

Report on Open Access Publishing for the Research and Scholarship Committee of the Faculty Senate with Recommendations

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Executive Summary

In this report, we discuss the need for the University of Houston to take an active role in managing open access (OA) publishing for the faculty and librarians.

OA Publishing: Open access publishing refers to papers that lack fee and usage barriers. If the publisher provides free access to the papers, it is referred to as Gold OA. If the authors provide free access to the papers, it is referred to as Green OA. Author provided Green OA typically occurs when the authors deposit their work in open repositories, often in a preprint format. In OA publishing, there may also be barriers for the use of the published work. OA Gratis refers to published works that are free to read, but have copyrights that restrict the manner that the work can be used. In contrast, OA Libre includes less restrictive copyrights that allow for a wider range of fair usage of the published works. The Creative Commons Attribution 4 (CC BY4) copyright license provides very broad usage rights, with fair attribution. Many publishers are now allowing CC BY4 licenses for published works.

OA Policies from Funding Agencies: Federal and private agencies are increasingly requiring publications resulting from their grants to be published in an OA format. This includes the NIH, NSF, DOE, and DOD. Each agency has somewhat different requirements, but a Green OA model currently satisfies all. An OA Gratis model currently satisfies most, but not all agencies. There may be a trend for increasing the requirements for OA Libre models that allow for further analyses of data.

Faculty Use and Understanding of OA Publishing: To assess the state of OA practices and understanding, UH librarians Santi Thompson and Christie Peters conducted a survey in 2015 of 87 faculty from around campus. Currently there appears to be confusion regarding the importance and need of UH faculty to publish in an OA format. In the Colleges of Engineering and Technology, only 27% of faculty felt OA is somewhat to very important in their fields. In NSM, 95% of faculty thought OA publishing is somewhat to very important. Yet it appears likely that many faculty publish sponsored research in a non-OA format.

Peer University OA Practices and Policies: Many of our peer and aspirational Universities have OA policies, or are in the process of developing policies. Several of these Universities have developed funds to help faculty and librarians cover the costs associated with OA publishing models.

Threats and Benefits to UH from OA Publishing: The move to OA models by many publishing houses and scientific societies has pushed the financial costs from subscriptions to author publication charges. Although faculty can include these costs on their grants, the publication frequently comes after the grants have expired and the funds are no longer available. This creates a strong threat of non-compliance with the funding agencies.

UH stands to gain in recognition for high quality scholarship by increasing its compliance in OA publishing. Papers published in an OA format have an increased reach, especially among

non-academics such as policy makers and journalists. This increased reach allows for an increase in recognition for faculty and the University as a whole. Adopting an OA policy that supports faculty compliance will achieve the possible gains of OA, while addressing the threats of non-compliance.

Recommendations: We recommend that a task force be created to develop a comprehensive Open Access Policy for the University of Houston. A component of this policy should be Green OA access for almost all published academic works. The task force should be composed of major stakeholders including but not limited to representatives from the RSC, DOR and University libraries.

We further recommend that 1) a service within the UH libraries is established to assist faculty members in understanding their rights and responsibilities, 2) the library repository currently used for dissertations be expanded to allow deposition of all academic published works, 3) a fund be established to help faculty comply with OA publishing policies of their funding agencies.

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I. What is Open Access Publishing?

Open access publishing is part of a movement to strengthen the structural and legal accessibility of literature that is to be used for the public good. This international movement gained significant traction from the Budapest Open Access Initiative in February of 2002, the Bethesda statement on Open Access Publishing in June 2003, and the Berlin Declaration on Open Access to Knowledge in the Sciences and Humanities in October 2003. Subsequently, US federal policies have mandated open access publication for work funded by certain US funding agencies.

A widely used definition of open access publishing resulted from the Budapest Open Access Initiative:

“By “open access” to [peer-reviewed research literature], we mean its free availability on the public internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. The only constraint on reproduction and distribution, and the only role for copyright in this domain, should be to give authors control over the integrity of their work and the right to be properly acknowledged and cited.”¹

Hence, literature that is open access lacks barriers for availability and use, is free on-line, is digitally available, and largely free of licensing and copyright restrictions. The absence of these barriers is of great importance to scholars and researchers since it provides a wider audience, and may increase the impact of their published works.² This increased access is also strongly advantageous to most fields of research as it facilitates more rapid advancement. Lastly, free access relieves institutional libraries from the financial burdens of expensive subscription fees.

Open Access publishing is further defined as Gold OA or Green OA depending on who provides the access.³ In Gold OA the publishers provide free access to the published manuscript through their own website. Publishers typically recover income from lost subscription and pay-for use downloads through Author Publication Charges (APCs), which can cost the author as much as \$5,000/article. In Green OA the author provides access to the published work, typically through a publicly accessible digital repository. These digital repositories may be hosted by the author's institute, by a society, publishing house, or websites such as ResearchGate and Academia. However, in order to deposit an author's manuscript in a publicly accessible digital repository, the author must have the legal rights to do so, and frequently these rights are transferred to the publisher as a condition of publication. Publishers vary widely in the rights they will grant back to authors. In some cases the author may only upload a preprint of their manuscript, and even then only after a variable embargo period. The author may also, in some

¹ Open Society Institute, “Budapest Open Access Initiative,” accessed on November 30, 2015, <http://www.budapestopenaccessinitiative.org/>.

² Xianwen Wang, Chen Liu, Wenli Mao, and Zhichao Fang, “The Open Access Advantage Considering Citation, Article Usage and Social Media Attention,” *Scientometrics* (2015). DOI: 10.1007/s11192-015-1547-0.

³ Peter Suber, *Open Access* (Cambridge, Massachusetts: The MIT Press, 2012).

cases, be prohibited entirely from uploading any version of the published work. Many publishers expect profits from subscriptions or pay-for-use downloads from these works.

The problem of copyright ownership and the limited rights provided to authors to distribute their own work is compounded by current requirements from several federal and foundational agencies to publish funded work through either Gold OA or Green OA mechanisms. Hence, a legal conflict can easily manifest between what an author is compelled to do by funding agencies and what they are permitted to do when they publish in professional journals. To solve this conflict, authors need to give up significant portions of their research budget to publish in Gold OA journals, or they need to navigate the complex terrain of Green OA permissions.

Open Access is also further defined by the rights provided to the user of the published material.⁴ In OA Gratis, the publications can be read free of charge, but no rights of usage are conveyed to the reader. In contrast, OA Libre removes the price barrier for reading and also some permission barriers for fair usage. OA Libre incorporates a range of usage agreements, in which the copyright holder can waive some rights of usage, while retaining others. For example, the copyright holder may allow the reader to distribute the work and use it in their own work provided the user provides credit to the author. Additional restriction may include free use for non-commercial work, but no derivative works, etc...

		How Is OA Delivered?	
How Open is it?	Gold Gratis	Green Gratis	
	Publisher Provided Free Access, but Usage Barriers	Author Provided Free Access, but Usage Barriers	
	Gold Libre	Green Libre	
	Publisher Provided Free Access & Selected Usage Barriers	Author Provided Free Access & Selected Usage Barriers	

Figure 1: Open Access Classifications.

