

# The future of scholarly publishing

A presentation to SciELO by Glenn Hampson  
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Good morning. My name is Glenn Hampson. I'm the executive director of the National Science Communication Institute. Thank you for inviting me to speak to you today.

As you know, scholarly publishing is an issue that is vital to the future of research and discovery, but that really hasn't received as much attention as it needs.

## What questions should we ask?

First, in order to answer the broad question of what the future of publishing looks like, we need to set a proper frame of reference by asking a long list of smaller questions. For instance:

- What is publishing anyway? What did it used to mean and what does it mean today? Tomorrow?
- What are journals anyway, how prevalent are they, what influence do they wield, and why do they matter to science? What do scientists think about journals? About journal reform? How about funders?
- Why is reform needed? What's wrong with journals anyway? Are these problems cosmetic, technological, systemic, institutional, connected (i.e, how fixable are they, can these repairs be prioritized, and do we need 100 one-off adjustments or just a few major ones)?
- What might be the possible impacts of publishing reform? How about the unintended consequences?
- What is changing now? Who is doing what and how successful are they so far? What influence will the market have in determining winners and losers?
- What are the prospects of widespread change happening anytime soon?

## The current state of publishing (overview)

There are many “broken” aspects of publishing---some that are legitimately dysfunctional, others that simply need improvement, and others that are only broken depending on your perspective. The table here lists just a few of these in very general terms. This list is just meant to be illustrative; cataloging the full litany of problems and solutions is well beyond the scope of my presentation here, so we’ll need to just suffice it to say that there’s a lot of activity going on at the moment.

## What does the future look like (the short answer)?

How should we answer these questions and how should we view the reform efforts that are happening? The short answer (since I only have 20 minutes of your time), is “it depends.” Specifically, it depends on:

- *who* you ask (except for the history of publishing question, different disciplines, institutions and stakeholder groups can have markedly different views of what should and will happen)
- *when* you ask (the answer is changing almost constantly)
- *what* you ask about (some parts of publishing are changing, some aren’t)
- *why* you ask (different problems--saving money, for instance---have different solutions)
- *where* you ask (different regions and institutions have different approaches)
- *if* you ask this as a realist or an idealist (realists will say that nothing will change without publishers leading the way, idealists will say that publishers are the problem and that society has a moral obligation to reform publishing)

## The future: A longer answer (10 key points)

The longer answer can be summarized with these 10 key points (these were developed by the OSI2016 delegation; I’ll describe later on what “OSI” means):

1. Scholarly publishing is changing, and this presents opportunities and challenges.
2. Some of the change that is happening involves shaking up the current system to utilize publishing tools and approaches that may be better suited to an Internet-based information world. But not all current and needed changes fall into this category. Indeed, some of the most needed changes do not.
3. Some change will need to involve reforming the ancient, stagnant communications culture inside academia, where old publishing methods, measures and perceptions drive author choices and are used as proxies for merit when evaluating grant awards and tenure decisions. And some will need to involve examining our own biases that publishing is a binary proposition involving either open or closed, subscription or green, right or wrong. Open, impact, author choices, peer review and other key concepts all exhibit a range of values. Creating new, non-binary measures for some of these values (as proposed by several workgroups) may be helpful insofar as allowing stakeholders to focus on improving areas most in

need of change, and comparing progress and best practices across disciplines, institutions, publishing approaches, funders, and so on.

4. Any widespread change is going to require a widespread, coordinated effort. There are simply too many stakeholders with different interests and perspectives who influence different decision points. No single stakeholder or group will be able to affect this kind of change unilaterally.
5. Additionally, we don't have a clear, coordinated action plan for improving open. What needs to happen today, tomorrow and the day after? Who are the actors, what are the mileposts, what are the likely impacts, and how do we measure success?
6. How do we make these reforms in response to needs and concerns of authors rather than in spite of authors?
7. How do we make changes across disciplines (which have different needs) and that also effectively build on the efforts of the many stakeholders in this space?
8. How do we reform the system without losing its benefits?
9. How do we move from simply repairing dysfunction to creating a more ideal publishing world and reaping the benefits that such a world could provide in terms of participation, efficacy, efficiency, and discovery?
10. More standards and norms would be helpful as we move forward, as well as answers to a number of key questions.

## The future: An even longer answer

But to get a really complete answer you need to take a step back and look at the whole ecosystem of scholarly communication.

