

# arXiv MAB Subgroup on Fundraising for Special Projects

## Summary Report

### Introduction

At the Fall 2015 meeting the arXiv Membership Advisory Board determined the need to do targeted fundraising in order to support a major software update to arXiv. This subgroup was charged to do the following:

#### Purpose:

Lay groundwork for the arXiv team to pursue significant funding towards substantial reengineering of the arXiv platform.

#### Outcomes:

1. Identify potential funding sources towards this need. Determine what types of projects they fund and why they might be interested in supporting arXiv.
2. Craft a couple of paragraphs that we can use to articulate arXiv's critical role and why it deserves an investment.
3. Provide support for the upcoming vision setting process (e.g. survey or user study testing, etc.).

### Potential Sources of Funding

The subgroup reviewed five different strategies for funding: Foundations, government sources, societies, industry partners, and state libraries. Of the five, the options with the most immediate potential fall in the foundation, government, and society categories.

#### Foundations

We reviewed the programs supported by 25 foundations to assess if arXiv's purpose and project needs are a match for the foundation's programs. The full list can be found in Appendix A. The following foundations appear to have programs that could match the needs of arXiv and could be potential sources of funding for a major update project:

- [Alfred P. Sloan Foundation](#)
  - The Alfred P. Sloan Foundation focuses on science and technology. "We believe that the scholars and practitioners in scientific and technical fields are chief drivers of the nation's prosperity. Grants in the Science Education program area promote access to the scientific enterprise,

provide information about scientific and technical careers, and encourage innovation to the structure of scientific training.”

- [Simons Foundation](#) (requesting additional funding for the specific purpose of the software update)
  - “The program is intended to support centers of excellence in the mathematics and physical sciences through funding to help establish scientific culture and strengthen contacts within the international scientific community. Our aim is to enable institutes to extend and enhance their mission; the program will typically not provide primary support for operating or establishing an institute.”
- [Helmsley Charitable Trust](#)
  - ORCID (orcid.org) received a 2015 18 month grant from Helmsley for \$3M+ under the Biomedical Research Infrastructure program. ORCID made the case that they are "expanding the breadth and depth of our global reach" and "that shift towards greater efficiency means stronger support to bring biomedical research one step closer to breakthrough discoveries in human health" even though ORCID covers every subject - not just biomedical research. arXiv could make a similar appeal on free and unfettered worldwide access to research, including biomedical.
- [Xerox Foundation](#)
  - Broadly support science and technology work. Each grant is championed by a Xerox scientist. Research must align with strategic interests of Xerox.
- [Research Corporation for Science Advancement](#) (RCSA)
  - RCSA is a private operating foundation that aids basic research in the physical sciences (astronomy, chemistry, and physics mainly) at U.S. colleges and universities. It supports research independently proposed by college and university faculty members and carries on activities related to science advancement. RCSA is a strong supporter of improvements in science education. Members of SAB have working relationships with them. There may be a match through educational materials in arXiv.
- [Gordon and Betty Moore Foundation](#)
  - “Seeks to develop outcome-based projects that will improve the quality of life for future generations. The private foundation focuses upon portfolios of large-scale initiatives and encourages collaboration so as to achieve the most significant and enduring outcomes possible. Funding is concentrated on: environmental conservation, patient care, science and the San Francisco Bay Area. Within these program areas, distinct initiatives—grounded in a "theory of change" (a rationale for selecting strategies and activities and a detailed explanation of how they yield positive transformations)—employ a portfolio of grants expected to help achieve large-scale outcomes in a set time frame. The Foundation also awards some grants for unique and opportunistic projects within its focus areas when the expected outcome is high-impact, long-term, and measurable.”
- [Broadcom Foundation](#)
  - In higher education, the Broadcom Foundation's STEM committee identifies university programs that will receive funding to support

innovation and leadership in engineering programs. California universities have been major beneficiaries of Broadcom funding, but the foundation supports prominent university engineering programs across the country and around the world.

We recommend that contact be made with these organizations to further explore the potential for a match to arXiv's funding needs.

## Government Agencies

We reviewed the major US federal government funding agencies to identify possible funding sources for arXiv. The following agencies appear to have programs that could match the needs of arXiv and could be potential sources of funding for a major update project.

