

Establishing a China ArXiv Service Working Group to Promote Effective Participation in OA Activities

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Abstract

ArXiv is an important open-access system operated by Cornell University Library, playing a significant role in the international scientific community. To promote the adoption of ArXiv in relevant fields in China and encourage the Chinese research community to actively participate in the submission of ArXiv preprint papers and the effective utilization of resources, the National Science Library launched an initiative in August 2012 to establish a China ArXiv Service Working Group, which received responses from many major domestic libraries. On October 22, 2012, during the “China Open Access Promotion Week,” ten major domestic institutions established the China ArXiv Service Working Group. This paper primarily explores the special status of ArXiv in the open publication of scientific research achievements, analyzes the primary applications of ArXiv within the Chinese scientific and technological community, and discusses how the China ArXiv Service Working Group can more effectively promote the adoption and application of ArXiv in the Chinese scientific and technological community.

Full Text

Preamble

Establishing the China ArXiv Service Group to Promote Effective Participation in Open Access Activities

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Abstract

ArXiv is a crucial open-access system operated by Cornell University Library

that plays a significant role in the international scientific community. To promote the adoption of ArXiv in relevant fields within China and to encourage Chinese researchers to actively participate in depositing preprints and utilizing ArXiv resources effectively, the National Science Library initiated a proposal in August 2012 to establish a China ArXiv Service Group, which received positive responses from several major domestic libraries. On October 22, 2012, during the “China Open Access Week,” ten leading institutions formally established the China ArXiv Service Group. This paper examines ArXiv’s unique position in the open publication of research findings, analyzes its current application within China’s scientific community, and discusses how the China ArXiv Service Group can more effectively promote ArXiv’s adoption and utilization among Chinese scientists.

Keywords: ArXiv; service group; open access; open publishing

1. ArXiv: A New Model Supporting Open Publication of Research Findings

1.1 The Continuous Development of ArXiv

ArXiv is a vital open repository system created by quantum physicist Paul Henry Ginsparg in 1991 [1]. Initially established at the Los Alamos National Laboratory in the United States, it has been operated by Cornell University Library since 2001. This important open repository provides services for depositing, retrieving, publishing, and sharing preprints in physics, mathematics, computer science, quantitative biology, and statistics. As of October 2012, it had stored over 790,000 research papers [2] and has become an essential academic communication infrastructure in these research fields, playing a significant role in the international scientific community. According to 2011 data, ArXiv added 76,578 new papers that year, while downloads exceeded 50 million [3].

Since January 2010, Cornell University Library has undertaken a three-year exploration of a long-term sustainable development model for ArXiv, promoting its transformation from a system solely managed by Cornell to a membership governance model with multi-institutional collaboration and support from multiple stakeholder groups. On August 28, 2012, Cornell University Library’s proposed sustainable development model for ArXiv received funding from the Simons Foundation. Under this grant, the Simons Foundation will provide matching funds of \$300,000 的 ArXiv 会员费。同时每年 “无条件赠予” 康乃尔大学图书馆 \$50,000 annually from 2013 to 2017 to support ArXiv’s operations and management [4]. This funding provides an important foundation for ArXiv’s future sustainability, while Cornell’s new membership and governance model will ensure ArXiv’s continued growth and success.

1.2 The Poincaré Conjecture Proof: A Classic Case of ArXiv's Impact

Since its creation, ArXiv has supported open publication of research findings through a novel approach distinct from traditional publishing. Russian mathematician Grigori Perelman's proof of the Poincaré Conjecture at the turn of the 21st century serves as a classic example of ArXiv's important position in the scientific community. After spending over eight years researching this ancient mathematical problem, on November 11, 2002, Perelman submitted a paper titled "The entropy formula for the Ricci flow and its geometric applications" to ArXiv [5] and emailed the abstract to several mathematicians. In the abstract, Perelman stated that this paper presented the main framework for proving the Poincaré Conjecture. Subsequently, on March 10, 2003, and July 17, 2003, Perelman submitted two additional key papers to ArXiv: "Ricci flow with surgery on three-manifolds" [6] and "Finite extinction time for the solutions to the Ricci flow on certain three-manifolds" [7].

