

## Developing Sustainability Strategies for arXiv

Oya Y. Rieger & Simeon Warner

Cornell University Library

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In January 2010 Cornell University Library announced a new business model to broaden the funding base for the arXiv.org online scientific repository. arXiv will remain free for readers and submitters, but the Library has established a voluntary, collaborative business model to engage institutions that benefit most from arXiv. Started in 1991, arXiv is recognized as an exemplary disciplinary repository and open-access distribution service for research articles. As of October 2010, it includes over 630,000 e-prints that are used by hundreds of thousands of researchers from all over the world (Figure 1). arXiv has transformed the scholarly communication infrastructure of multiple fields of physics and plays an increasingly prominent role in mathematics, computer science, and other disciplines (Figure 2). Since it moved to Cornell in the summer of 2001, the Cornell University Library has provided the bulk of arXiv's operating costs, which is currently at \$400,000 per year.

### An Interim Business Model

The first phase of the sustainability planning process included a landscape analysis and a survey of arXiv stakeholders' positions and opinions on arXiv's future. Also critical during this assessment phase was expanding our understanding of the income models for open access and understanding the pros and cons of emerging practices. Based on a review of available funding models [1, 2] and an extensive survey of arXiv stakeholders, we considered several support options that are compatible with the Cornell University Library's mission. These included: sponsorship and advertising; donations; endowment; fees generated by "freemium" services; and support from funding bodies, scholarly and professional societies, and publishers. We did not consider imposing article processing charges or submission fees because barrier-free submission and use is one of the founding principles of arXiv. The arXiv white paper further describes our planning process as well as addressing the questions raised by stakeholders during the input gathering process [3].

Based on this initial planning work, we decided to implement an interim business model for 2010-2012 as we realized that a thorough business planning process will require additional time and necessitates broader collaborations and engagement from many stakeholders including scientists, libraries, research centers, societies, publishers, and funding agencies. The interim model aims to generate funds through recurring subsidies from libraries at academic institutions, research centers, government laboratories, and other organizations that are the heaviest users of arXiv. The 3-tiered institutional support model targets the top 200 institutions representing the most active users of arXiv and suggests institutional contributions within the range of \$4,000 and \$2,300 per year. Cornell University Library will continue to provide 15% of arXiv's operating budget. Since announcing our collaborative business model in January 2010, we have secured pledges from 85 institutions, totaling to \$302,000 in contributions. We have been encouraged with the international support from Australia, Canada, China, Germany, India, Israel, Japan, Switzerland, the United Kingdom, and the United States. The strong response to our support request - almost meeting our fundraising goal in the first year - validates our interim model and suggests that the approach may be a viable component of a long-term strategy. Although the interim institutional contribution model has garnered strong support, we realize that it is a transitional strategy that needs to be further assessed and developed. One of our goals is to understand the underlying

reasons for nonparticipation as some of the top 200 institutions targeted for pledges have either not responded to our requests or indicated that they do not intend to contribute.

## Developing a Long-Term Sustainability Strategy

Over the next couple of years we will develop a long-term business plan that provides a framework to sustain and further develop arXiv. To this end, we formed an international advisory group, which will serve an essential consultative role in developing diverse and durable sustainability strategies for this critical international resource. Our business model needs to be responsive to the shifting ecology of scholarly publishing. arXiv complements, rather than competes with, the commercial and scholarly society journal publishing market. Based on requests from several publishers and societies with publications in physics and mathematics, we have been exploring how to expand our current institutional contribution model to invite support from relevant publishers and societies. Included in our business planning process is looking into other potential funding sources such as related foundations and agencies. We also have been considering the role of the Sponsoring Consortium for Open Access Publishing in Particle Physics (SCOAP3) initiative for our financial planning.<sup>1</sup>

An integral part of our business planning process is assessing the technologies, standards, services, and policies that constitute arXiv. The sustainability of arXiv also depends on enabling interoperability and creating efficiencies among repositories with related and complementary content to reduce duplicate efforts. We will strengthen existing collaborations, such as those with INSPIRE<sup>2</sup> and with NASA ADS,<sup>3</sup> and develop additional partnerships that allow arXiv to provide better services. As we collectively address the creation and management of community-based infrastructures, we need to factor in issues such as financial needs, user requirements, robust discovery features, innovation in scholarly communication, quality control, and enduring access. The Library is committed to maintaining arXiv as an open access service, free to submitters and users alike. However, we believe that as a public good, arXiv should be supported by those institutions that use it the most. Keeping open access academic resources such as arXiv sustainable involves not only covering the operational costs but also continuing to enhance their value based on the needs of the user community.