- DOD
  - The mission of the Department of Defense says (boldface added):
    - The United States depends on science, technology and innovative engineering to not only protect the American people but to advance our national interests and to prepare us to meet the challenges of an uncertain future. **Given today's globalized access to knowledge and the rapid pace of technology development, innovation, speed, and agility have taken on greater importance to DoD efforts.**
  - There are many sub-agencies that may provide funding for opportunities like arXiv:
    - DARPA, in particular, could be a good place to start.
    - Defense Threat Reduction Agency
    - Army Research Office
      - ARO normally only funds research, and they have a special category for things like conferences. They don't typically do infrastructure except for DURIP, which is not a fit for ArXiv. The ArXiv coverage is so broad that I can't even suggest where to start with ARO. Grant officers familiar with ARO suggest that the best approach might be to contact one or two program officers to see if they can suggest anything.
    - NSF Campus Cyberinfrastructure program
      - That call actually came out the week of May 24, 2016. There is no limit on the number of proposals an institution can submit. This would seem to stretch the definition of "campus" far beyond recognition, but who knows? It would be worth a call.
- DOE
  - Although DOE primarily funds basic and theoretical science research, there may be an opportunity to seek arXiv funding through offline channels and direct contact with HQ offices. These would be various program offices under the Office of Science (SC), including Basic Energy Sciences (BES), Biological and Environmental Research (BER), Fusion

Energy Sciences (FES), High Energy Physics (HEP) and Nuclear Physics (NP).

- NASA
  - Several program areas for NASA mention topics related to sharing research and data sets. NASA could be useful for funding improvements to arXiv for additions related to research data. Advanced Information Systems Technology - a possible area for arXiv related funding - but not soliciting proposals at this time. Planetary Data Archiving, Restoration, and Tools area could be applicable - "PDART) program solicits proposals to generate higher-order data products, archive and restore data sets or products, create or consolidate reference databases, generate new reference information, digitize data, and develop or validate software tools. The objective of this program element is to increase the amount and quality of digital information and data products available for planetary science research and exploration, and to produce tools that would enable or enhance future scientific investigations." - solicitation period over right now
- NSF
  - There is significant past funding from NSF for arXiv. In the past year several conversations have been initiated to explore the NSF as a potential source of funding. See Appendix B for additional details.
  - NSF funding from the past has been to Paul Ginsparg:
    - EAGER: Adaptive Methods for Scalable Dissemination and Retrieval of Scientific Information Award Number:1142251; Principal Investigator:Paul Kantor; Co-Principal Investigator:Peter Frazier, Thorsten Joachims, David Blei, Paul Ginsparg; Organization:Rutgers University New Brunswick;NSF Organization:IIS Start Date:08/15/2011; Award Amount:\$299,501.00;
    - Tools for Open Access Cyberinfrastructure. Award Number:0926550; Principal Investigator:Paul Ginsparg; Co-Principal Investigator:; Organization:Cornell University;NSF Organization:ACI Start Date:09/01/2009; Award Amount:\$882,610.00;
    - Classification, Analysis and Navigation Tools for Physics Research Communication Award Number:0404553; Principal Investigator:Paul Ginsparg; Co-Principal Investigator:; Organization:Cornell University;NSF Organization:PHY Start Date:10/01/2004; Award Amount:\$796,395.00;
    - E-Print Archive. Award Number:0132355; Principal Investigator:Paul Ginsparg; Co-Principal Investigator:; Organization:Cornell University;NSF Organization:PHY Start Date:09/01/2001; Award Amount:\$958,798.00;
    - E-Print Archives, Award Number:9413208; Principal Investigator:Paul Ginsparg; Co-Principal Investigator:David Forslund, Erica Jen, Geoffrey West; Organization:Department of Energy Albuquerque Operations Office;NSF Organization:PHY Start Date:03/01/1995; Award Amount:\$1,730,303.00;

- BIGDATA: Mid-Scale: ESCE: Collaborative Research: Discovery and Social Analytics for Large-Scale Scientific Literature, Award Number:1247637; Principal Investigator:Thorsten Joachims; Co-Principal Investigator:Paul Ginsparg, Peter Frazier; Organization:Cornell University;NSF Organization:IIS Start Date:01/01/2013; Award Amount:\$1,294,450.00;

