

**Cornell University Library
arXiv Membership Program**

March 28, 2012

I. Introduction

arXiv Sustainability Initiative

In January 2010, Cornell University Library (CUL) undertook an effort to establish a long-term sustainable support model for arXiv, an open-access repository that has become an enormously valuable research communications tool all over the world. This effort aimed to reduce arXiv's financial burden and dependence on a single institution, instead creating a broad-based, community-supported resource.

CUL initially established a voluntary institutional contribution model and invited pledges from 200 libraries and research laboratories worldwide that represent arXiv's heaviest institutional users. This community-funding model entails a tiered structure, building on contributions of \$2,300 to \$4,000 per year based on the level of use.¹

This institutional contribution model was characterized as a three-year interim strategy for 2010-2012, with the goal of developing a long-term business and management plan by summer 2012. During this interim phase, CUL is covering 15% of the direct annual expenses of running arXiv, plus all indirect costs. The short-term contribution model has been successful and, with Cornell's contributions, resulted in sufficient funds to cover all direct expenses for 2010 and 2011. It also created a contingency fund of approximately \$125,000.

During the last two years, CUL has started to assess and strengthen arXiv's IT, service, and policy infrastructure. One goal has been to communicate the developments in a timely manner to the community.² To seek input from the key stakeholders, CUL convened an external sustainability advisory group discuss the planning process.³

Simons Foundation Planning Grant

In September 2011, the Simons Foundation provided Cornell with a \$60,000 planning grant to support arXiv's transition from CUL's exclusive initiative to a collaboratively governed,

¹ The white paper that describes the rationale behind the current business model is available at <http://arxiv.org/help/support/whitepaper>

² arXiv's website includes a section with sustainability planning information, including lists of heavy users for calendar years, institutional contributors, annual budgets, and quarterly updates at [arXiv.org/help/support](http://arxiv.org/help/support)

³ Information about the group, which will complete its term in April 2012, can be found at: http://arxiv.org/help/support/sustainability_advisory_group

community-supported resource. Contingent on the outcomes of this process, the Foundation signaled its interest in further supporting arXiv. Because the Simons Foundation is interested in a collaborative business model that engages libraries and research labs, its long-term financial support would take the form of a matching fund. This fund could include up to \$300,000 per year, based on the amount other institutions commit to maintaining and enhancing arXiv. The Foundation would start with five-year funding for 2013-2017 and would consider renewing support for an additional five years, based on the outcomes of the first phase.

As a part of the initiative, the arXiv team invited the university librarians and consortia leads of the top 100 heaviest users to discuss a new membership model and associated principles. The meetings were held on Feb. 1, 2012, in New York City (hosted by Columbia University Libraries) and on Feb. 13, 2012 in Frankfurt, Germany (hosted by the Max Planck Institute). They included representation from 111 institutions, representing nine countries: China, Canada, France, Germany, Japan, Netherlands, Switzerland, the U.K., and the U.S. The arXiv team focused on the top 100 institutions and representatives to maintain a group size that would encourage interactive and comprehensive discussion. These meetings were very productive, and they generated several recommendations to clarify and strengthen the proposed plan.

This document outlines CUL's current plans for transitioning arXiv to a membership model and the role of institutional contributors as partners in supporting Cornell in qualifying for funding from the Simons Foundation. It presents a funding scenario based on a five-year commitment for 2013-2017, targeting the 200 heaviest institutional users of arXiv. Based on this implementation, the ultimate goal is to fine-tune and expand the program for 2018-2022 in order to put in place a 10-year plan. The following section offers a set of principles to delineate the editorial, operational, and economic procedures and values of arXiv. These guidelines support the membership model.

II. Operating Principles

General & Editorial Principles

1. arXiv provides an open-access repository of scientific research to authors and researchers worldwide.
2. arXiv is a scholarly communication forum informed and guided by scientists and the scientific cultures being served.
3. Access to arXiv content via arXiv.org is free to individual end users.
4. Individual researchers can deposit their own content in arXiv for free.

5. Criteria and standards for depositing content in arXiv are maintained by the Scientific Advisory Board, and deposit is governed by transparent and publicly posted policies and procedures.
6. arXiv serves the needs of researchers in physics, mathematics, computer science, quantitative biology, quantitative finance, and statistics. Any expansion into other subjects or disciplines must include scholarly community support, satisfy arXiv's quality standards, and take into consideration its operational capacity and financial requirements.
7. Whenever possible, arXiv adopts open-source software and relevant standards and best practices.

