The Scholarly Publishing Business is in great flux driven by rapidly changing technology, shifting business models and changing societal expectations.
Scholarly Publishing

- Selects
- Validates
- Improves
- Classifies
- Distributes
- And Archives the results of research

Scholarly publishing selects, validates, improves, classifies, distributes and archives the results of scholarly research
Value is added by selection or rejection via peer review, by author response to peer review, through copy-editing, markup, classification and the imposition of consistent style as well as through dissemination of content on paper or in electronic format. Digital content must maintained in an archive. All these steps are now handled digitally and in many cases are outsourced for speed and economy.
Publishing is expensive

Example:

- Editorial review ~ $500/manuscript published
- Production & distribution ~ $1000/manuscript
- Total cost $1.5M for 1000 manuscripts/year

The traditional editorial and production process is expensive. Review might cost about $500 per published manuscript - including the cost of rejecting a significant percentage of manuscripts. Copy-editing, production and distribution costs might be about $1,000 thus totaling about $1,500 per published manuscript. For a modest sized journal with 1000 manuscripts a year the total expense would be $1.5million.
The traditional business model is to recover costs by selling the content through subscriptions to individuals and libraries, but library subscriptions are the dominant source of income. A library subscription rate of $1.5K would allow our previous example to break-even with 1K library subs. Library subscription rates are in the $1K-$10K range depending on the journal size.
The library rate for print plus online in the US for MedPhys is about $1.25K as compared to just under $4K for PMB. Note that MedPhys earns substantial income from advertising as well as from subscriptions which helps it maintain a relatively low subscription rate. Another difference is that PMB is published by the IOP while MedPhys is its own publisher although we use the AIP as a service provider.
Publishing has been historically profitable so the market is dominated by a few very large commercial publishers able to return substantial profits to their investors. However non-profits societies still own some of the most prestigious titles and use profits to support their other programs. Many societies have become almost totally dependent on this source of income. The AAPM is fortunate in that it has income from other sources.
Library budgets are under pressure because of more, larger, and more expensive journals. Additional pressures on the business model arise from the potential for libraries to redistribute electronic content, leading to the formation of library consortia that can negotiate from strength and potentially to national libraries that could provide access to all content within that nation or beyond.
Electronic publishing has eliminated dependence on the library to classify, access and archive content. Spurred by technology, the perception that web content is “free”, resentment against excess commercial profits, and the desire to access content through online search, there is a powerful movement towards other models that have no charge for access.

- Are libraries redundant if content online?
- Can profit be justified?
- Should all online content be “free”?
- Content accessible through Google etc?
- Open access mandates
- There are other business models ....
The physics community pioneered an early form of open access publishing when an email distribution list for preprints at the Los Alamos National Lab was replaced by an online repository know as arXiv (pronounced "archive").
In arXiv the costs of publishing are minimized by making the authors do the work of composing their manuscripts and by eliminating peer review in the usual sense. The postings are classified and moderated to eliminate inappropriate postings. Use of an associated discussion forum may provide informal peer review under this model. arXiv was first hosted (meaning subsidized) by Los Alamos and now by Cornell.
The biological community pioneered open access publishing with full peer review, as is currently manifest in PLoS (the Public Library of Science) which publishes several titles in the Biology and Medicine fields. This model has been subsidized by wealthy supporters.
PLoS (Public Library of Science)

• Open access, no subscriptions
• Author/institution/funding agency pays to publish
• $1.35K author fee for Plos One (not a full peer review)
• $2K-$3K for their peer-reviewed titles.

The business model for PLoS is that the author (or institution or funding agency) pays to publish. Author fees for PLoS One (which is only partially peer-reviewed) are $1.35K and for other PLoS titles that are fully peer-reviewed fees are in the $2000-$3000 range.
Several subscription journals charge authors a partial charge and many (like MedPhys) charge for excess pages to help reduce subscription costs.