⁴ Peter Suber, "Gratis and Libre Open Access," *SPARC Open Access Newsletter*, August 2008, <http://sparcopen.org/our-work/gratis-and-libre-open-access/>.

To clarify usage rights in OA Libre, many publishers use Creative Commons Open Licenses, which reserve some rights for the copyright holder. Creative Commons is a non-profit organization that provides free for use licenses with wide variety of retained rights.⁵ *It is currently easier for publishers than authors to apply Creative Commons licenses to published works.* One of the most common licenses currently in use is the Creative Commons Attribution BY 4, which provides the user the free rights to share and distribute the published material in any medium or format, the rights to adapt the work and transform or build upon it for personal, professional or commercial purposes, but requiring appropriate credit to the creator be provided and with an indication of how the work has been transformed.⁶ Among other benefits, this license allows researcher the right to mine data in published works, with appropriate attribution.

II. Federal Policies on Open Access Publishing

In a February 2013 memorandum,⁷ the White House's Office of Science and Technology Policy (OSTP) charged federal agencies with developing strategies and mechanisms for making data and scholarship derived from federally funded research more accessible to the public. The memorandum directed agencies with over \$100 million in annual research and development expenditures to require fundees to make published articles available in open access repositories. Additionally, the memorandum instructed researchers to devise data management plans to better account for data produced by federally funded research.

Since the release of the OSTP memorandum, multiple federal agencies have established their own approaches for complying with the mandate for open access. A majority of agencies require open and free access to publications within one year of publishing articles.

Table 1: Selected Agencies' Public Access Policies⁸

Agency	Publication Mandate
National Institutes of Health	Authors must submit final, peer-reviewed journal manuscripts to PubMed Central. ⁹

⁵ See <https://creativecommons.org> for more information.

⁶ Creative Commons, "Attribution 4.0 International," (2016): <http://creativecommons.org/licenses/by/4.0/>.

⁷ John P. Holdren, "Increasing Access to the Results of Federally Funded Scientific Research," Executive Office of the President, Office of Science and Technology Policy, (February 22, 2013): https://www.whitehouse.gov/sites/default/files/microsites/ostp/ostp_public_access_memo_2013.pdf.

⁸ Adapted from Columbia University Libraries, "Public access mandates for federally funded research: implementation plans," Center for Digital Research and Scholarship (January 2016): <http://scholcomm.columbia.edu/open-access/public-access-mandates-for-federally-funded-research/>

⁹ National Institutes of Health, Plan for Increasing Access to Scientific Publications and Digital Scientific Data from NIH Funded Scientific Research (February 2015): <http://grants.nih.gov/grants/NIH-Public-Access-Plan.pdf>

National Science Foundation	Authors must submit either the version of record or the final accepted peer-reviewed manuscript to the Department of Energy's Public Access Gateway for Energy and Science (PAGES) repository in PDF/A format that should be available for download, reading, and analysis free of charge no later than 12 months after initial publication, with machine-readable metadata available at initial publication. ¹⁰
Department of Energy	Discoverability and access to version of record publications will be made possible through the portal and search interface tool, the Public Access Gateway for Energy and Science (PAGES), and in cases where the publisher-hosted version of record is not publicly accessible, the DOE will provide access to accepted manuscripts in publicly accessible repositories, of which the DOE's OSTI repository may be one. ¹¹
Department of Defense	Authors must submit final, peer-reviewed journal manuscripts to the Defense Technical Information Center (DTIC) system upon acceptance for publication. ¹²

For more information on other agency requirements, including mandates for data collection and access, see Columbia University Libraries' [Public access mandates for federally funded research: implementation plans](#)

Private foundations have also developed open access policies for publications and data.

Table 2: Selected Foundation's Public Access Policies¹³

Foundation	Publication Mandate
American Heart Association	"The AHA requires that all journal articles resulting from AHA funding ("outbound" research) should be made freely

¹⁰ National Science Foundation, "Today's Data, Tomorrow's Discoveries: Increasing Access to the Results of Research Funded (Executive Summary)," <http://www.nsf.gov/pubs/2015/nsf15051/nsf15051.pdf>

¹¹ Department of Energy, Public Access Plan (July 24, 2014), http://energy.gov/sites/prod/files/2014/08/f18/DOE_Public_Access%20Plan_FINAL.pdf

¹² Department of Defense, Memorandum on the Public Access to the Results of Department of Defense-Funded Research, <http://dtic.mil/dtic/pdf/PublicAccessMemo2014.pdf>

¹³ Adapted from Columbia University Libraries, "Private foundations requiring public access," Center for Digital Research and Scholarship (2015): <http://scholcomm.columbia.edu/open-access/private-foundations-requiring-public-access/>.

	available in PubMed Central within 12 months of publication.” ¹⁴
Bill & Melinda Gates Foundation	“All publications shall be published under the Creative Commons Attribution 4.0 Generic License (CC BY 4.0) or an equivalent license. This will permit all users of the publication to copy and redistribute the material in any medium or format and transform and build upon the material, including for any purpose (including commercial) without further permission or fees being required. All publications shall be available immediately upon their publication, without any embargo period.” ¹⁵
Ford Foundation	“Effective February 1, grantees and consultants will be required to make foundation-funded materials subject to a Creative Commons license allowing others, free of charge and without requesting permission, the ability to copy, redistribute, and adapt existing materials, provided they give appropriate credit to the original author... By moving to broadly disseminate a large amount of educational and research materials resulting from its funding, the foundation hopes to make its work and the work of its grantees more accessible and, ultimately, increase its impact.” ¹⁶

III. State of Open Access at the University of Houston

The University of Houston does not currently have a policy for open access publishing, nor does it administer a fund that is dedicated to help faculty and librarians with insufficient funds to publish in an open access format. Furthermore, the University of Houston does not currently have an office that is dedicated to help faculty with questions regarding open access publishing requirements, copyrights, and their rights to provide copies of their work in public repositories.