Governance Principles

Role of Cornell University Library

1. CUL holds the overall responsibility for arXiv's operation and development, with strategic and operational guidance from its Member Advisory Board (MAB) and its Scientific Advisory Board (SAB).
2. Cornell University Library:
 - a. Manages the moderation of submissions and user support, including the development and implementation of policies and procedures;
 - b. Operates arXiv's technical infrastructure, including system maintenance, standards implementation, and development initiatives for incorporating new features and services.
 - c. Coordinates and facilitates the meetings and deliberations of Member and Scientific Advisory boards.
 - d. Provides interfaces and data access to support open reuse of arXiv data.
 - e. Assumes responsibility for archiving to ensure long-term access and maintains arXiv mirror sites.
 - f. Establishes and maintains collaborations with related initiatives to improve services for the scientific community through interoperability and through sharing tools and software.
 - g. Administers the arXiv membership program and assumes ultimate financial responsibility for running arXiv.
 - h. Maintains a transparent and open communication strategy to engage and inform arXiv's key stakeholders.

- i. Bears responsibility for developing a succession plan in the event it can no longer host the service.

Role of the Member Advisory Board

1. A Member Advisory Board is elected from arXiv's membership and serves as a consultative body.
2. The board represents participating institutions' interests and advises CUL on issues related to repository management and development, standards implementation, interoperability, development priorities, business planning, and outreach and advocacy.
3. Membership in arXiv and representation on the MAB is reserved for libraries, research institutions, laboratories, and foundations that contribute to the financial support of the service.
4. Voting for representatives to the MAB is open to all eligible member institutions, each of which shall have one vote.⁴ Member institutions may delegate their representation to a consortium or other proxy,⁵ with the voting representation of such proxies being equal to the number of members represented.
5. The MAB is chaired by the arXiv Program Director from CUL and includes two members of the Scientific Advisory Board as non-voting *ex officio* members. The CUL IT and user-support leads attend meetings as non-voting members to participate in discussions and provide background information.
6. The MAB reviews and comments arXiv budgets proposed by CUL.

Role of the Scientific Advisory Board

1. The Scientific Advisory Board is composed of scientists and researchers in areas covered by arXiv. Chairs of subject Advisory Committees serve as *ex officio* members of the board. The selection process for the remaining members will be delineated in arXiv board bylaws.
2. The SAB selects a Chair from among its members. The Chair works with the arXiv director of user support to coordinate SAB activities. The roles of the Chair and the arXiv director of user support, with respect to the SAB, will be specified in arXiv board bylaws.

⁴ To ensure equity between members, the bylaws will define an "eligible member" as an institution paying the full membership fee. As a result, a consortia or other proxy's representation for selecting the Advisory Board will be determined by the number of full equivalent memberships (e.g., if a consortium has 10 members, but pays a fee equivalent to 9 memberships, then it would represent 9 votes).

⁵ Funders may make their payment of membership fees for individual institutions conditional on those institutions designating the funder their proxy. However, monitoring such requirements would be beyond arXiv's purview.

3. The SAB:

- a. Provides advice and guidance pertaining to the intellectual oversight of arXiv, with particular focus on the policies and operation of arXiv's moderation system.
 - b. Reviews the criteria and standards for deposit in arXiv and proposes revisions to those criteria and standards as it deems warranted.
 - c. Proposes new subject or discipline domains to be covered by arXiv and/or reviews proposals for such domains.
 - d. Provides scientist feedback on arXiv development projects proposed by the MAB.
 - e. Makes recommendations regarding development projects — in particular, suggestions about improvements to the systems that support submission and moderation processing.
4. Two members of the MAB serve as non-voting *ex officio* members of the SAB.
 5. The CUL IT and user support leads attend SAB meetings as non-voting members to participate in discussions and provide background information.

General Governance Principles

1. To ensure transparency and accountability, arXiv provides annual operational and financial reports to member institutions.
2. The SAB and the MAB operate in parallel, complementing each other and providing essential input for CUL.⁶ To this end, the SAB appoints two members to serve as non-voting *ex officio* members of the MAB; the MAB appoints two members to serve as non-voting *ex officio* members of the SAB.
3. Members acknowledge that the host institution's legal obligations and fiduciary responsibilities place practical constraints on the formal governance structure and terms. Within these constraints, arXiv is committed to adhering to the stated governance principles, and to review periodically these principles.