These three papers were submitted only to ArXiv and never published in any formal journals, yet they sparked significant discussion and debate in the mathematics community [8]. By October 2005, most experts in the international mathematics community had recognized Perelman's work as a valid proof of the Poincaré Conjecture. Based on these three papers "published" on ArXiv, Perelman was awarded the Fields Medal on August 22, 2006 [9]. In 2006, *Science* magazine listed the proof of the Poincaré Conjecture as the Breakthrough of the Year [10], marking the first time *Science* had given this honor to a mathematics achievement. On March 18, 2010, Perelman was awarded the Clay Millennium Prize for solving the Poincaré Conjecture, one of the seven Millennium Prize Problems [11]. However, the unconventional Perelman declined both the Fields Medal and the Millennium Prize.

1.3 The Daya Bay Neutrino Experiment: The Impact of a New Open Publication Model

While Perelman's example reflects ArXiv's important status in the scientific community, the 2012 discovery of a new neutrino oscillation by Chinese scientists highlights how ArXiv's novel open publication model has profoundly impacted traditional scientific research [12].

On March 8, 2012, Wang Yifang, spokesperson for the Daya Bay Reactor Neutrino Experiment collaboration, announced in Beijing the discovery of a new type of neutrino oscillation [13]. A key paper in this research was "Observation of electron-antineutrino disappearance at Daya Bay" [14]. This paper was submitted to *Physical Review Letters* on the evening of March 7, and its preprint was deposited to ArXiv for open publication on March 8, 2012. According to Cao Jun, a researcher at the Institute of High Energy Physics and the paper's corresponding author, the paper was not accepted by *Physical Review Letters* until April 1, 2012, but "from submission on March 7 to acceptance, over 24 days, it had already been cited 22 times" [15]. This means the preprint on ArXiv

received 22 citations within 24 days before being formally accepted by a journal. More notably, another paper that cited this not-yet-formally-published work – “Implications of the Daya Bay observation of θ_{13} on the leptonic flavor mixing structure and CP violation” [16]—had itself been cited 6 times by April 1, 2012, also thanks to ArXiv’s innovative publication model. The paper “Observation of electron-antineutrino disappearance at Daya Bay” was not published online in *Physical Review Letters* until April 23, 2012, and was not included in Volume 108, Issue 17 of the journal until April 27, representing a 51-day lag from submission to formal publication.

2. Current Status of ArXiv Usage in China’s Scientific Community

ArXiv has become a new, important, essential, and indeed preferred channel for academic exchange in international research fields of physics, mathematics, computer science, advanced mathematics (nonlinear science), mathematical biology, and statistics. However, apart from some high-level research institutions, awareness and application of ArXiv within China’s scientific community remain at a relatively low level.

2.1 China’s ArXiv Usage Does Not Match Its Status as a Mathematics and Physics Powerhouse

According to 2011 ArXiv usage statistics, downloads from China’s scientific community accounted for only 4% of total downloads, ranking behind the United States (26%), Germany (12%), the United Kingdom (8%), Japan (7%), France (6%), and Italy (5%). This figure does not align with China’s position as a major research power in mathematics and physics.

From an institutional usage perspective, top-tier research institutions are the primary users of ArXiv. In 2011, an analysis of ArXiv article downloads by institutional domain showed that the top-ranking institutions were all leading research organizations, including the Max Planck Society, CERN, the University of Tokyo, the University of Cambridge, Harvard University, the University of Oxford, Kyoto University, Princeton University, UC Berkeley, and the French National Institute of Nuclear and Particle Physics [17]. Among Chinese institutions, only Tsinghua University and the Institute of High Energy Physics (IHEP) of the Chinese Academy of Sciences ranked within the top 200, at positions 29 and 39 respectively. In fact, over the past three years, these two institutions have consistently ranked within the top 50 ArXiv users. In 2009, IHEP ranked 35th and Tsinghua 38th; in 2010, Tsinghua ranked 36th and IHEP 37th. Apart from these two institutions, no other Chinese organizations entered the top 200 user list in 2009 or 2010.