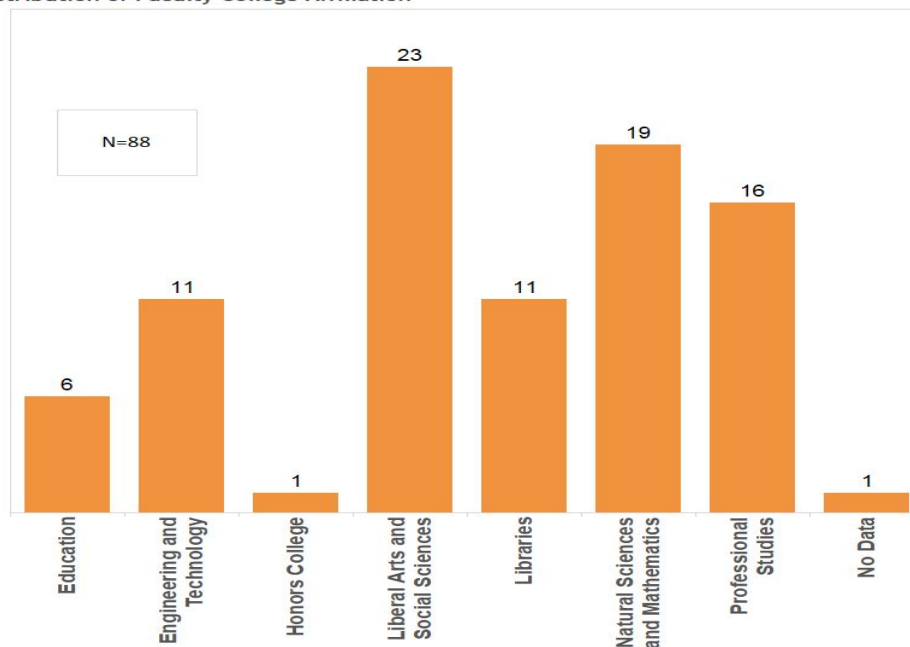
¹⁴ American Heart Association, Open Science Policy Statements for AHA Funded Research (July 16, 2015), http://my.americanheart.org/professional/Research/FundingOpportunities/Open-Science-Policy-Statements-for-AHA-Funded-Research_UCM_461225_Article.jsp

¹⁵ Bill & Melinda Gates Foundation, Open Access Policy, <http://www.gatesfoundation.org/how-we-work/general-information/open-access-policy>

¹⁶ Ford Foundation, “Ford Foundation expands Creative Commons licensing for all grant-funded projects” (February 3, 2015): <http://www.fordfoundation.org/the-latest/news/ford-foundation-expands-creative-commons-licensing-for-all-grant-funded-projects/>

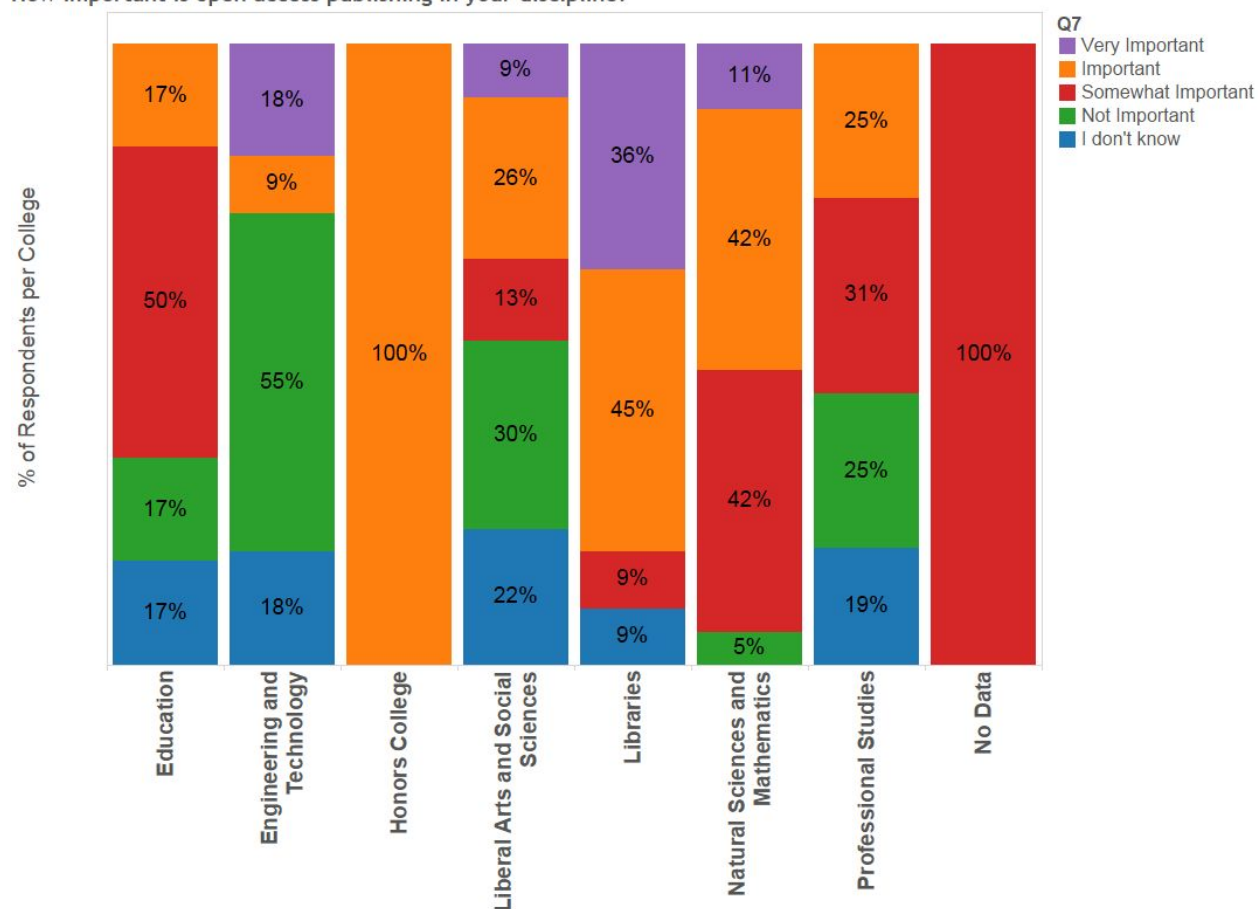
To discover the current understanding and practices regarding OA publishing, Christie Peters and Santi Thompson, librarians at the University of Houston Libraries, administered a survey during the Spring 2015 semester on the scholarly communication practices among tenured or tenure-track faculty and librarians who received or are in the process of receiving continuing appointment. The survey collected 87 responses from 14 colleges. The sample population was calculated based on the total number of faculty at each college (14 Colleges) based on data from the Office of Institutional Research (IR). The survey was sent to 827 UH Faculty members and the overall response rate was 11%. All faculty were sampled for those colleges that had twenty or less faculty reported to IR. The response rate per college was 10% or more for all colleges with the exception of Engineering, Optometry, Pharmacy and Technology. For the purposes of creating more meaningful categories for analysis, we recoded several colleges and created seven new college affiliation groups. Social work was combined with CLASS to create the final category of Liberal Arts and Social Sciences (n=23). Optometry and Pharmacy were folded into Natural Sciences and Mathematics (n=19). Architecture, Business, HRM, and Law were all combined to create a final category of Professional Studies (n=16). Technology was combined with Engineering to create a final category of Engineering and Technology (n=11).

Distribution of Faculty College Affiliation



Included in this survey were questions that addressed open access publishing practices and perceptions. Respondents were split almost evenly among those who thought open access, publishing, defined broadly and generally here without designating between green or gold OA options, was important in their discipline.