Economic Principles

1. arXiv is supported financially by Cornell University Library and a global collective of institutional members, potentially supplemented by foundation grants.

⁶ Specifics of the composition, terms, selection, and goals of the Scientific Advisory Board and the Member Advisory Board will be articulated in the groups' bylaws (to be developed).

2. CUL has committed to contribute a cash subsidy of \$75,000 per year in support of arXiv's operational costs and an in-kind contribution of all indirect costs, which currently represents 37% of total arXiv operating costs.⁷
3. Each member institution pledges a five-year initial funding commitment to support arXiv.⁸ Membership fees may be adjusted annually to ensure that arXiv is sustained at an acceptable level of service, as determined by Cornell University in consultation with the MAB and the SAB.
4. Membership fees are equitable and based on an explicit fee structure.
5. Board proposals to CUL for service upgrades or development projects that require supplemental funding (that is, costs additional to the costs incurred for operating and maintaining the service) must identify the source of such funding prior to the upgrade being implemented.
6. Any fees for value-added services will be set at a level sufficient to recover the cost of providing the service and to contribute to arXiv operating costs. Supplemental services need to be provided on transparent and non-discriminatory terms, avoiding exclusive partnerships.
7. After a successful initial membership offering, if members' financial support falls below the level Cornell deems adequate to maintain arXiv at an acceptable level of quality, contingency funds will be used for two years to allow time for Cornell to secure sufficient funding support. Failure to do so may result in the development of an exit strategy, including the transition of arXiv to another institution.

III. Interim Member Advisory Board

Based on the recommendation of the planning meeting participants, the interim Member Advisory Board will be constituted by Cornell University Library and represent various constituent types. By May 2012, CUL intends to establish an initial MAB that includes representatives from CUL and the institutions that make a five-year financial commitment; a liaison from the Scientific Advisory Board; and a member appointed by the Simons Foundation. Between June and October 2012, the MAB's goals are to:

⁷ CUL's indirect costs include library and departmental administration; staff support (finance/budget, human resources, facility staff, and staff IT); and maintenance, custodial, utility, and other facility related costs for the building.

⁸ See the arXiv Membership Program section about the specifics of the five-year commitment.

- Review and ratify bylaws for the MAB that specify its operations, including member appointment methods, terms, and conditions;⁹
- Test potential governance scenarios to better understand the dynamics among the CUL team, MAB, and SAB to further fine-tune the principles and respected responsibilities;
- Develop guidelines for contingency fund use;
- Further delineate what is free for all users and what is for fee for both members and non-members (value-added services);¹⁰
- Continue to seek additional member institutions.

IV. arXiv Membership Program

Goals of Membership Program

CUL seeks to establish a membership program to generate the institutional contributions required to sustain arXiv and to match the funding possibility presented by the Simons Foundation. Because arXiv will continue to provide a free open-access service, the membership model must overcome the free rider problem inherent in public goods. That is, although arXiv as a public good can only be supported through collective funding, the service will benefit an institution whether or not it participates in the cooperative action. Unless motivations compel heavy institutional users of arXiv to support the service, contributions to the service would be essentially voluntary, and such voluntary contributions may conflict with policy restrictions at publicly funded institutions that preclude such contributions.

The purpose of the arXiv membership program is to create a model that will allow exclusive benefits for participating organizations; however, the arXiv operating principles effectively limit the type of exclusive benefits that can be offered to participating member institutions. For example, arXiv cannot offer preferential submission benefits to authors from member institutions without appearing to disenfranchise authors from non-participating institutions. Therefore, the

⁹ A similar process will take place within the current Scientific Advisory Board to review and ratify bylaws for the Member Advisory Board to specify appointment methods, terms, and conditions. Working with CUL, the MAB will also assess the idea of appointing a scientific leader — a part-time position to provide intellectual leadership from the perspective of the scientific community.

¹⁰ An example of a value-added service are specialized or detailed statistics beyond what is provided to members, integration with ORCID or local ID systems in bulk. Scope of such services will be determined by the MAB with input from SAB and need to factor in arXiv's operational and development priorities.

exclusive benefits to arXiv members cannot impinge on provision of the service or its principles. The benefits proposed as a part of the membership program include:¹¹

- Participation in arXiv’s ongoing governance, including providing input for project prioritization, new service offerings, financial planning, use of discretionary funds, future technical developments, and policy decisions;
- Access to enhanced institutional use statistics;
- Public acknowledgement of the members’ role in financial support, as well as their contribution to arXiv’s operation and strategic direction.¹²

arXiv Financial Projections for 2013-2017

As indicated in Table 1, arXiv’s operating costs for 2013-2017 are projected to total approximately \$4.1 million, or an average of \$826,000 per year. Based on a decade of operating experience, CUL considers the funding requirements detailed in Appendix A to represent the minimum for providing an acceptable level of service.