Pursuing funding via a US government budget line item could be another effective strategy. This idea requires further development, but the team discussed the following talking points as support for this funding strategy:

- arXiv is a repository visited by millions of scientists worldwide, yet it is located in the United States, and much of the usage is US based. Because the US benefits substantially from the availability of the arXiv, it would be ideal to have regular funding for everyday operations and as well as funding to upgrade and interface arXiv with changing landscape of published and scientific repositories.
- arXiv is used by university **and** industry scientists across of the country. As a freely accessible repository of the latest scientific results, it enables small business and industry access to information needed for technology without a costly subscription.
- Scientists from all states require arXiv. Each state also has senators and representatives that need to know about the need for arXiv and the minimal cost at which it needs to run.
- In order to make our case better to particular congress members, having a state-by-state breakdown of usage would be needed.
- Ultimate goal would be to have a budget line-item in the annual omnibus bill to fund arXiv's basic budget, so that donations and grants can be used for upgrades.

## Societies

The following professional societies have each expressed, at various times and in various ways, interest in funding arXiv. It has been noted by the Member Advisory Board (MAB) that the issue of appropriate recognition for society funders needs to be addressed. arXiv staff are already discussing the potential match of these groups to arXiv's needs.

- American Institute of Physics (AIP)
  - Amongst the professional societies, AIP has expressed the strongest interest in collaboration with and funding arXiv. Ideas in which AIP has expressed interest include arXiv as a submission hub, adding new services (based on user survey feedback), tapping into existing toolsets (depending on choice of new platform).
  - American Physical Society (APS)
    - APS has in the past expressed potential interest in funding arXiv, depending on support from other physics societies.
  - American Astronomical Society (AAS)
    - The American Astronomical Society (AAS) is the major organization of professional astronomers in North America. Our

mission is to enhance and share humanity's scientific understanding of the universe.

- AAS journals allow references to arXiv articles: “Unpublished Material: References to articles in preparation, preprints, or other sources generally not available to readers should be avoided if possible. Please check preprint references carefully in case any of these have been formally published since your manuscript was prepared; if the preprints have not been published, please give the reference (e.g, arXiv) number and the journal to which the work has been submitted. If no publication of record is available, preprints may be listed in the reference list with version given.”
- Astro2010 Decadal Survey published on arXiv (arXiv:0909.3892)
- American Mathematical Society (AMS)
  - Interested in closer coordination between arXiv and MathSciNet, similar to the way arXiv currently works with INSPIRE. AMS is willing to fund development of an API for maintenance of such a service. AMS Board has also voted to support funding for arXiv for 5 years.
- Institute of Physics (IOP)
  - IOP is often mentioned as an obvious potential source of funding support for arXiv, though to our knowledge no direct contact has been made between arXiv and IOP to date.

## Industry

The subgroup agreed that there is further potential in developing funding from businesses that use and benefit from the existence of arXiv. The group's thinking is summarized:

- Industry scientists need access to scientific data, methods, and analysis but are not affiliated with universities. Some also publish their preprints on arXiv.
- Do they access this information through arXiv? We need further information on industrial users.
- Could we develop these businesses as donors? Would they be willing to make small - med (\$1000 - 10,000) annual donations to arXiv? What if arXiv was working on enhanced functionality?
- Acknowledging contributions of this nature is a standard practice. Currently there is a site:  
<https://confluence.cornell.edu/pages/viewpage.action?pageId=241664021> which is linked from the main page by clicking the phrase: "We gratefully acknowledge support from the Simons Foundation and member institutions," in the Cornell banner on the upper, right hand side. This is difficult to see, it was not clear to the members of this sub-committee that this is where to go, and the page it goes to could use an upgrade. Corporations are likely to expect that the corporate logo be used on a true donation page and that the page be searchable in google (which this page is currently not).

## State Libraries

Since use of arXiv benefits universities and industries in every state, one possible source of funding could be U.S. State Libraries. The group explored this idea with the California State Librarian as described below and found that this idea has some potential.