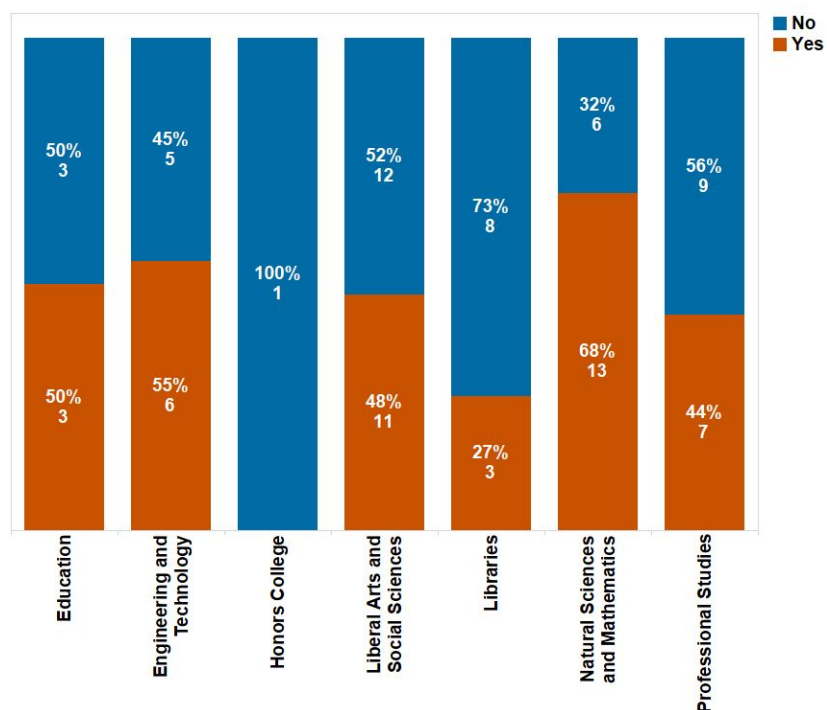
How important is open access publishing in your discipline?



Analyzing this result by disciplines allows for a more nuanced understanding of how specific academic areas view OA publishing. Nearly half of the respondents in both Natural Sciences and Mathematics and the Libraries viewed OA publishing as an important aspect of scholarly dissemination; in contrast, half of respondents in Education saw OA publishing as “somewhat important;” and a slight majority of respondents in Engineering and Technology viewed OA publishing as “not important” to their disciplines.

When it comes to publishing and dissemination practices, most respondents did not utilize open access options during the last 12 months. During that time, half of all respondents published articles in a fee based journal in a non-open access format. Viewing this data by discipline showed that a majority of the respondents in the areas of Natural Science and Mathematics and Engineering and Technology opted for this method, while a minority of those in the Libraries, Professional Studies, and Liberal Arts and Social Sciences elected to publish in non-open access format.

Over the past 12 months, have you published articles in a fee-based journal in a non-open access format?

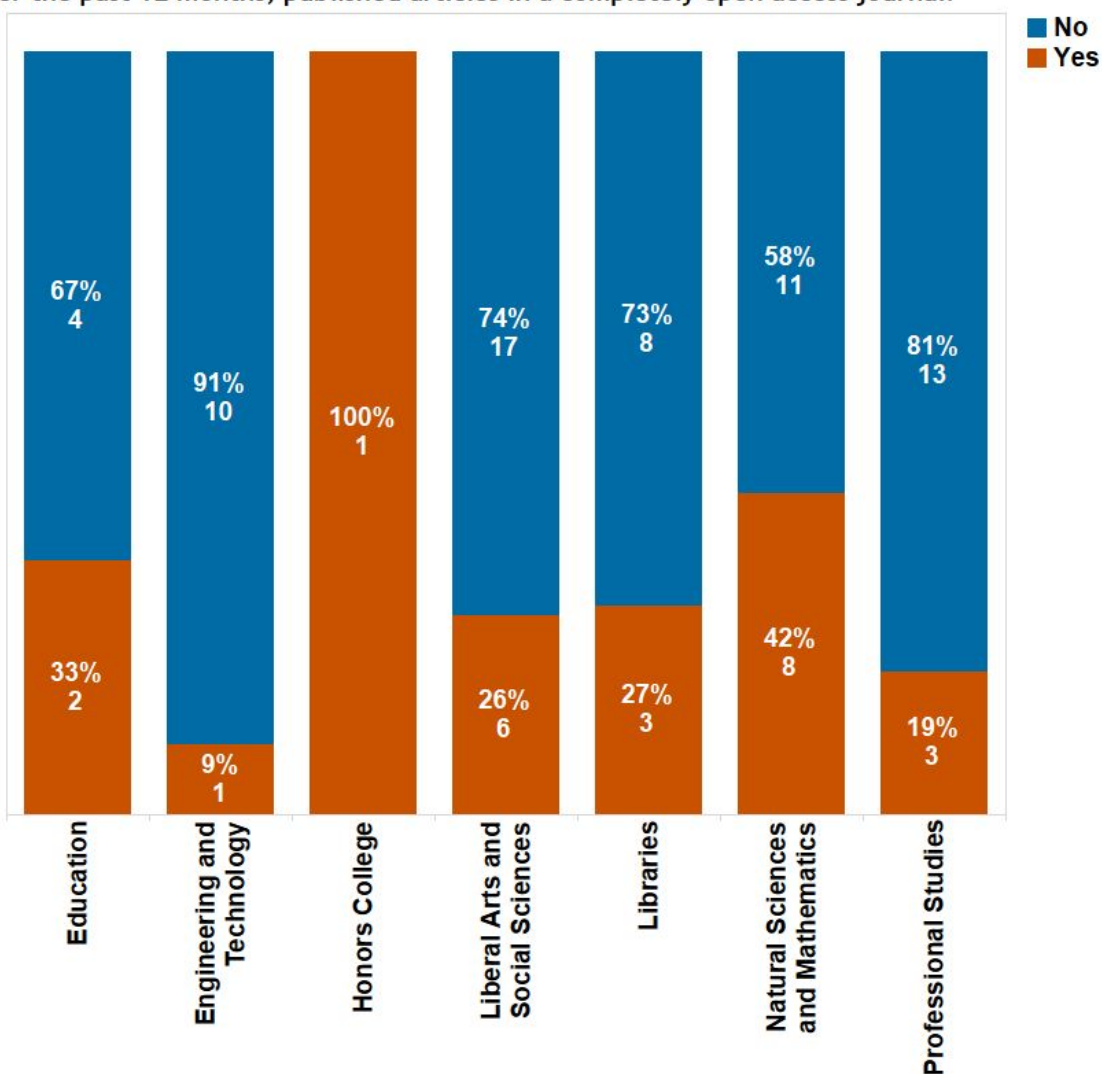


How many articles or other scholarly content have you published in an open access format in the last year?