Table 1: arXiv Operating Costs, 2013 – 2017

Description	2013	2014	2015	2016	2017	Total
Staff Costs	\$ 537,410	\$ 473,585	\$ 489,875	\$ 548,925	\$ 568,140	\$ 2,617,935
Other Direct Costs	74,095	76,690	79,375	82,155	85,030	397,345
<i>Subtotal Direct Costs</i>	611,505	550,275	569,250	631,080	653,170	3,015,280
Indirect Costs	226,255	203,600	210,620	233,500	241,675	1,115,650
Total Operating Costs	\$ 837,760	\$ 753,875	\$ 779,870	\$ 864,580	\$ 894,845	\$ 4,130,930

CUL will continue to cover a significant percentage of arXiv’s operating costs, including \$75,000 per year in support of direct operational costs and the indirect expenses that constitute 37% of direct expenses. CUL’s contribution commitment is summarized in Table 2.

¹¹ There are several other benefits that CUL will consider working closely with the advisory boards. For instance, one interest area is automatic posting of arXiv submissions to the institutional repository at an author’s host institution. Another idea is creating a members’ portal to provide timely information for the participating institutions. Such potential benefits need to be further explored to understand delivery and maintenance requirements for the CUL team.

¹² Currently, the sustainability initiative information, including a list of arXiv supporters, is available under the Help option from the main menu (<http://arxiv.org/help/support>). Through IP identification, the users of these institutions see an acknowledgement banner to indicate support from the home institution. We are planning to make this information more prominent for arXiv’s users, specifically to communicate the contributions of the participating libraries and research laboratories to the institutional scientists. Also critical is to raise awareness about the resource needs for running scientific repositories and the roles of member libraries in securing arXiv’s future.

Table 2: Cornell University Support Commitment, 2013 – 2017

Contribution Type	2013	2014	2015	2016	2017
Direct Contribution	\$ 75,000	\$ 75,000	\$ 75,000	\$ 75,000	\$ 76,500
Indirect Contribution	\$ 226,255	\$ 203,600	\$ 210,620	\$ 233,500	\$ 241,675
Total Cornell Contribution	\$ 301,255	\$ 278,600	\$ 285,620	\$ 308,500	\$ 318,175

As Table 3 indicates, after taking into account the financial contributions of Cornell and a potential challenge grant from the Simons Foundation, arXiv will require additional funding of approximately \$1.14 million for 2013-2017, an average of \$228,000 per year.

Table 3: arXiv Fund Raising Goal, 2013 – 2017

Description	2013	2014	2015	2016	2017	Total
Total Operating Costs	\$ 837,760	\$ 753,875	\$ 779,870	\$ 864,580	\$ 894,845	\$ 4,130,930
Less CUL Commitment	\$ 301,255	\$ 278,600	\$ 285,620	\$ 308,500	\$ 318,175	\$ 1,492,150
Fundraising Goal	\$ 536,505	\$ 475,275	\$ 494,250	\$ 556,080	\$ 576,670	\$ 2,638,780
Less Simons Foundation Matching Grant	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000	\$ 300,000	\$ 1,500,000
Membership Fees	\$ 236,505	\$ 175,275	\$ 194,250	\$ 256,080	\$ 276,670	\$1,138,780
Average annual funding gap:						\$ 227,756

Membership Fee Levels¹³

Table 4 presents the fee levels, income, and participation rates required to sustain arXiv operations given the funding requirements summarized in Table 3.

¹³ The variations in different national procurement policies will require that the terminology used to present the arXiv participation offer be tailored to serve the needs of participating organizations. For convenience, this document uses the terms “member,” “membership,” “contribution,” etc. to characterize the program.

