

## Notes from the EMS/AMS panel discussion „The Future of Mathematical Publishing”

7th European Congress of Mathematics, Berlin, Thursday 21 July 2016 from 16:30 till 18:30

The panel was organized on the initiative of Pavel Exner, the President of the EMS, and Robert Bryant, the president of the American Mathematical Society.

Organizers: Jiří Rákosník (EMS), Olaf Teschke (EMS), Charles Weibel (AMS)

Panelists:

Harry Blom (Springer Nature, Mathematics, Computer Science and Publishing Development)  
Thierry Bouche (Université de Grenoble Alpes, Institut Fourier & Cellule Mathdoc; EuDML)  
Jean-Pierre Demailly (Université de Grenoble Alpes, Institut Fourier; Episciences-Maths)  
Sabrina Eck (FIZ Karlsruhe; ELibM)  
Sergei Gelfand (AMS Publisher)

The discussion moderated by O. Teschke focused on three topics.

### 1. What constitutes mathematical publishing (introductory talks by J.-P. Demailly, H. Blom, S. Eck)

J.-P. Demailly wanted to focus on journals only, in particular open access journals. After a brief note about the arXiv.org he presented the web site [www.ccsd.cnrs.fr](http://www.ccsd.cnrs.fr) of the Centre pour la Communication Scientifique Directe with links to several open archives for scientific information, in particular HAL (<https://hal.archives-ouvertes.fr/>) and Episciences.org. While HAL is a universal repository of scholarly preprints (it contains a copy of arXiv but with more metadata), Episciences.org is a project that provides a technical platform of peer-reviewing promoting the emergence of the so called epijournals, open access electronic journals taking their contents from preprints deposited in open archives such as arXiv or HAL, that have not been published elsewhere.

J.-P. Demailly gave a brief overview of the ideas, implementation and functioning of Episciences.org: it is managed as usual journals but the workflow is organized so that the reviewing process is faster and beneficial for both authors and reviewers. After possible corrections and improvements made by the author in a direct yet anonymous communication with the reviewer the paper is placed in the epijournal and also returned back to the preprint archive as the authoritative version.

Due to initial technical problems the episciences.org was delayed in development, there are currently 3 journals in computer science and 2 in mathematics.

According to H. Blom the publisher Springer is following the recent trends in publishing scholarly mathematical journals and is open to collaboration with the researchers' community. They are introducing a new content sharing feature in which the author receives a link to the full-text of his/her publication. This link may be shared with colleagues and posted anywhere on the Web. Subscribers and leading public media channels reporting on research such as the New York Times will have the option to generate and use such shareable links as well.

S. Eck presented the Electronic Library of Mathematics (eLibM, <http://www.emis.de/>) run by FIZ Karlsruhe, archiving a range of journals and conference proceedings and providing access to them. She is coordinating an ongoing project to build an open platform for editing, archiving and disseminating mathematical journals.

In the discussion, H. Blom pointed out that new technologies are developed aimed at a better organization of the peer reviewing process, removing some well-known pain points for authors, editors and referees. S. Eck meant that the necessary changes in publishing process should be gradual because radical changes bring a high risk in it. T. Bouche reminded that 15 or 20 years ago it was said that the classical journals will soon disappear; they are still playing important role.

## 2. Development of a sustainable publishing system (introductory talks by S. Gelfand, H. Blom, T. Bouche)

S. Gelfand explained that he has here two hats – one as a publisher and one as a mathematician – but he wants to express rather his private opinions as of a member of the mathematical community. There are 4 stages in publishing and presentation of mathematical knowledge:

1. evaluation assuring the quality
2. processing the topic for print/communication
3. dissemination
4. archiving and providing searchability

He wants to emphasize the first one. This part of the process basically did not change, peer review is still the principal method. The peer review system is undergoing a difficult phase; in particular, reviewers are overloaded and the quality of reviewing is decreasing. The control over the creation of new journals and of peer review process is almost entirely in hands of mathematicians who should take care of it and strive for quality, not for quantity. As an example of recent strange development he mentioned the existence of a journal called Antarctica Journal of Mathematics symptomatically published in India.

H. Blom spoke about sustainability, how to avoid the growth of expenses for peer reviewing. The peer review system seems unsustainable because of the continued growth in papers coupled with inefficiencies. Many papers are not submitted to the right journals and too often the same experienced but busy researchers are asked to be referee. Big Data techniques may help to identify the best matching journals for an article, to give authors better advice and choice where to submit. In addition, technology can help Editors-in-Chief to find the best available referees for a particular submission. It will also help to give referees more reward and recognition for their reviewing work. Publons <https://publons.com/>, for example, offers a mechanism to give recognition to referees. Finally, when it comes to the cost of publishing, one way to control those costs is working on larger scales. For example, if Springer could sign more Open Access agreements at country level, or even EU level, the cost per article is likely to go down. Admittedly, this is the sort of solution a large publisher would think of. There may be other solutions. He again emphasized that due to new technologies an increasing number of publications need not imply increasing costs.