	1	2	3	4	Grand Total
Education	4	2			6
Engineering and Technology	6	5			11
Honors College		1			1
Liberal Arts and Social Sciences	13	10			23
Libraries	8	2	1		11
Natural Sciences and Mathematics	13	3	1	2	19
Professional Studies	6	5	3		14

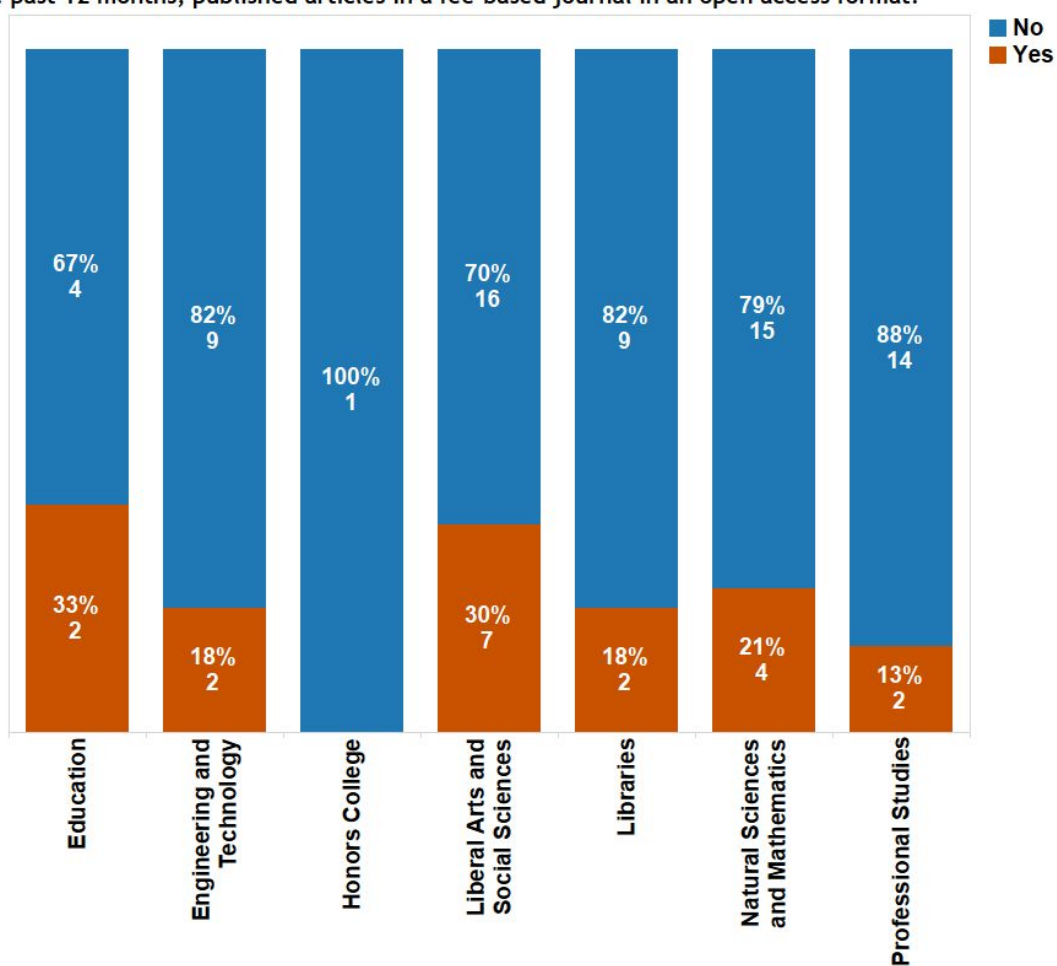
Of those respondents who chose an OA option during the last year, nearly a quarter (27%) published articles in a completely open access method (equivalent to Green OA). Broken down by discipline, close to half of the respondents in Natural Sciences and Mathematics opted for this publishing method, whereas a strong majority of respondents in Engineering and Technology and Professional Studies did not.

Over the past 12 months, published articles in a completely open access journal?

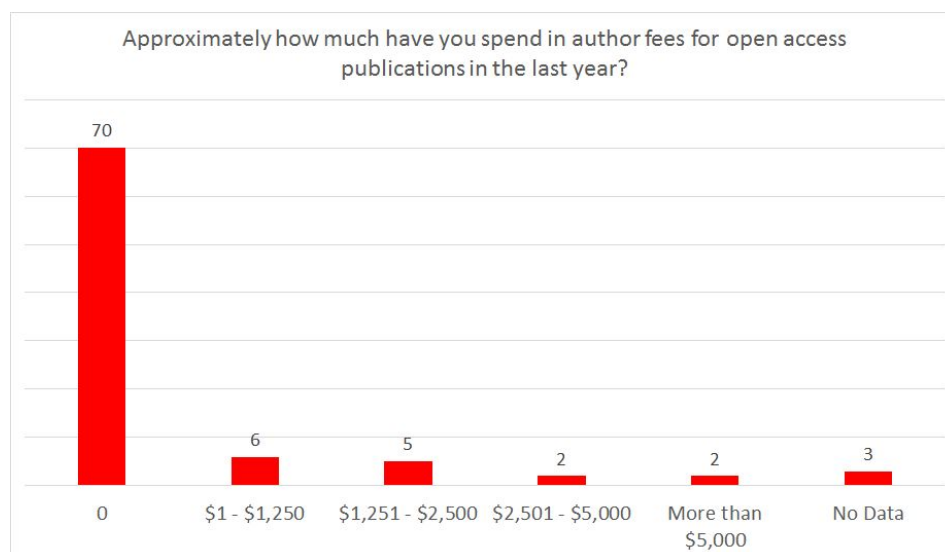


Just under a quarter (23%) of respondents published in fee based journal in an open access format (equivalent to Gold OA) during the last year. Viewed by discipline, nearly one third of respondents from Education and Liberal Arts and Social Sciences elected this OA method.

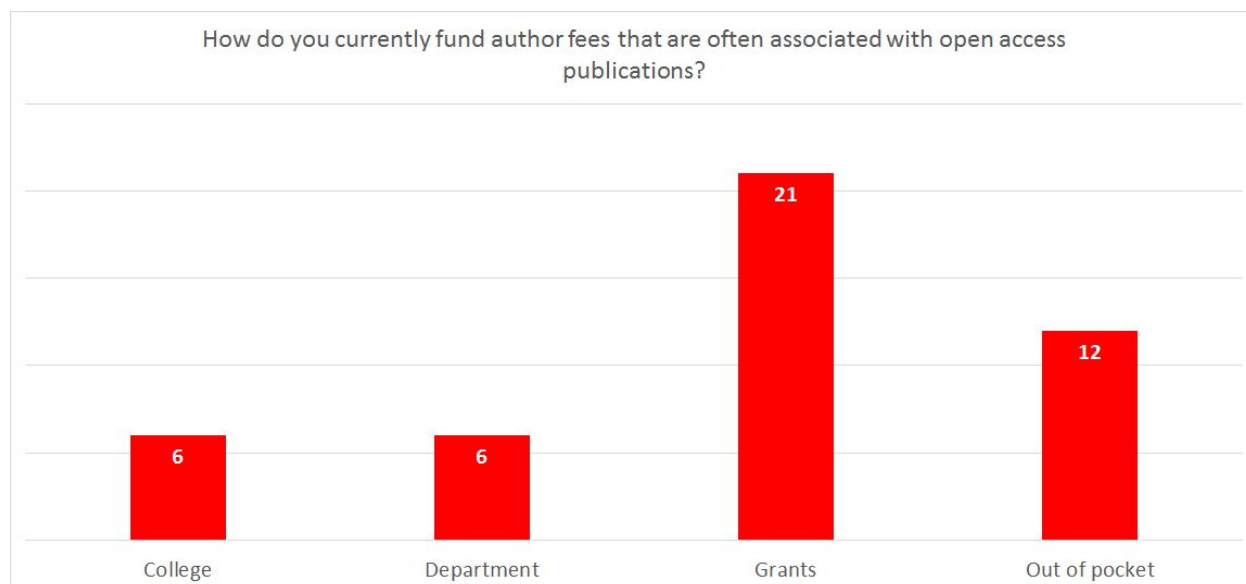
Over the past 12 months, published articles in a fee-based journal in an open access format?