Table 4: Provisional arXiv Fees & Participation Assumptions, 2013

Usage Rank	Provisional Fee	Uptake %	Fee Income	Participating Institutions
1 - 50	\$ 3,000	78%	\$117,000	39
51 - 100	\$ 2,500	64%	\$80,000	32
101 -150	\$ 2,000	54%	\$54,000	27
151 +	\$ 1,500	42%	\$31,500	21
Total:			\$282,500	119

Weighted average fee: \$ 2,374

The institutional participation assumptions in Table 4 are in line with the commitments that CUL has received to date, based on a conservative projection. As Table 4 indicates, the weighted average fee — that is, the average arXiv fee, taking into account the number of participating institutions at each fee level — would be \$2,374 in 2013.

Table 5 shows the institutional fees available to fund arXiv, assuming that membership fees increase at an average rate of 2 % per year. Of course, the fees would decrease as the number of participating institutions increases. The purpose of the arXiv contingency fund is to support unexpected expenses to ensure a sound business model.¹⁴ Appendix B summarizes 10-year financial scenarios under three alternative fee structures.

Table 5: Operating Projection at Provisional Fee Levels

Description	2013	2014	2015	2016	2017	Total
Membership Fees	\$ 236,505	\$ 175,275	\$ 194,250	\$ 256,080	\$ 276,670	\$1,138,780
Participating institutions	119	119	119	119	119	
Weighted average institutional fee*	\$ 2,374	\$ 2,420	\$ 2,470	\$ 2,520	\$ 2,570	
Institutional fees at minimum # of participants	\$ 282,500	\$ 287,980	\$ 293,930	\$ 299,880	\$ 305,830	\$1,470,120
Annual Operating Contingency/(Deficit)	\$ 45,995	\$ 112,705	\$ 99,680	\$ 43,800	\$ 29,160	
Cumulative Contingency/(Deficit)	\$ 45,995	\$ 158,700	\$ 258,380	\$ 302,180	\$ 331,340	

* 2014 - 2017 fee reflects an average annual increase of 2.0%.

¹⁴ Currently, arXiv has a contingency fund of approximately \$125,000 accumulated during the last two years due to unexpected staff vacancies and other savings, such as transition to virtual servers. Guidelines for the use of these funds will be discussed with the Member Advisory Board.

Appendix A: arXiv Budget Projection, 2013-2017

Projected arXiv Staff FTE, 2013 – 2017 (Direct Costs)

Position Description	2013	2014	2015	2016	2017
User support (staff)	3.0	3.0	3.0	3.5	3.5
User support (student)	0.36	0.36	0.36	0.36	0.36
Programming & system maintenance	2.25	1.5 ¹	1.5	1.5	1.5
Management & administration	0.5	0.5	0.5	0.5	0.5
Total FTE:	6.11	5.36	5.36	5.86	5.86

¹ *Invenio implementation complete*

Projected Expenses, 2013 – 2017

Expense ¹	Description	2013	2014	2015	2016	2017
Staff						
	User support (staff)	228,405	236,400	244,680	295,453	305,795
	User support (student)	8,500	8,500	8,500	8,500	8,800
	Programming & system maintenance	238,669	164,685	170,453	176,415	182,590
	Management & administration	61,835	64,000	66,240	68,558	70,955
	<i>Subtotal Staff Costs</i>	<i>537,409</i>	<i>473,585</i>	<i>489,873</i>	<i>548,925</i>	<i>568,140</i>
Other Direct Costs						
	Server costs ²	41,700	43,160	44,670	46,235	47,855
	Network bandwidth & telephony	1,550	1,605	1,660	1,720	1,780
	Staff computers, software & supplies	1,865	1,930	2,000	2,070	2,140
	Staff travel	8,280	8,570	8,870	9,180	9,500
	Advisory group travel support	20,700	21,425	22,175	22,950	23,755
	<i>Subtotal Direct Costs</i>	<i>74,095</i>	<i>76,690</i>	<i>79,375</i>	<i>82,155</i>	<i>85,030</i>
Indirect Costs						
	Facilities ³	67,265	60,530	62,617	69,419	71,849
	Department administration & staff support ⁴	158,991	143,072	148,004	164,081	169,824
	<i>Subtotal Indirect Costs</i>	<i>226,256</i>	<i>203,602</i>	<i>210,622</i>	<i>233,500</i>	<i>241,673</i>
	Total Expenses	837,760	753,877	779,869	864,580	894,843

¹ *Average annual cost increase, 2013 onwards is 3.5%.*

² *Server amortization, hosting, hardware maintenance, storage, and backup.*

³ *Calculated at 11% of direct costs.*

⁴ *Calculated at 26% of direct costs.*