

Stakeholders weigh costs of open-access publishing

As open access moves mainstream, publishers are concerned about who is going to fund their journals.

When Franco Nori of Japan's RIKEN research institute published a paper on electromagnetic surface waves in *Physical Review Letters* earlier this year, he and his coauthors took an unusual step: They paid to make their paper freely available for anyone to read. The scheme, called "Free to Read" by PRL's publisher, the American Physical Society (APS), is part of the burgeoning open-access publishing market.

Traditionally, publishers have relied on revenue from libraries and other subscribers to cover their costs, but that's changing. "Open access is often used as a catchphrase to describe many different and competing business models," says Mark Cassar, acting publisher of journals and technical publications at the American Institute of Physics (AIP, publisher of *PHYSICS TODAY*). Business models for open access include authors paying up to \$3000 per article—either as an option or, for open-access-only journals, as a requirement; institutions paying a \$20 000 blanket fee so their researchers can submit papers to a particular journal without author charges; and journals making papers freely available after a given time has elapsed.

The percentage of academic journals that offer open access recently surpassed 10%. For APS publications, it's more than 20%, although the author-pay model has generated minimal demand; only 1% of papers published annually across APS are open access, says the society's editor-in-chief, Gene Sprouse. Researchers, particularly in biomedical fields, tend to like open access because it makes articles more available, and librarians like it because at first glance it saves them money. As those groups exert pressure on publishers to move more journals to open access, two questions remain: Can publishers make money? And what are the long-term implications for researchers, publishers, and libraries?

Is open access viable?

Open-access models in which an author pays up front are generally "unsuccessful financially," says Jerry Cowhig, managing director of the UK's Institute of Physics Publishing. Few authors at AIP journals have taken advantage of the option of open access, adds Darlene

Walters, AIP's senior vice president of publishing. But, says Christopher Leonard, publisher of PhysMath Central (PMC), "This is hardly surprising given that there is an option not to pay." One publication that charges authors and is breaking even after more than a decade since its launch is the Optical Society of America's *Optics Express*.

Most publishers pursuing open-access-only strategies, such as the non-profit Public Library of Science and the privately held company BioMed Central (BMC), which just launched PMC, do so with grants from the UK's Wellcome Trust, the US National Institutes of Health (NIH), or other sources. PLoS also recently raised its author charges from \$1550 to \$2500 per article. In some cases pressure from funding agencies, governments, and cash-strapped institutions has led publishers to try open access as a business experiment in niche and interdisciplinary fields. And some scientific society publishers have reduced their author fees by as much as 25% to encourage authors to try open access, says Marc Brodsky, former executive director of AIP.

Physicists have been slower than biologists to embrace open access, partly because of the high profile of arXiv, a free preprint server. "ArXiv enjoys a symbiotic relationship with commercial journals," says Leonard. "The journals cover peer review and provide quality branding while arXiv disseminates information."

But thanks to pressure from European physicists, the *European Physical Journal* will become exclusively open access as soon as long-term financial support to cover realistic article-processing fees can be guaranteed by funding agencies and university consortia, says Christian Caron, senior physics editor at Springer, one of the journal's publishers. A consortium of European funding agencies is discussing ways to raise €10–13 million (about \$14–18 million) annually to pay for open access to particle-physics papers through direct contributions to journals such as *EPJ C* and *Physical Review D*. The group will have to raise about \$3.5 million a year from the US for the scheme to work, says APS's Sprouse.

In the US, an attempt to push legislation supporting open access failed last

year. However, Congress is considering an amendment to an appropriations bill that would require all peer-reviewed manuscripts from NIH-funded research to be free on the internet 12 months after publication, either in a repository, on the author's website, or on the publisher's website. APS and AIP are already in compliance with the bill's requirements, says Sprouse.

The adoption of new technology has dropped the cost of producing journals to a level at which a small publisher can compete with a larger rival, says PMC's Leonard. "It will probably take 18 months to break even depending on the number of articles we publish." APS treasurer Joseph Serene is not convinced that PMC's costs will remain competitive as the publisher expands its open-access offerings. "Doing editing and peer review well is expensive," he says. "There are no shortcuts."

The cost of conducting peer review also worries Yale University librarian David Stern, a critic of open access. If small libraries and corporations switch to preprint servers or repositories to provide the material previously obtained from traditional journals, it could be devastating for publishers, he says. As a consequence, he warns, remaining subscribers will wind up paying more.