The cost of publishing in open access methods is a popular topic of discussion. Respondents overwhelmingly stated that they have not spent any funds on author fees to publish in an open access publication over the last year.



If faced with author fees, almost half of all respondents (44%) use grant funds to cover the costs. Others relied on themselves or UH sources for funding.



Responses to questions related to OA perceptions, practices, and funding models indicate several growing trends in the production of scholarship at UH:

- Almost half of survey respondents feel that OA is an important publishing option for their profession
- One-third have direct experience in it, showing that some faculty are actively engaged in this process
- Local funding models supports the cost of OA publishing

Overall, however, these results suggest there are a large number of faculty members that undervalue OA publishing and too few that are using it. These data combined with lack of consistent funding models indicate a strong potential threat of non-compliance with funding directives on OA publishing.

IV. Peer Policies and Practices for Open Access Publishing

To better understand the Open Access practices of our peer, neighboring, and aspirational institutions, Peters and Thompson researched the policies and funding mechanisms in place at other research universities.

First, they searched for Open Access policies among sixteen institutions, ten of which have been identified as peers on the University of Houston Progress Card. Five (Texas Tech, UNT, UVA, Oregon State, and Georgia Tech) of these institutions have an open access policy, one (UCLA) is part of a system-wide policy, another (UI Chicago) is part of a system working on a policy, and two (University of

Nebraska and Penn State) endorses the Library institutional repository (IR) as a campus-wide open access option, but does not have a mandate. One institution that does not have an institutional policy (Arizona State) has an internal open access policy among its librarians. Six institutions (Texas A&M, UT Austin, UT Dallas, University of Cincinnati, University of Oklahoma, and Temple University) have no visible open access policy. See table 3 below for a summary.

Second, they investigated open access funding mechanisms at these same institutions. Eight of the sixteen institutions that they researched (Texas A&M, Texas Tech, UI Chicago, University of Oklahoma, UCLA, UVA, OSU, and Penn State) have some sort of open access funding mechanism in place. While they could not find details about the total annual allocation for this fund from every institution on the list, the amount for those institutions for which that information is available ranges from \$15,000 at OSU to \$70,000 at A&M. Four of the institutions on the list that do not have institution or system-wide open access policies in place (A&M, UI Chicago, the University of Oklahoma, and Penn State) have open access funds available to faculty. UI Chicago is part of a system-wide open access policy initiative, and Penn State Libraries has an internal open access policy. For those institutions that do have funding mechanisms in place, the library seems to be the administrator of the funds, even when the funds come from other units on campus. The library appears to be the most common contributor of OA funds, followed by the office of the Vice President for Research, and in one case the Provost's office.

Table 3: Comparison of Open Access Policies and Funding Mechanisms

Institution	Policy	Funding Mechanism
Texas A&M	None	OAK Fund (\$70K) – Lib, VPR
UT Austin	None	Book Subvention only – VPR
Texas Tech	University Policy	OA Fund (\$25K)– VPR
University of North Texas	University Policy	None
UT Dallas	None	None
University of Cincinnati	None	None
University of Illinois-Chicago	System-wide policy is planned	ROAAP (\$60K) – Lib, AA, VPR Library Membership Discounts
Arizona State	Library Policy	Library Membership Discounts
University of Oklahoma	None	Norman OA Subvention Fund (?)
Temple University	None	Library Membership Discounts
UCLA	System-wide Policy	OA Publishing Fund Pilot (?) – Lib, CDL

		<ul style="list-style-type: none"> • Berkeley • UC Davis • UC Irvine • UC Merced • UC San Diego • UC San Francisco • UC Santa Barbara
UVA	University Policy	OA Fund (?) – Lib
Oregon State	University Policy	OA Fund (\$15K) – Lib & Press
University of Nebraska	University Endorsement of IR	None
Georgia Tech	University Policy	None
Penn State	Library Policy; University Resolution in Support of OA	OA Fund (?) – Lib, Membership Discounts

A number of libraries also have publisher memberships that offer faculty and students a discount on open access publication. For example, in addition to a publication subvention fund that provides MIT faculty with up to \$1000 for OA fees, the MIT library (<https://libraries.mit.edu/scholarly/mit-open-access/open-access-at-mit/mit-open-access-policy/open-access-publishing-support/>) provides discounts through multiple library memberships. The most common of these is the 15% discount provided by BioMed Central. The UH library has this membership and during 2015, 28 OA papers including UH authors were published in BioMed Central journals.

V. Benefits of Open Access Publishing for the University of Houston

The motivation for open access publishing comes largely from the idea that it solves problems for both the authors and those that read and use the information contained within the publications. The University of Houston gains from the OA benefits to both authors and users within its community, and further benefits from maintaining a progressive policy that supports OA publishing. Such a policy will also protect against non-compliance with federal OA guidelines.

Author Benefits

The primary benefit for authors is that OA can increase the reach and therefore the potential impact of their work. Numerous studies have supported the view that OA publishing increases citations.¹⁷

¹⁷ Steve Lawrence, "Free online availability substantially increases a paper's impact," *Nature* 411, no. 6837 (2001); I.D. Craig, A.M. Plume, M.E. McVeigh, J. Pringle, and M. Amin, "Do open access articles have greater citation impact? A critical review of the literature," *Journal of Informetrics* 1, no. 3 (2007): 239-248; T. Koler-Povh, P. Južnič, and G. Turk, "Impact of open access on citation of scholarly publications in the field of civil engineering,"

