, DC 20036 • Tel. 202 296 2296

THE RIGHT TO RESEARCH COALITION
21 Dupont Circle NW Suite 800
Washington, DC 20036

T: 202 296 2296
F: 202 872 0884

www.righttoresearch.org | Access to research is a student right

July 29, 2010

The Honorable Representative Lacy Clay
Chairman, Information Policy, Census and National Archives Subcommittee
Committee on Oversight and Government Reform
U.S. House of Representatives
2418 Rayburn House Office Building
Washington DC, 20515

Dear Chairman Clay,

On behalf of the over 5 million students represented by the Right to Research Coalition, I would like to thank you for convening today's hearing on the issue of public access to research. Public access to the results of federally funded research is an issue of great importance to students at all levels of the American higher educational system.

Rising prices and shrinking library budgets have put the necessary academic journals out of reach for far too many students and the professors who educate them. Not even the most well-funded institutions can afford access to the entire scholarly record, and students at smaller, less well-funded schools frequently have to go without core journals simply because their library cannot afford them. This has led to the current situation where students' educations are based not on what they need to know but, rather, on what they can afford access to.

Public access policies will significantly expand the breadth of resources to which students have access. In today's world where science is becoming increasingly both specialized and inter-disciplinary, ensuring the widest possible access is crucial. Students often only have adequate access to journals in the fields in which their institution specializes, rather than what they need to follow an idea or make a promising new connection.

Finally, community colleges, which represent roughly half of Americans in higher education, are in a particularly difficult position. They must often run on a budget much smaller than that of a typical four-year institution, forcing them to forgo many resources larger institutions take for granted. Public access would vastly expand the resources with which we equip these crucial institutions to prepare students for jobs that are becoming increasingly technical everyday.

Our coalition applauds your leadership in giving the issue of public access the full, public hearing that it deserves, and we hope that you will continue to be a champion for this issue of such great importance to America's students.

Sincerely,

Nick Shockey
Director, Right to Research Coalition

The Right to Research Coalition is an organization of local, national, and international student associations that advocates for researchers, universities, and governments to adopt more open scholarly publishing practices. While continually growing, the coalition currently includes 24 student organizations, collectively representing over five million students and their interest in improving the scholarly communication system.

Members of The Right to Research Coalition:

The American Medical Student Association
California Institute of Technology Graduate Student Council
The Canadian Federation of Students
Columbia University Graduate Student Advisory Council
Cornell University Graduate and Professional Student Assembly
Dartmouth College Graduate Student Council
The International Association for Political Science Students
Library and Information Science Student Association, Simmons College
Massachusetts Institute of Technology Graduate Student Council
Massachusetts Institute of Technology Undergraduate Association
The National Association of Graduate-Professional Students
The National Graduate Caucus of the Canadian Federation of Students
Oberlin College Student Senate
Oklahoma State University Graduate and Professional Student Government Association
St. Olaf College Student Government Association
The Student Public Interest Research Groups
Students for Free Culture
Trinity University Association of Student Representatives
The United States Student Association
Universities Allied for Essential Medicines
University of Calgary Students' Academic Assembly
University of Minnesota Graduate and Professional Student Assembly
University of Nebraska - Lincoln Graduate Student Association
University of Tennessee - Knoxville Student Government Association