In addition, there is some evidence that the standards of peer review could be weakened with the introduction of open access. For example, the new PMC *Physics A* editorial guidelines state: "In the absence of compelling reasons to reject, PMC *Physics A* advises that reviewers recommend acceptance, as ultimately the quality of an article will be judged by the scientific community after its publication."

Why pay for journals?

Costs for subscribing institutions are also an issue. Open-access journals "aren't necessarily cheap," says physics librarian Robert Michaelson of Northwestern University in Evanston, Illinois. "Open-access models that involve article charges [in which the author's institution pays the author or membership fee] may be as costly or more costly than traditional journals for large research institutions that publish many articles in them—although they probably will be much cheaper, or even free, for small schools." Budget cuts have already led some institutions, such as the University of Texas Health Science Center at Houston and Baylor College of Medicine, to drop their BMC membership subscriptions.

As papers are deposited in university and funding-agency open-access repositories, and as the rise of new Web-based search tools is making finding papers easier, librarians are faced with the question, Why pay for journals at all? "So far, open access adds to the economic burden. At some point, at least some administrators will probably start questioning why we are subscribing to physics journals," says librarian Ben Wagner of the University at Buffalo. Librarian Debra Bailey Kolah of Rice University agrees, "If our budgets were to get tight again, we would consider dropping something that was covered in an open-access site."

The COUNTER statistics with which many librarians track usage of online journals as an aid to deciding which journals to subscribe to also work against publishers. "If people are reading the preprint via arXiv or pulling the data from another source—author website [or] repository, as is often done via Google—the article will not be recorded as read at the publisher site," says Yale's Stern.

"Author charges are also a nightmare for institutional auditors and planned budgeting," Stern adds. If open-access journals make big inroads into the current subscription model, he says, publishers and research funders

will have to consider splitting funding into separate schemes for peer review and distribution.

"A real carrot"

One study of articles in the *Proceedings of the National Academy of Sciences* found that, compared with subscription-only papers, articles whose authors paid for open access saw their citations jump by as much as 250% (G. Eysenbach, *PLoS Biology*, volume 4, page e157, 2006). "This is a real carrot," says Wagner, "especially with a noticeable shift from journal impact factors to total citation counts for tenure or promotion." A study on similar statistics for a physics journal has yet to be undertaken, but a study on papers published in leading astronomy journals saw no impact because of open access (M. J. Kurtz et al., *Information Processing and Management*, volume 41, page 1395, 2005).

But the attention on open access might be hiding other changes the internet has wrought in publishing. Brodsky points out that due to publisher innovations in technology and distribution models, "more people have more access to more science literature than at any time in history, and they are using it more." Asks APS's Serene, "Isn't that a form of open access?"

Paul Guinnessy

Cohen reorganizes DHS science with "customer-focused" research

Viewing scientists and researchers as "input mechanisms" for his directorate, the new science and technology undersecretary says he is open to all ideas but insists on technology that works.

Jay Cohen, the retired rear admiral and former submarine commander who has taken the helm as undersecretary of the science and technology directorate at the Department of Homeland Security (DHS), worked the crowd in the hallways of the Ronald Reagan building like a professional politician—with a smile, a firm handshake, and eye contact. The event was a four-day conference in mid-May on how defense contractors could better do business with the newly reorganized science and technology directorate.

The conference, sponsored by the National Defense Industrial Association, was a showcase of high-tech gear. Even the name badges worn by the participants were electronic, allowing the exchange of business-card information merely by beaming them at each other. Despite the flash of the technology on display, the message Cohen and other

DHS officials delivered was blunt and cautionary.

"We don't buy no junk," Cohen told the contractors in the auditorium. "My experience in S&T is that about half the stuff presented doesn't work. That doesn't mean we don't want to hear about it, but in the end it had better work." Michael Jackson, a DHS deputy secretary, reinforced Cohen's message by announcing that if new technology fails to meet DHS standards, "We'll flush it."

Cohen and Jackson also warned the contractors that Congress is skeptical about the performance of the DHS, and has expressed that skepticism by cutting the S&T budget dramatically in fiscal year 2007 and threatening to do the same in FY 2008. And if a Democrat wins the White House, the future of the DHS may be even less certain. "You have to think about what we can do to