### California

Greg Lucas, Librarian of the State of California, has indicated that the Brown Administration is currently looking into the issue of access to databases for the population of the State of California. Mr. Lucas has expressed that he would welcome a conversation about ArXiv, the amount of usage coming from California, and the possibility of state funding to support development and maintenance of arXiv. Any conversation would have to include a sense of what scale of ask is being considered and for what purposes those funds would be used. The subcommittee is establishing an introduction between Greg Lucas and Oya Reiger.

## Boilerplate language for funding requests about arXiv

The second part of the charge asked that the subgroup put together draft boilerplate language that potentially could be used in pursuing funding requests. We recommend that this draft be further developed as the arXiv team completes the visioning work that is in progress.

arXiv is the most successful and prominent subject repository system serving the needs of scientists worldwide. Started in 1991, this highly-automated electronic archive and distribution server for research articles set the stage for open sharing of research output. Scientists in Physics, Mathematics, Computer Science, Quantitative Biology, Quantitative Finance, and Statistics find it an indispensable tool to facilitate connections and collaboration between scholars and fastest access to the latest research findings in their fields.

The impact of arXiv is enormous. It is available to scholars and readers worldwide and reaches the broadest possible audience. The speed with which new research is available for development of new technologies fuels the engine of innovation and entrepreneurship.

The following speaks resoundingly for the success of arXiv:

- More than 1.1 million articles in arXiv;
- arXiv ranks #1 in Ranking Web of Repositories;
- arXiv sections rank as five of the top ten publications in Google Scholars' Top Publications in Physics and Mathematics;
- 105,000 Submissions in 2015, a 8.25% increase from 2014
- Usage of arXiv continues to grow, hitting more than 5,000,000 downloads during the month of December 2015.

Investment and additional funding for arXiv will enable the incorporation of new technologies and methods into the platform to further support rapid open sharing of the latest research.

## Conclusions/Recommendations

In the course of research for this project the team came to a series of conclusions and recommendations for moving forward.

- The subgroup was pleased to find that there are many funding opportunities available with nonprofit foundations, professional societies and government entities, in addition to industry and state libraries.
- arXiv staff have found grant writing capacity at Cornell to assist with fund raising. The subgroup fully supports that action in order to pursue these opportunities.
- The subgroup recommends putting together teams of scientists and professional grant writers to begin writing proposals.
- Each category of funders requires different strategies and may require a combination of support from grant writers, campus fundraisers and more. This supports the need for having a funding coordinator working for arXiv.
- The group suggests that arXiv captures usage data split between educational or research institutions and everyone else. Seeing that arXiv doesn't just support academics can bolster the argument for seeking funding from state libraries, congress people, or potential industry sponsors.
- In general the ability to parse out different kinds of usage data and analytics towards making the case for the different funding strategies would be helpful.
- The boilerplate language can benefit from further development and the inclusion of specific data from the survey.
- As additional funding sources are cultivated it will be important to make sponsors easier to find and more prominent on the arXiv website.

## Members of the arXiv MAB Subgroup on Fundraising for Special Projects:

- Tracy Gabridge - MAB
- Carol Hoover - MAB and SAB
- Steven Mandeville Gamble - MAB
- Jenny Ross - SAB



---

## Appendix A - Foundations and Agencies examined

[\(link to working spreadsheet\)](#)

### Foundations

- Adelson Foundation
- Alfred P. Sloan Foundation\*
- AMD Foundation
- American Honda Foundation
- Beckman Foundation
- Bill and Melinda Gates Foundation
- Broadcom Foundation\*
- Burroughs Wellcome Fund
- David and Lucile Packard Foundation
- Doris Duke Charitable Foundation
- Gordon and Betty Moore Foundation\*
- Helmsley Charitable Trust\*
- Howard Hughes Medical Institute
- Julian Schwinger Foundation for Physics Research
- Kavli Foundation
- Knut and Alice Wallenberg Foundation
- M. J. Murdoch Charitable Trust
- MasterCard Foundation
- NEC Foundation
- Oracle Education Foundation
- Research Corporation for Science Advancement (RSCA)\*
- Simons Foundation\*
- United Nations Foundation
- Wellcome Trust
- Xerox Foundation\*