## REFERENCES

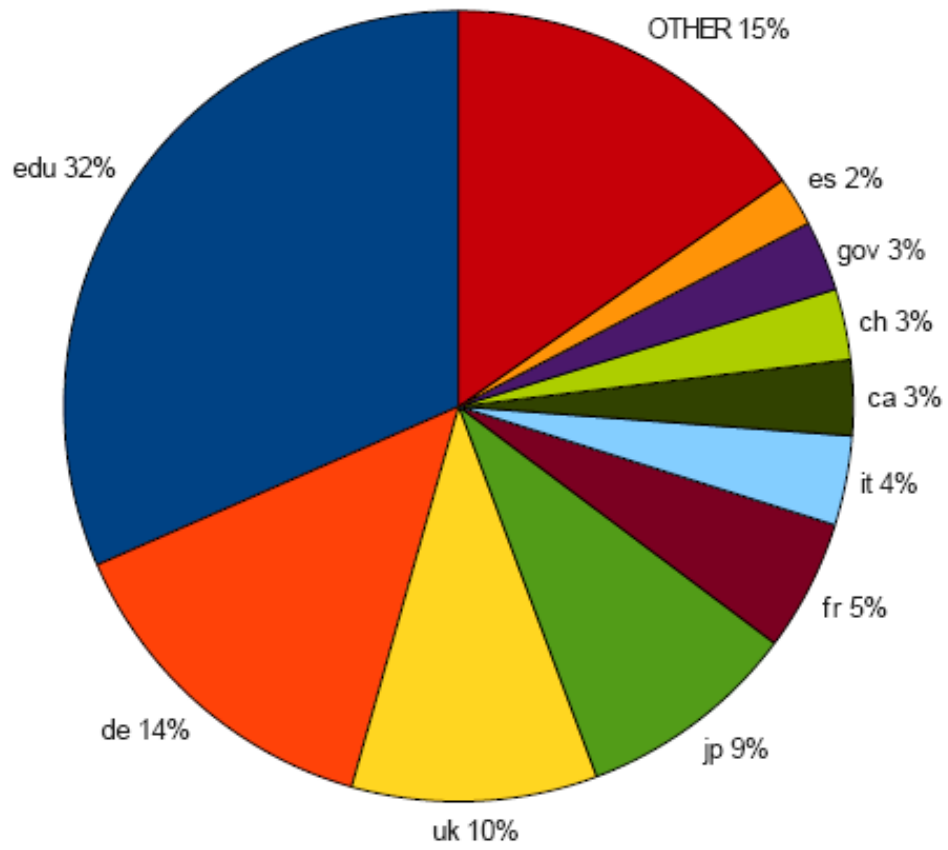
- [1] Guthrie, K., Griffiths, R., Maron, N. Sustainability and Revenue Models for Online Academic Resources. An Ithaka Report. 2008.  
<http://www.ithaka.org/ithaka-s-r/strategy/sustainability-and-revenue-models-for-online-academic-resources>
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<http://www.arl.org/sparc/publisher/incomemodels/>
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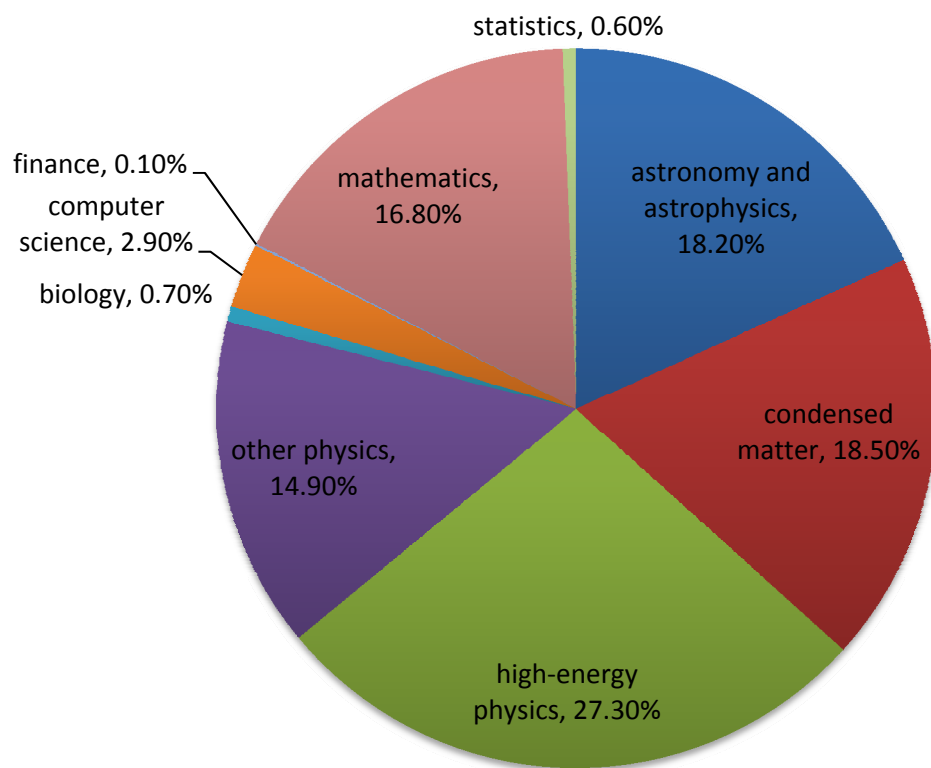
1. <http://scoap3.org/>

2. INSPIRE is an information system that aims to integrate existing databases and repositories to host the entire corpus of the high-energy physics (HEP) literature worldwide (<http://www.projecthepinpire.net>).

<sup>3</sup> NASA Astrophysics Data System (ADS) is a digital library portal for researchers in astronomy and physics (<http://adswwww.harvard.edu/>).



**Figure 1: arXiv institutional downloads at main site by Internet domain of institutions (2009)**



**Figure 2: arXiv submissions by subject, 1991-2009**