1. Journal publishing itself fits inside a large and complex science communication ecosystem, and this ecosystem is poorly defined and understood, and also evolving through a variety of disconnected efforts and initiatives. As science communication goes, so goes journal publishing.

And how you determine where science communication is going this really depends on what you do for a living. If you're a journalist, science communication means writing and reporting about science. If you're Alan Alda's Center for Communicating Science, it means trying to improve the way that scientists talk to the public. If you're scholarly communications specialist at a university, it means improving access to research materials produced at your institution and ensuring it can be widely shared and disseminated. If you're a special interest advocate---maybe your concern is climate change or medical research---it means working to ensure that critical information is shared quickly and effectively in science and with policymakers and the public. It's the proverbial case of blindfolded people trying to describe an elephant: Science communication means many things to many people, including but not limited to science writing, STEM education, science marketing, science policy, collaboration, informatics, study design, and tech transfer. There is no one all-encompassing description, no one course of study that prepares someone for a career in science communication, and no right answer for how to improve science communication. Fortunately, all of these endeavors are connected. They all have a common goal to improve science through more effective communication. Our failure to connect these efforts to-date so they can work together more effectively has had and will continue to have ramifications for education, public policy,

even discovery, and it's one reason why the National Science Communication Institute was started---to help connect the dots and help science communication reach its full potential so it can help remedy these impacts. Science journals are just one part of this ecosystem--- of critical importance inside science but certainly less visible to "outsiders" and well off the radar of most funders who want to help reform science communication but are backing just limited efforts like science writing or science education.

2. While it is growing and transforming, science communication is struggling to adjust and respond to a society that:

- is creating massively more information than ever before in its history---the increase is on an exponential growth curve
- is pushing for better access everywhere (e.g., more free, open content )
- has lost faith that science is above reproach ,and
- has less and less confidence that science can is providing reliable answers.

I'll talk about the growth in journals in a moment---which really pale in comparison to the growth of information in general but that's sort of a separate talk altogether. As for our push for open, the world is becoming more open everywhere—open research, open government, open data, open source code, and so on. However, in at least in one of these areas—open research—there is growing tension between the desire to see more open content in the world, and the reality of how this is going to happen quickly and on a large scale. So many systems in research are interconnected and depend on the status quo—peer review systems, tenure and promotion practices, embargo policies, the use of impact factors, the metrics of funding decisions, data protection and competition in research, and so on. Simply "switching" to open is an unfunded and untested mandate, and will require not only institutional changes, but changes in the culture of academia, government policy, and research itself. Indeed, there is resistance to (or at least misunderstanding of) change inside research and even a fear among many that this change will cause harm. But change is coming. More and more funders are mandating open policies, as are governments and a growing number of universities. How can this change be coordinated so that researchers aren't caught in the crossfire of complying with new communication requirements that may not be in their best interests and that may also move in a different and even competing directions? A number of high ranking research officials have expressed concern that this cacophony poses a threat to research and that solutions need to be developed immediately.

I don't have time to go into much detail on points 3 and 4. The retraction crisis of the past few years, which I'll mention later, has certainly played a role in damaging the public's confidence in science. So too is the branding problem that science has. We live in a world where the moniker of science has been appropriated---and unfortunately, misappropriated as well---by many fields wishing to look more "scientific" by tacking on ornaments like equations and studies of some sort to gloss over conclusions that are anything but rigid. And the net result has been dilution of the science brand. Public confidence in science has been eroded by a long parade of broken promises regarding how many eggs we should eat, whether sugar is good or bad for you, how much television our kids should watch, whether product x is better than product y because it has been "scientifically proven" to be better, and on and on. In the

popular media, there is often no distinction between “soft” science and “hard” science---the discovery of the Higgs Boson particle, for instance, or new planets around nearby stars---and so over time, people internalize these false equivalencies and begin to question whether all scientists really know what they’re talking about. “Why not keep smoking, skip vaccinations, and keep driving a car that spews smoke out its tailpipe? Scientists really don’t know what they’re talking about anyway.”

3. Whether and how journal publishing transforms depends in large measure on whether and how journal publishing can respond to these broader societal forces, and do so in a way that is broadly and quickly adopted and makes sense for authors, science, the marketplace, funders and policymakers, and for the culture of communication in science. It’s a complicated puzzle.