Several subscription journals will now allow authors to pay to make their manuscripts open access with fees in the $2000 range.
Optics Express (published by AIP-member society OSA) is a successful compromise between the arXiv model and the PLoS model in that it shifts much of the burden for manuscript preparation onto the author to reduce cost, while also conducting rapid peer review. The author fees are about $1K for 6 or fewer pages or about $1.7K for 7 or more.
One of the curiosities of the author-pays model is that the author must effectively paying for the cost of the review of rejected manuscripts, which is a significant cost. The fee is consequently larger if the rejection rate is higher, but so is the prestige.

In the author-pays model the income scales with the growth of the journal so there is no need to increase charges as the journal grows. In the subscription model, subscription income must grow if the journal is to grow in size.
The author pays model discriminates against unfunded research and while charges may be waived in case of need the ability to pay may ultimately bias what can get published.
JACMP - Online only, open access

- Founded by ACMP now published by AAPM.
- Has online advertising income, charges no author fees.
- Growth limited by potential income.

JACMP which was founded by the ACMP as an online-only open access journal and is now published by AAPM charges no author fees but generates online advertising income. An online advertising model limits potential growth since income may not scale with growth.
Online advertising income does not return as much revenue as paper advertising in a journal. Online traffic is limited and online ads are more easily bypassed by the reader. There are also many other ways for advertisers to reach potential customers online.

MedPhys generates income from paper and online advertising but most still comes from paper advertising, which continues to justify the production of a print version despite the extra cost.
Archiving

- Libraries once archived paper “in perpetuity”.
- Publishers must now have online archives.
- Must refresh and upgrade archived content
  – Added cost, but potential archive sale or subscription
- Managed repositories now exist to guarantee long-term access.

The publisher must maintain an archive on its own servers or in the cloud. The archive needs to be actively maintained and refreshed and in many cases enhanced. This adds expense, so some publishers sell subscriptions to their archive to help cover this cost. MedPhys provides its full archive to subscribers without additional cost at this time.
At this time all NIH funded research that is published in any journal must also be deposited into a NIH digital archive called PubMed Central and made available to the public within 12 months. MedPhys manages the transfer of such articles to PubMed Central.
Advocates for open access argue that since most research is paid for by the taxpayer then the taxpayer should have unrestricted access to the results of the research. There is legislative pressure to extend the concept from NIH funded research to all funded research. National archives depend upon a continued and growing subsidy from the taxpayer so may be vulnerable in budget slashing times and absorb funds that may be better spent on research.
The AAPM in cooperation with the AIP is experimenting with alternative ways to provide access to content and has made access to a substantial amount of content completely free. This helps draw readers to the Journal which may help drive interest in the journal. We will also be providing online access to single articles at very modest cost in the future.
The Digital Revolution

- Content is essentially a database
- Only a virtual relationship to volume, issue and page
- “Article at a time” publication
- Color and motion
- Content enrichment and contextual search
- Active equations
- Inclusion of data
- ..................... etc....... (at a cost)

Digital publishing means that there is only a virtual relationship to volumes, issues and pages. Manuscripts and their figures and equations have become elements in that database. Content is enriched by XML markup and can be accessed not only through a website portal but also by online search, subscription to RSS feeds, monthly alerting services and other links. Color, motion and active equations all become possible with digital delivery.
Through collaboration between publishers an independent organization known as CrossRef acts as a switchboard so that the click on a reference can be immediately linked to an article in a different journal through the use of unique Digital Document Identifiers (DOI).

Such digitally-enabled features add new costs, complexity and competitive elements to publishing.
In summary .... Editing and publishing research adds great value but is expensive. The digital revolution created new challenges and costs, many of which were addressed through the profits from the old business model of publishing. The questions are – will the business be profitable or just break-even in the future and who will pay?
These changes have major implications for the AAPM because MedPhys is both a highly successful subscription journal that gives the AAPM standing within the scientific and medical community and also a substantial source of income.
The Take-away

- Publishing in and reviewing for MedPhys helps support the AAPM
- Pressure on publishing business models will impact the AAPM
- If you have expertise or are willing to gain it you might help the AAPM/IBMC deal with inevitable change.

The AAPM is its own publisher – choosing to referee or publish in MedPhys helps keep the AAPM strong.

We need members who are willing to dig in and learn about a business very different than the one we practice in our professional lives.

The similarity is that technology is transforming the industry and the business model is under tremendous pressure.