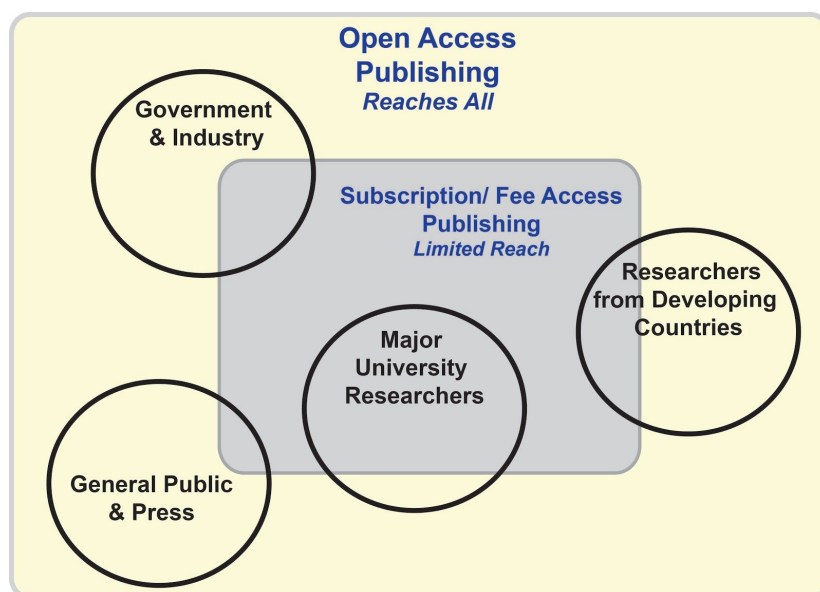
However, there remains some reservations because confounding effects can not be eliminated.¹⁸ Overall, there is general agreement that a positive effect on citations is real and probably greatest with high impact factor (and therefore high visibility) journals. Nevertheless, the effect of OA publishing on citations is not substantial. In contrast, the frequency of paper downloading is much higher implying perhaps that open access provides readers greater opportunity to find and evaluate articles published in lower impact journals. This may also represent increased readership from non-academics (Fig 2).

<http://www.nature.com/openresearch/about-open-access/benefits-for-authors/>

http://www.nature.com/press_releases/ncomms-report_2014.pdf

In general, it is clear that online repositories such as institutional preprint servers in combination with search tools such as Google Scholar make finding articles of potential interest far less dependent on journal quality and library subscriptions than previously.

Figure 2: Open Access Expands the Reach of the Published Work. Most publications behind a fee barrier will still reach academic researchers, however this is not true for many other groups, including policy makers in the government and the general press (adapted from Houghton and Sheehan, 2006).



Scientometrics 98 no. 2, (2014): 1033-1045; Y. Gargouri, C. Hajjem, V. Larivière, Y. Gingras, L. Carr, and S. Harnad, "Self-selected or mandated, open access increases citation impact for higher quality research," *PLoS ONE* 5, no. 10 (2010); Henk Moed, "The effect of "open access" on citation impact: an analysis of ArXiv's Condensed Matter section," *Journal of the American Society for Information Science and Technology* 58 no. 13 (2007): 2047-2054; Henk Moed, "Does open access publishing increase citation or download rates?" *Research Trends* 28 (May 2012): <http://www.researchtrends.com/issue28-may-2012/does-open-access-publishing-increase-citation-or-download-rates/>.

¹⁸ Nature Publishing Group, "Benefits for authors," Open Research @ NPG: <http://www.nature.com/openresearch/about-open-access/benefits-for-authors/>

User Benefits

Open access allows better and faster access to the literature. This is especially true in many developing countries where fee barriers are more impactful, resulting in fewer journal subscriptions and greater delays in delivery (fig 2). OA also makes it easier for international students and scientists to identify researchers they may wish to visit or work with in the US. The same tools affect the more general public such as scientists working in industry or individuals wishing to find the latest developments associated with some disease.

It has been argued that 'Green' open Access is superior to 'Gold' and hence Gold may ultimately disappear.¹⁹ The core argument is that Green is not only cheaper but ultimately accomplishes the purpose of allowing online access to essentially all articles including those from Gold publishers. This is so because Gold articles typically become publically available after some period of time due to embargo policies or are added to preprint servers. However, green open access can also be embargoed, and many journals only allow OA libre (Creative Commons Attribution BY 4) for papers published in gold OA format. Moreover, the simple fact that a 'Gold' article will not ultimately be publically available if it doesn't get published in the first place! Thus, as long as high impact journals continue to exist, they will continue to be able to charge sometimes substantial fees through either subscriptions or author fees. This reflects the simple fact that publication in such journals favorably impact key career issues such promotion, tenure, and grant writing success.

Green open access is also increasing the importance of public preprint servers such as LinkedIn, Academia, and ResearchGate that are increasingly utilizing tools typically associated with social media. For example, as a member of ResearchGate one creates a personal repository of publications that can include patents, poster presentations, reports, meeting abstracts, etc. In addition, one also creates a list of individuals with similar research interests that you wish to follow and vice versus. You can then find papers from these individuals by searching on their site, some of which may not be available through the library. Most importantly, when one of these colleagues adds a paper to their repository all of their followers are immediately informed and given access to the preprint. Likewise, when a paper is cited, you are informed and given access to the citing article. This greatly facilitates the ease of keeping up with relevant literature. In addition, various metrics are maintained that allow comparison of units within the University as well as with external institutions. In some cases, sites such as Academia Inc. allow one to announce the addition of a new paper by Tweets or Facebook.

University Benefits

There are four major sources of benefits for Universities that result from policies for increased Open Access Publishing:

- 1) **Impact from Increased Exposure of Intellectual Products:** receive benefits that are also bestowed upon users and authors through increased impact and productivity, which

¹⁹ S. Fredericks, "Questioning the efficacy of 'Gold' open access to published articles" *Nurse Researcher* 22 (2015): 8-10. doi: 10.7748/nr.22.6.8.e1370.

should also result in more papers and more funding. There should be further direct benefits of open access to University for the Offices of Development and Communications, and other offices that interact with policy makers and the press, since the audiences for these offices can now have access free of barriers to the intellectual work of the University.

- 2) **Protection from Non-Compliance:** Having firm policies in place for OA publishing and structures to support those policies makes it easier for faculty and librarians to understand their obligations to publish OA, and to follow through and find an appropriate venue to publish their work. Even though Universities may not be directly penalized for non-compliance, a sanction against one investigator still hurts his ability to receive grants, and it damages the University's reputation.
- 3) **Being Part of the Solution Can Help Reduce Publication Costs.** OA publishing can be expensive, but understanding the process can reduce costs to investigators and the library system. Some Gold OA publishers may provide reduced author publication charges with Institutional subscriptions or memberships. Understanding and advertising these benefits may save the investigators large sums in Author Publication Charges. If sufficient numbers of Universities increase support of OA publishing, University library systems may be able to decrease the budgets for expensive journal subscriptions.
- 4) **Becoming a Leader in OA Publishing Policy Making.** OA publishing is here, and there is a need to develop strategies and policies for implementing it on campus. Yet, many of our peer institutions around the country have not yet adopted any policies. Universities that step forward at this point in time to help guide their faculty and provide assistance in pursuit of OA publishing will be at the forefront and become a de-facto leader in OA publishing policies within our peer group.

VI. Challenges and Threats of Open Access Publishing for the University of Houston

Although there are compelling reasons to publish scholarly work using open access models, including federal and foundational requirements for many to do so, there are also challenges that frequently make this a difficult path for authors. These challenges evolve from the financial costs of open access publishing and the author's ignorance of the complex terrain generated by different classifications of OA and the specific rights and responsibilities of the authors.