## Struggling to adjust: Growth

The growth of legitimate journals is another issue for several reasons. There are somewhere around 30,000 scholarly journals at present (no one knows the exact number) that publish about 2 million articles per year. The rate of growth of articles has been a constant 3.5% per year for the last 350 years, on average, but even this steady growth results in a doubling of the amount of published content every 20 years. The growth rate driven by a mix of factors---not clearly related to markets, political influences, or research and development spending, but probably more related to the number of active researchers. More researchers means more publishing. That said, the number of publications has increased exponentially in recent years due to a number of factors, including the increasing specialization of science, the internationalization of research, and changes to the publishing industry itself over the last 30 years (with lower barriers to entry due to desktop publishing and the emergence of the Internet). What challenges does this increase present for the future of journal publishing?

## Struggling to adjust: Growth (continued)

How do we reliably vet all this information? The explosion in content poses at least an existential threat to science in terms of outright fraud and replicability issues.

Is it a big issue? Not if measured by retraction rates, anyway. Out of the 2 million articles published last year alone, everywhere in the world, in every language and on every subject it’s possible that only 75 or so—or 0.005 percent—were retracted for a variety of reasons, and not just fraud. Journal articles were also retracted because of errors, duplication, plagiarism, ethics violations and other causes, and the retraction rates in biomedical research were higher than in most other fields, and varied by geography as to the specific causes. That’s like walking into the largest bookstore in your state, and in this wall-to-wall mass of published work covering acres of shelf space on every subject known to man, finding just seven books that contain suspect information, plagiarized passages, or calculation errors. This might be touted as an impressive statistic in most circles, not a dire warning. Indeed, what makes these particular findings even less newsworthy is that in 2012 (for example), a mere 38 labs with five or more retractions each accounted for 44% of the total number of retractions due to fraud or suspected fraud (390 cases

out of 889), and 17 researchers with 10 more retractions accounted for fully 37% of the total (325 cases). What's more, the definition of fraud is broad and include everything from "conclusions set forth...cannot be relied upon" to "critical data can't be reproduced," to "errors in calculations," to contaminated samples, inappropriate data collection methods, ethics violations, and more. Added to this, retractions didn't even exist before 1975; there is more robust oversight and protection capacity of today's science with the far less developed systems of 36 years ago.

Still, the "retraction crisis" stirred up a lot of negative press, which only further eroded public confidence in science and played into the hands of policymakers who need more reasons to fight against climate change legislation. Also, its possible that what we're seeing is only the tip of a much larger problem (psych studies were recently criticized for their lack of replicability, although an analysis of this by the Center for Open Science has since been criticized), and we need to be cognizant of this. This is because there's a new threat to science from journal publishing fraud---fake science, journals that publish bad science for a fee, and journals that repackage plagiarized journal articles for a fee. Why? Because there's money to be made, and because of the cache involved in being published.

## **Struggling to adjust: Growth (continued)**

- How do we make sense of the information overload?
- How do we combat information underload, where lower resource areas and institutions aren't getting the information they need to succeed?
- How do we reliably vet all this information? Our peer review systems are not up to the challenge, and the sheer number of publishers means there will certainly be more players who see an opportunity to make money at any cost.
- How do we reliably categorize all this information and provide guidance about which venues are good and which aren't. Impact factors are the current method, but these have come under heavy criticism for their poor methodology and the perverse impact these factors have on funding and tenure decisions.
- How do we ensure that what's being published is useful and readable? This question goes beyond just trying to move increasingly toward an international lingua franca in science (English appears to be the standard). It also means trying to ensure that the studies that get published are helpful and not just gibberish for the sake of being publishing, that these studies are actually readable---there is a "journal speak" expectation in science writing which requires multisyllabic obfuscation where plain language would be just fine (the internationalization of science and the fact that there are more multiple-author papers now than in the past is also impacting this evolution of readability)---and whether they are being shared and read.
- What do we do about costs, as more journals means more subscriptions are needed? The pressure of subscriptions is weighing heavily on even the richest libraries? For this reason there's been a global move toward open (and accompanying tensions). The move toward open is not

limited to “open access” in scholarship. We live in an increasingly open society, and this expectation that everything should be free has played a leading role in the slow death of journalism. So open is coming. But it will have consequences, both good and bad, and universities need to be convinced about the benefits of open, what it means in practice, what it means to faculty and researchers, and so on. Universities will not jump blindly into the unknown--they are very conservative institutions--which is why the open access movement, while important in raising our collective consciousness about this issue, has succeeded in making only 15% of academic content freely and immediately available over the last 15 years. The movement can do more, and needs to do more, but it will take more thinking about how to get there from here.