Based on three years of statistical data provided by ArXiv, we conducted a sta-

tistical analysis of usage by major Chinese research institutions, summarized in Table 2. Our findings reveal several key issues: (1) China's scientific community ranks low in ArXiv usage, with only IHEP and Tsinghua University among the top 200, which does not correspond to Chinese research institutions' standing in physics and mathematics; (2) Usage rankings have declined significantly—for example, Lanzhou University dropped from 329th in 2009 to 462nd in 2010, and further to 902nd in 2011; (3) Chinese research institutions primarily use ArXiv for physics-related fields, and despite ArXiv's expansion into six domains, for Chinese researchers it remains largely a preprint system for physics and mathematics; (4) Even within physics and mathematics, Chinese research institutions lack sufficient awareness and understanding of ArXiv's importance, with some library websites failing to effectively highlight and promote this important resource.

2.2 Early Involvement and Exploration by Some Domestic Institutions

Some Chinese research institutions have recognized ArXiv's importance and actively taken steps to promote its adoption in China. As early as 1998, the Institute of Theoretical Physics of the Chinese Academy of Sciences established the ArXiv China mirror site, cn.arxiv.org [18], providing quality services to Chinese researchers. In 2012, to ensure the long-term sustainable operation of the ArXiv China mirror, the Institute of Theoretical Physics and the National Science Library agreed to strengthen cooperation on mirror site services. According to the needs of ArXiv's international cooperative sustainability plan, the two institutions would jointly operate the ArXiv China Mirror Service, with the National Science Library specifically responsible for long-term and sustainable system operation, technical services, and data preservation, as well as for liaison and communication with relevant departments at Cornell University Library. Through this initiative, the two institutions hoped to effectively integrate ArXiv into the Chinese Academy of Sciences' and national scientific literature support system to better serve Chinese researchers.

The National Science Library also actively participated in ArXiv's international cooperative funding plan on behalf of Chinese Academy of Sciences users, contributing \$4,000 annually as a Tier 1 user from 2010 to 2012. In 2012, following the Simons Foundation's recognition of ArXiv's sustainable development model, ArXiv's membership model was set to begin implementation in 2013. Both the National Science Library (representing Chinese Academy of Sciences users including IHEP) and Tsinghua University Library actively supported this new model, with both Chinese institutions pledging their commitment.

3. Establishing the China ArXiv Service Group to Serve Chinese ArXiv Users

3.1 The Establishment of the China ArXiv Service Group

To promote the full utilization of ArXiv by Chinese research institutions, the National Science Library, in consultation with Cornell University Library, initiated a proposal in August 2012 to establish the China ArXiv Service Group (ArXiv China Service Group). The plan was to invite several service-capable units from research institutions that frequently submit to and use ArXiv resources to jointly form the working group.

On September 28, 2012, representatives from ten institutions—including the National Science Library, Tsinghua University Library, Peking University Library, Fudan University Library, Shanghai Jiao Tong University Library, Jilin University Library, Nanjing University Library, the Institute of High Energy Physics, the Institute of Theoretical Physics, and the Academy of Mathematics and Systems Science—held a preparatory meeting in Beijing. All attending representatives endorsed the proposal and unanimously agreed to establish the China ArXiv Service Group.

During the China Open Access Week held from October 22-24, 2012, these ten institutions officially announced the formation of the China ArXiv Service Group and held its first working meeting to define the group's objectives, tasks, and operational mechanisms.