Financial Costs

Prior to the OA movement, almost all publishers of journals and other scholarly material used a subscription model, whereby the reader paid for access. For many research scientists, this meant that the institute's library system covered the expenses of the subscription/access fees, and many governmental worker or private readers had a fee barrier to access the work. The move from subscription based to OA publishing shifted the burden of paying the publishers for their time and effort from the subscriber to the authors or their institutes. Most Journals that offer Gold OA or a hybrid Green OA charge additional Author Publication Charges (APCs) to cover lost income from article

subscriptions. A Hybrid OA journal charges APCs for OA (Green or Gold), but will also publish non-OA papers that retain a reader access fee. The APCs come on top of page charges or other author fees. The Author Publication Charges for Gold or Green Hybrid OA journals can be quite expensive and account for a consequential portion of a research budget (**Table 2**). These publication expenses can create significant hardships for authors, largely in two major ways:

- 1) Publishing after the grant ends - Although a researcher can budget for publications within a grant, frequently the publication comes after the expiration of the grant, when the money is no longer available. The researcher is still obligated by the funding agency to publish OA, but now without funds to cover the costs of this publication.
- 2) Affording multiple publications - the funding levels of many grants have soft caps. Increases in non-research expenditures generally means less money for research rather than larger grant awards. In effect, this means that publishing more papers leaves less money for salaries and research. An investigator with an NSF grant that has \$100K/annum, which covers \$75K in salaries, may be able to afford spending \$3,000 for one paper, but would be hard pushed to afford \$9,000 for 3 papers.

Table 4: OA Policies and Cost from Common Research Journal Publishers

Hybrid OA Publisher	# of Journals	Gold OA	Green OA	Use Creative Commons BY 4 License	Website
Elsevier	3,193	Fees range from \$500 to \$5,000/article	Preprint sharing allowed anytime, print version with an embargo of 12-24 months.	Under Limited Situations	https://www.elsevier.com/about/open-science/open-access
SpringerNature	2,775	\$3,000/article	Preprint sharing allowed with an embargo of 12 months.	Available for Gold Access	http://www.springer.com/open+access?SGWID=0-169302-0-0-0
Nature Publishing Group	140	Fees range from \$1,350 to \$5,200/article	Final Accepted preprint after 6 month embargo	Yes	http://www.nature.com/openresearch/#close
Cell Press-Elsevier	34	Fees range from \$1,800 to \$5,000/article	Preprint sharing only after embargo period of 0 to 12 months	Available for Gold Access	http://www.cell.com/rights-sharing-embargoes
Dedicated Gold OA Journals	# of Journals	Gold OA	Green OA	Use Creative Commons BY 4 License	Website

BioMed Central-SpringerNature	302	Most are \$2,145/article	Gold Only	Yes	http://www.biomedcentral.com/about
PLoS	7	Fees range from \$1,495 to \$2,900/article	Gold Only	Yes	https://www.plos.org/open-access/
PeerJ	2	Maximum of \$695/article	Gold Only	Yes	https://peerj.com/about/publications/

Navigating the Byzantine OA Publishing Terrain

Even though most authors may need to publish OA, or at least stand to benefit from publishing OA, there are no industry standards for how to handle OA. The owner of the rights to the published work depends in large part on the arrangements between publishers and authors. The authors need to understand the OA process for each publisher to make the best decision on where or how to publish.

When an author publishes an article, either the publisher obtains the rights to the work, or the author maintains their rights, including the right to distribute using the Green OA model, but provides permission to the publisher to use the work.²⁰ If an author signs over the copyright to the publisher, the decision for OA is also signed over. In this case, the author would have no rights to distribute the work through a Green OA mechanism. However, a publisher that does not have a policy for OA may still agree to allow Green OA distribution if petitioned, as Elsevier did in 2004 prior to forming a blanket OA policy.

²¹ A primary problem in navigating these agreements is that authors generally do not have a strong understanding of copyright law, and what rights they provide to a journals upon publication. An individual author may not even know the need to negotiate rights with a publisher or how to even begin. Hence, an author, not knowing any better, may break the law by adding a copy of their work to a public repository such as ResearchGate. Furthermore, older literature is likely to have been published under restrictive licenses, and the author may not realize his legal rights to distribute this work. While most publishers appear to look the other way, this behavior can expose the University to liability.

One side effect of the need for OA publishing has been predatory OA publishing.²² Predatory publishing journals may accept manuscripts for publication without peer-review, and not indicate APC until after papers are accepted. Many of these journals use fraudulent credentials, such as fake impact factors and editorial boards, to capture new submissions and APCs.²³ Many of these journals are not indexed, and hence author's publishing with them will lose visibility and citations, reducing the impact of their work. To help protect authors, especially young investigators, from mistakenly publishing in a predatory

²⁰ Peter Suber, *Open Access* (Cambridge, Massachusetts: The MIT Press, 2012).

²¹ Ibid.

²² J. Beall, "Predatory publishers are corrupting open access," *Nature* 489, no. 7415 (2012): 179; Margaret H. Kearney, "Predatory Publishing: What Authors Need to Know," *Research in Nursing & Health* 38 (2015): 1–3.

²³ Mehrdad Jalalian and Hamidreza Mahboobi, "New corruption detected: Bogus impact factors compiled by fake organizations," *Electronic Physician* 5, no. 3 (2013): 685–686.

journal, the Directory of Open Access Journals (DOAJ)²⁴ was launched in 2003. This directory maintains a whitelist of “quality” OA journals and aims to provide this information as a starting place to search for authentic OA journals.

A Recommendation for an Open Access Policy and Action for the University of Houston

We recommend that the University of Houston begin to develop a comprehensive OA policy with a goal for a minimum green level of open access (OA) publishing for all academic works by faculty and librarians by the end of FY2018. To facilitate this policy, the Division of Research should collaborate with the Office of Academic Affairs and the University of Houston Libraries to accomplish the following:

1. Establish task force for developing and implementing OA policy. This task force should be composed of representatives of major stakeholders including from the RSC, the UH libraries, and the DOR. This task force will be responsible for:
 - a. Developing an easy online process for depositing published works
 - b. Promoting the use of the library repository for preprints of accepted manuscripts
 - c. Ensuring this repository is freely accessible by web based servers (e.g., Google Scholar)
 - d. Identifying and promoting additional repositories for OA publishing, including arxiv, RePEc, CiteSeerX, and ResearchGate.
 - e. Developing an incentive system to ensure compliance
 - f. Recommending a waiver system for protected works to bypass OA requirements.
2. Establish a service within UH Libraries that can help investigators understand copyrights, creative commons attribution licenses, and predatory journals, and that will negotiate with publishers for OA rights.
3. Establish a fund to help investigators pay for high visibility open access papers. This fund will help investigators whose grants have expired, or lack sufficient funds for gold level open access in a high impact journal. These investigators can apply for assistance in meeting publications charges, and the application can be reviewed *ad hoc* by a small designated panel. An initial investment of \$25,000 is recommended to establish the program.

²⁴ see <https://doaj.org/>