## Struggling to adjust: More open

More subscriptions means more costs, which are taxing even the wealthiest library systems into submission. What can be done about this?

- Rethink subscription bundles?
- Make pricing more transparent?
- Make more open options available?
- Make more open options available? The growth rate of open isn't strong (about 15% of journal content is open after 15 years of advocacy for this approach). With a “global flip, subscription journals could be “flipped” to free, open journals if universities and research funders agree to pay the publishing costs up-front instead of after the fact through subscriptions, which in theory would accelerate the global move toward open. Critics question whether there's enough competition in the system to actually make this happen, though, since about 45% of the journal publishing market is controlled by only six publishers), and even what incentive publishers would have to do this---unless they could make at least as much money as before.
  - There are many other loose ends here: what kinds of open are we talking about (is there an open spectrum), what are the measured economic impacts of open, what is the moral case for open weighed against the business case (yes, information should be free, but at what cost), what are the usage dimensions of open---who needs it and why and where's the proof it's being used as envisioned---and importantly, who should decide these issues? Libraries? Open knowledge groups? Governments? Through what process. And how do we ensure participation in the new system (indeed, how do we ensure that what we're doing is what's needed?).

## Struggling to adjust: Faith & confidence

Restoring public confidence in science is perhaps the seminal challenge of science communication and science journals. It will take a village to make this happen:

- Democratize science by making information much more readable and understandable, and also take time to explain its relevance, not only for the benefit of the public and policymakers, but also for other scientists (who if hard pressed would also admit that it's hard to understand most articles), with a particular focus on doing a better job of explaining what science is and is not (to help rebuild the science brand and public confidence in science)
- Make information more discoverable (whether through more open, more use of institutional repositories, a wider variety of non-journal summaries in blog posts and so on), both to help with discovery but also to help combat our information overload issues
- Support approaches that combat underload without violating copyright like SciHub
- Make information more complete (including datasets, for instance) and more comparable so we can connect the dots better within and between fields.
- Do a better job of making the case for open with universities---the challenges ahead should not be divisive and partisan. There are practical concerns that need to be discussed and addressed, and the sooner we can do this and come up with solid answers and practical approaches the better for everyone---publishers, scientists, and society.
- Connect science communication efforts to improve their efficiency, visibility and impact
- Connect journal reform efforts so the global community is involved. See the next slide.

## The key to the future: Make sense

Finally, it's important to note that for all the activity that surrounds publishing reform and concerns about reform, the reality is that nothing can happen and change cannot be sustainable unless it makes sense:

- for authors (do authors want these changes? How will these change impact their recognition, funding, promotion, and so on?)
- for science (is this what science needs? In all fields? Will these reforms help or hurt science? This needs to be the first and last question we ask.)
- the marketplace (publishers need to be part of these reforms. Mandating reforms that publishers won't follow is simply creates chaos---the system is already filled with lots of unenforced and unenforceable "mandates" regarding manuscript deposits and such)
- for funders and policymakers (are there reforms good policy?)
- and for the culture of communication in science (can these reforms be achieved?)

## The Open Scholarship Initiative

The Open Scholarship Initiative is the only such effort trying to build the future of journal publishing with a global, collaborative approach. Why is collaboration needed? What proof is there that collaboration



will succeed? On the one hand, it's clear to many people who have followed the changes happening in scholarly publishing over the years that much tension and uncertainty currently exists. Having a forum where issues can be discussed that reach across stakeholder groups is critical, as it is with many other societal concerns. Imagine OSI's approach to improving scholarly publishing as being akin to auto manufacturers needing to establish common standards, or environmental regulators working toward common goals with a wide variety of stakeholders in the private sector, state and local governments, and federal and international governments. In scholarly publishing, a variety of independent stakeholders are independently working to create a similar class of products that should ideally be interoperable and that have significance to society—the production of knowledge of consequence to medical research, industry, environmental protection, and so on, using public money in most cases. This information isn't entertainment, nor is the type of information we're likely to easily find in newspapers or online (without access privileges), but research that we've invested in, that we monitor, and from which we increasingly expect to receive a return on investment. And in the production of this good, we have no universal guidelines—no coordinating body that says how it will be done, where it will be stored and preserved, how it can (or can't) be used, and so on. Ensuring that this process has reasonable guidelines that protect the benefits owed to society is the best way to protect the outputs from this system. So, to create these guidelines—or at least to begin having this conversation—we need to create some kind of working group, some kind of representative body or forum that can work toward developing a system of joint responsibility for its proper care and development.