3.2 Objectives and Tasks of the China ArXiv Service Group

The China ArXiv Service Group is a “service” organization that strongly recognizes the necessity of promoting ArXiv among Chinese research institutions and believes that Chinese research organizations should participate in and contribute to the development of professional or domain-specific open knowledge repositories internationally. The working group will adopt an open and innovative operational mechanism based on collective interaction and mutual assistance, operating in a non-administrative, open framework to unite committed stakeholders and effectively serve Chinese ArXiv users. The National Science Library and Tsinghua University Library serve as co-conveners of the working group, with the secretariat located at the National Science Library [20].

The China ArXiv Service Group will strive to promote the full utilization of ArXiv by Chinese research institutions, strengthen domestic publicity and training for ArXiv, participate in ArXiv's international support plan, and promote the application and development of professional or domain-specific open knowledge repositories internationally. Specifically, the working group will collaborate to achieve four objectives: (1) promote Chinese scientific community participation in ArXiv; (2) conduct ArXiv user training; (3) participate in ArXiv's international support plan; and (4) promote the application and development of professional or domain-specific open knowledge repositories internationally.

[21].

To achieve these objectives, the China ArXiv Service Group will undertake four tasks: (1) promote ArXiv in China, mobilize Chinese scientists to deposit content, and encourage Chinese researchers and students to fully utilize the ArXiv system; (2) represent China in advancing ArXiv's development, including surveying user opinions and participating in the development of open and personalized ArXiv services; (3) facilitate ArXiv application and promote the development of Chinese domain-specific and institutional repositories through the China ArXiv User Group forum; and (4) participate appropriately in implementing ArXiv's international support plan.

3.3 Specific Work Plan of the China ArXiv Service Group

For the 2012-2013 period, the China ArXiv Service Group has established a more detailed action plan [22], which includes the following activities:

- (1) **Intensify domestic publicity and training for ArXiv:** Through presentations and training, actively mobilize Chinese scientists to deposit content and promote full utilization of the ArXiv system by Chinese researchers. Specific activities include inviting relevant personnel from Cornell University Library to give presentations at Peking University, Tsinghua University, and the Institute of High Energy Physics, and conducting training for researchers and students at 20-30 top Chinese institutions in physics, mathematics, and computer science who are likely to deposit to or use ArXiv.
- (2) **Develop ArXiv publicity and training materials:** Create unified, standardized, and clear ArXiv publicity and training materials for use by working group members and other interested parties. The working group will collect and compile questions from Chinese ArXiv users, solicit supplementary input from member institutions, and develop a Chinese-language FAQ after consulting with Cornell University. It will also prepare ArXiv presentation slides, obtain relevant publicity materials and authorization from Cornell University Library, and develop unified presentation materials for member use while respecting intellectual property rights. Additionally, the group will translate and organize information about ArXiv and the China ArXiv mirror site services to develop training outlines and materials based on input from service working group members.
- (3) **Conduct a survey on ArXiv usage in China:** Through a comprehensive survey, investigate the level of awareness, usage patterns, and feedback from intensive physics, mathematics, and computer science research institutions to produce a relevant research report that accurately reflects Chinese users' opinions and suggestions regarding the ArXiv system.
- (4) **Submit development recommendations to ArXiv:** Based on the survey findings, combined with ArXiv's own development plans and in-

put from international supporting institutions, propose recommendations for improving and perfecting the ArXiv system and suggest ways Chinese institutions can undertake relevant responsibilities. This will enable the China ArXiv Service Group to play a substantive role in ArXiv's operation and management while enhancing the visibility of Chinese research institutions.

- (5) **Establish a working group communication forum:** Create an online forum for the ArXiv working group through the Chinese Institutional Repository Support Portal to organize information dissemination, provide publicity reports and work outcomes, and establish a regular communication and discussion mechanism among working group members.
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4. Conclusion

ArXiv is an open-access resource with high-quality information whose international influence continues to grow. However, there remains considerable room for expanding domestic researchers' awareness and utilization of this resource. To address this, we have established the China ArXiv Service Group. Through publicity campaigns, online forums, user surveys, and feedback mechanisms, we will support ArXiv's development and serve the needs of Chinese users.

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