T. Bouche stated that it is important to revert the balance of power so that publishers serve the authors.

S. Eck meant that there is no need to organize it globally, it can start with local initiatives. She brought attention to legal aspects of publishing, copyright and access. There is a need of a good infrastructure to inform about owners of the IPR, this should be transparent to every user. She also reminded the growing importance of archiving research data and providing access to them.

J.-P. Demailly emphasized the sociological aspect in behaviour of authors and publishers. He mentioned the current trend in China where professional promotion is very formal being based on number of publications and impact factors which is contra productive. Currently impact factors are calculated by private companies with no scientific input. Academics do all the work, but don't get any control.

Participants in the audience noted that the impact factors cause problems for new journals and it is an enormous problem for young people. The senior mathematicians have to change their ways. As long as hiring/promotion committees look for major journals, the young have to do this.

J.-P. Bourguignon pointed out that different research communities have different needs. Mathematician should not read papers which are not mature. Accepting improper publication and assessment procedures has bad impact on career development. The prices for APC model are calculated as average over all research fields which is too expensive for maths.

O. Teschke informed that arXiv contains only 3% of the whole mathematical corpus and about 20% of the new mathematical literature.

T. Bouche noticed that the current system is not sustainable because we are facing an oligarchy of multidisciplinary publishers imposing their rules (with a very limited number of customers, namely big consortia or national licensees). We should break it into smaller parts (which means: much more diversity in business model, operational model, and different services for different communities with different practices and needs).

H. Blom reacted on the question who is to serve whom. He claimed that if publishers do not serve the community then they will be soon finished.

S. Gelfand (putting on the publisher hat) proposed that we should let professionals (publishers) run the system. An otherwise useful activity often stops when the mathematician behind it is retired or steps down. Professional publishers can better assure the sustainability. Mathematics is too small area for big publishers and this provides an opportunity for specialised math publishers to address math needs. He also asked, how to stop millions of researchers looking at impact factors. This problem was widely acknowledged in the discussion. It was mentioned that it is a task for the math community to adjust the impact bias when taking hiring decisions which are largely still in our hands.

### **3. Long-term preservation of documentation (introductory talks by T. Bouche, J.-P. Demailly, S. Eck)**

T. Bouche, quoting J.-P. Serre's statement "les mathématiciens se contentent de mettre leur production à la disposition de tous, comme sur des étagères où l'on peut venir se servir", emphasized that the mathematical accumulated knowledge is scientific commons that should be preserved and made easily accessible for eternity. Libraries have up to now played a central role by providing archiving and preservation of print material and they have provided long-term access for their patrons and, more widely, for the general public. He put the questions:

- Who will in the future be responsible for acquiring, archiving and preserving the digital mathematical heritage and how reliable are the potential candidates?
- Will the mathematical production remain part of our common, freely accessible, heritage or will it be gradually locked by private interests?
- What about the opportunities in our digital world to exchange and consume mathematics through open standards?

As an optimistic view of the future he documented the growth in digital repositories in the past 15 years: Today, Numdam ([www.numdam.org](http://www.numdam.org)) provides access to 56,600 items and the EuDML to 252,000 items of the whole world volume estimated at 4,5 million.

S. Eck pointed out that long-term preservation does not only mean save storage of the original data. Metadata and identifiers (interoperability) should be added to ensure long term retrieval (sustainability), access restrictions/rights should be stored in addition. And for ideal sustainability the stored data must be frequently checked in regard to usability. And in case of changing technologies and formats the objects and metadata must be migrated to the new standards and stored again.

H. Blom mentioned that Springer pays both Portico and LOCKSS/CLOCKSS for archiving everything the company is publishing. In addition, Springer has invested in the back-digitization of more than 100 000 book titles, so it is a serious activity trying to unlock and preserve the scholarly literature.

A discussion followed on file formats which can withstand changes over time. Everybody is concerned that rapid changes in technology will be a challenge for proper digital preservation.

## **Conclusions**

S. Gelfand said that for him it was a very useful discussion.

Concluding remarks by J. Rákosník:

Mathematics is very specific in its needs about access to literature, very different from other fields.

Despite all the technological developments the journals remain important. We need more than just myriads of files, we cannot rely only on new technologies, big data and power of computers.

The future development in publishing is not only technological issue but also very much sociological one. People's behaviour matters.

Nobody can predict what will come in the next 20 or 30 years but we should not fear of it. We should keep controlling the development.

We should not look for easy nor definite solutions. This is not about proving theorems.

We should not compete with other science fields using their weapons.

Despite the fact, that we are not in even position with the publishers now, the future of mathematical publishing is still in our hands.

Rephrasing JFK's appeal: Ask not what the publishing system can do for you, ask what you can do for the system.