For the print version of this presentation, I'll include a broad overview of OSI. For more information, go to the OSI website at [www.osinitiative.org](http://www.osinitiative.org):

Different stakeholder groups—universities, researchers, commercial publishers, funding organizations, scholarly societies, libraries, governments, open access advocates and so on—have focused on improving scholarly communication for many years now but generally as interest or industry groups and not as a broad stakeholder community. Because of the scope of impact of scholarly communication and because there are so many divergent perspectives on this issue—by stakeholder group, discipline, country and more—many have concluded that coming up with a broad, large-scale, collaborative, global approach to scholarly communication issues is vitally important, now more than ever, not just to protect the future health of research but also to ensure that the solutions we adopt today won't widen the information access gap that already exists between wealthy and developing regions of the world (and indeed that ideally, global efforts will help close this gap and help sustain a more equitable future for information access).

The Open Scholarship Initiative (OSI) was developed to address this need. The objective of this effort is to build a new and robust framework for direct communication and cooperation among all nations and stakeholders in order to improve scholarly communication, beginning with

scholarly publishing and the issues that surround it—and to the extent possible to help usher in common understanding and achievable, sustainable solutions and the capacity to work toward these solutions together. To accomplish this, OSI, which has been developed in partnership between the National Science Communication Institute (nSCI) and the United Nations Educational, Scientific and Cultural Organization (UNESCO), has created a large community of high-level delegates from stakeholder groups around the world and convened this community in extended conversations, meetings and collaborative efforts—executive officers from key groups chosen to represent a cross-section of interests and opinions, authorized in most cases to speak on behalf of their institutions and in a position to reach agreements and push forward change.

These leaders are currently interacting on four levels to negotiate the future of scholarly communication and publishing: (1) On the OSI listserv (with 350 scholarly communication executives from around the world), ideas and perspectives are constantly being exchanged. This listserv is the main communication tool for this group—and the only direct line of communication between some stakeholders; (2) Listserv members choose important questions and projects to work on—for instance, how to improve peer review—and work together as part of interdisciplinary teams (publishers, librarians, policy officials, open knowledge advocates, funders, etc.) to develop approaches for the full group to consider. The project manager, the National Science Communication Institute, provides a technical and management capacity to help roll out the solutions proposed by workgroups and approved by the full OSI group; (3) Annual meetings (the first was held this past April) provide an opportunity for these different leaders to discuss issues face and face, and get to know each other better; and (4) In addition to these measures, there are a number of important research questions that are being funded by OSI and that exist in parallel with OSI’s work—including but not limited to determining the impact of embargoes on journal subscriptions and the economic impacts of open.

The first meeting of this group happened this past April (OSI2016). Meetings are just one part of the overall OSI strategy, which consists of a continuous 10 year-long effort to expand perspectives, explore options, build partnerships with the many other groups who are also trying to affect change in these areas, research answers and fix problems, punctuated by annual meetings to build new bridges and dig more deeply into key issues. A central tenet of OSI’s still-evolving program will be to help figure out how these different groups and voices can work effectively together to rapidly achieve common goals and actionable, sustainable solutions. Improving the global reach of OSI will also be important in this effort: OSI is not yet to the point where it is truly global or inclusive process—more work remains to be done but this effort is off to a strong start.

The goal of OSI is to help make significant improvements scholarly communications quickly—not to help eventually nudge along marginal change, but to help make broad, significant, sustainable

change in a reasonably short period of time. Toward this end, it's important to acknowledge first and foremost that everything that happens as a result of the enhanced communication between stakeholders that happens as a result of OSI is win—even the conversation itself. That these groups are agreeing to communicate at all—OSI2016 was just a first step—shows that there is broad acceptance of the merit of this general approach, but the exact mechanisms for what comes next and how have yet to be considered and approved by the full OSI assembly.

It is also important to understand that OSI is not trying to supplant or surpass existing reform efforts. Indeed, one of the goals expressed by several OSI2016 workgroups was to try to integrate OSI quickly into the fabric of existing stakeholder groups to figure out how this effort can add value.