\* Recommended foundations, described further in the document above

### Government Agencies

- DoD
- DoE
- NASA
- NSF

## Professional Societies

- AIP
- AMS
- APS
- IOP

## Appendix B - Correspondence and conversations about potential for NSF funding for arXiv in the past year

- From Oya Rieger, May 20, 2016 email: “Chris Myers met with a group of NSF officers last year, Daniel Katz (NSF Program Director, Cyberinfrastructure) suggested that we contact Amy Friedlander from the Division of Advanced Cyberinfrastructure to find out about the NSF public access working group and how we might contribute to the deliberations. I've worked with Amy in the past so I contacted her to see if we can get involved. NSF requires the final accepted version of peer-reviewed journal articles to be deposit in the NSF public access repository hosted by the Department of Energy (DOE). As her appended response indicates, arXiv is seen as a pre-print repository. This issue also comes up in the user survey. Several respondents expressed the need to be more systematic about including information about the final published paper (e.g., linking to DOI) along with pre-print versions.” \*\*See the report from Chris Myers in the Google Drive.
- Document from Chris Myers about his visit to NSF (distribution on December 1, 2015): We visited NSF on October 28, 2015 to discuss arXiv with NSF program directors. This was a follow-up to Myers' initial visit to NSF in June 2015, although was still intended more as a “fact- finding” meeting to clarify how arXiv activities are perceived within NSF, rather than a pitch of specific activities to specific programs. The prior visit had suggested that, while arXiv's supporters within NSF reside primarily in divisions associated with its core subject areas of Physics and Mathematics, its best prospects for significant funding are likely to lie more in the area of computational infrastructure supporting a broad range of scientific fields. Our visit consisted of three separate meetings: (1) with Pedro Marronetti (MPS/Physics); (2) with Dan Katz (CISE/ACI), Rajiv Ramnath (CISE/ACI), and Bob Chaddock (CISE/ACI); (3) and with Frank Olken (CISE/IIS), Chris Clifton (CISE/IIS), Tie Luo (Acting Deputy Division

Director, MPS/DMS), Sonja Gardner-Clarke (OIRM/DAS), and Brock Temanson (ORIM/DAS).

- From Paul Ginsparg, November 9, 2015 email: “there is one other point: the grants that nsf supported historically were all packaged in the form of new functionality or research. support for infrastructure was only mentioned insofar as necessary improvements to facilitate the preceding.”
- From Greg Kuperberg, November 9, 2015 email: “Paul applied for the last of these principal grants in 2003, after he came to Cornell, and was awarded in 2004. ... It was also used to help restore the arXiv after the serious service interruption in 2006. (PHYS 0404553) If you take the main three NSF grants that Paul obtained, you're looking at 15 years of funding ending in 2009, which is 6 years ago. That's not really the distant past. It is also not true that there is no recent funding, although I admit that recent funding is configured for special projects rather than infrastructure. Paul pointed out to me privately that he is still a co-PI on a \*current\*, arXiv-related NSF grant, expiring next year (IIS 1247637). Of course we all understand that Paul needs to be and wants to be replaced. If his name is on 22 years of arXiv-related NSF funding, then this is an essential activity that must be continued by other people, not relegated to the past. and we cannot be certain that NSF will take up this funding burden again (despite some positive reaction from some program officers). For sure, I agree that we cannot be certain, as we never can with any grant proposal. But this is not a reason to talk away the idea.”
- From Oya Y. Rieger, December 1, 2015: A couple of months ago, we had an email exchange about the emerging public access mandates and arXiv's potential role. You might be interested in this morning's press release about NSF's decision to use the CHORUS service to provide access to publicly available research articles and to enable the long-term preservation of scholarly articles reporting on NSF-funded research. <http://www.chorusaccess.org/chorus-signs-agreement-with-nsf-to-advance-public-access-to-research/> CHORUS (Clearinghouse for the Open Research of the United States) is a suite of services for agencies and publishers to deliver public access to published articles reporting on U.S. funded research. CHORUS enables users to discover and access the articles on the publishers' sites, along with tools, updates, and correction and retraction information. More than 100 publishers have joined the initiative: <http://www.chorusaccess.org/about/our-members/>