Over the short term, then, this project will benefit the open science effort by creating a framework where inclusive, widespread, sustainable, and rapid change can be negotiated and implemented instead of continuing with the current polarized environment where unpopular change is being slowly adopted on a limited scale. Eventually—whether OSI ends up taking three years or ten—we hope this effort will improve the scholarly communication landscape for everyone by:

- Achieving open goals faster and on a more predictable trajectory by bringing all stakeholders to the same side of the table to push together toward their common goals (while continuing to work out their differences on tangential issues),
- Creating multiple platforms for working on scholarly communication improvements together as a broad stakeholder community (these platforms will expand as OSI's ability to collaborate and communicate increases),
- Increasing the efficiency and effectiveness of stakeholders by facilitating the development of a common roadmap of goals, policies, and standards in scholarly communication, and
- In the end, increasing the amount of science information available to the world and the number of people who can access this information.

## What will happen?

I've told you what might happen and why. Here's what *will* happen:

- Other forms of recording will continue to emerge and be tested as technology supports these changes—for instance, e-notebooks that archive a full accounting of lab notes and data, open data repositories that will help better integrate study data instead of just the summaries of data that are written in journal.

- Science journalists play a critical role in selecting and “translating” science for the public. But as the amount of published material increases in science and the number of science journalists decreases, journalists are handed an increasingly impossible task in this regard. There will eventually need to be some other way more realistic way of transmitting important science information to the public. In the meantime, journalists will continue to struggle in the short term.
- The current state of journal publishing is healthy---the major publishers turn a healthy (and much maligned) profit, and the market is supporting a lot of innovation. As mentioned, of course, subscription costs are an issue, and there are many other issues with the system. But journals themselves have an important credentialing and filtering role in science. Will some other format emerge that handles these responsibilities? For instance, what if peer review was handled elsewhere and not by journals? What if some sort of field-wide ranking systems evolve that could help determine the importance of a piece of research instead of determining this by which journal handles publication and/or which study gets the biggest grants? If this happened---say in an “All-Scholarship Repository” type of system where all research articles everywhere are deposited, then publishers would be removed from the middle of the publishing and vetting process and would instead be forced to compete for content, which might result in lower prices for journals and even paying royalties to authors. But this is decades away if it ever happens. Over the short term, the most important journals will remain king. And it’s important to recognize why this important---it’s not just market inertia, but market need. If publishers disappear in a brave new world, what will our creation system will look like without some sort of credible filter? Can you imagine what news would look like in such a world? Already we can, with the emergence of “fake news” this past year and its role in swaying the US presidential election. In response, Facebook and Google will be taking an active role in delegitimizing fake news sites (by withholding ad revenue, for instance). Do we think science would be immune to these same forces? Without publishers, science would be overrun with fake science, and the damage to real science would be incalculable since science is built on itself.
- But publishing is not immune from change. It needs to continue to evolve to become more responsive to the changing world of publishing and changing needs and demands of authors. It is changing already, of course---just in twenty different directions at a thousand different institutions. It will take time to see how this all settles. In the meantime, it will be important for the world of science to maintain some reliable channels with predictable practices. Print will stick around, open options will continue to grow, authors will continue to have more choices, and other science communication channels and practices will continue to evolve, but over the short term certainly, publishing as we now know it will continue to exist and thrive.

- Issues and services that are peripheral to publishing will change and evolve: embargo periods, peer review systems, impact factor measures, institutional repositories and “domes” that connect repositories, libraries, subscriptions, and so on---but not publishing itself. In this respect, SciELO is exactly where the future is headed and SciELO’s work is extremely important: serving as a filter to help organize and categorize science and provide some stamp of authority for what is good science and what is not, editing to make science more readable and ensure that more science is available to the world in English, coordinating the transition of publishing to tech platforms and otherwise improving the interoperability of science, and more.

## In conclusion

I’m afraid I may have left you with more questions than answers here, or at least very vague and unsatisfying answers. Maybe that’s fitting---science appreciates equivocation. I think the next five years will tell us a lot---whether we’re going to see only modest changes at the margins, or some wholesale push toward radical change. Inertia is on the side of the former, but an up and coming generation of young researchers who are digital natives and who have come to expect that information should be free (or least more free) are on the side of the latter. My brain is betting on inertia, but my heart is with the natives. Hopefully, OSI will make progress soon where everyone will win.

Sincerely,

Glenn Hampson  
November 2016