

Minutes of ICMS 2016 Business Meeting

Zuse Institute Berlin, Germany

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SUMMARY

The “International Congress of Mathematical Software” (ICMS) is a community of researchers and practioners centered around “mathematical software” as a **scientific activity**. This community has organized five conferences:

- (1) ICMS 2002: Chinese Academy of Sciences (Location: Beijing, China)
- (2) ICMS 2006: University of Cantabria (Location: Castro Urdiales, Spain)
- (3) ICMS 2010: Kobe University (Location: Kobe, Japan)
- (4) ICMS 2014: Hanyang Univesity (Location: Seoul, Korea)
- (5) ICMS 2016: Zuse Institute Berlin (Location: Berlin, Germany)

ICMS 2016 has approximately 150 attendees from many countries with diverse research areas.

The business meeting for ICMS 2016, led by Michael Joswig, had 3 main topics:

- Section 1: Announcements
- Section 2: Next ICMS
- Section 3: Other topics

1. ANNOUNCEMENTS

The following three announcements are from the Advisory Board of ICMS:

- Jonathan Hauenstein was appointed *Secretary of ICMS*
- Michael Kohlhase was appointed *Web Chair of ICMS*
- The website <http://icms-conference.org> is being developed to be the home for ICMS

2. NEXT ICMS

As seen above, ICMS started out having a quadrennial cycle that roughly tracked the location of ICM. In 2014, it was decided to change to a biennial cycle related to ICM and ECM. Due to this, the Advisory Board of ICMS solicited bids to host ICMS 2018, which led to the submission of a bid from Jonathan Hauenstein and Andrew Sommese at the University of Notre Dame. A formal decision would be made by the Advisory Board at a later date. Following a question by James Davenport, preliminary dates of July 23 - 26, 2018 were proposed.

Following a discussion about collocating ICMS near ICM and ECM, it was reported that approximately 10% of attendees at ICMS 2016 were also registered for ECM. Additionally, ICMS 2010 was not officially a satellite conference of ICM 2010.

The Advisory Board will apply for satellite conference status of ICMS 2018.

3. OTHER TOPICS

The rest of the business meeting was a lively discussion that can be summarized into two main topics: publication of software, software repository, and the development and retention of human capital in the area of mathematical software.

3.1. Publication of software. Since peer-reviewed publications are an important part of ones career in academia, outlets for publishing software were discussed.

The idea of having mathematical software as the main item of the submission was discussed. Several current journals were discussed throughout the meeting with a focus on software: *JSAG* (software for algebra and geometry), *MPC* (software for optimization), and *ACM ToMS* (general math software). The journal *SIAGA* (applications of algebra and geometry), was also discussed.

Towards the end of the meeting, Bruno Buchberger discussed the original vision of *JSC* (symbolic computation) was to have a journal that included foundations, algorithms, software, and applications. He was going to discuss with the editorial board of *JSC* a return to this vision and encouraged other editorial boards of journals to adopt a similar approach to software, particularly those with a focus involving “computational mathematics.”

There were two major difficulties in publishing software that were discussed. The first was the ability to decide the peer-reviewed criterion (e.g., How to review software? What makes good software?) and how to find referees that could judge such criterion. This difficulty can be exacerbated by special hardware needed for the code (e.g., GPUs, specific architecture in a super computer). The other difficulty was the legal issue surrounding the storing of software.

In the end, publications describing software will come down to someone reading a paper due to its interesting text. Thus, the paper needs to be readable most likely with pseudocode to discuss aspects of the software. A link so that one can obtain the software should be provided, potentially including several versions including the one used in the writing of the paper (a reference copy). This text is what will be read and cited in future work that utilized the software.

Since “impact factor” for software does not yet exist, there was a discussion about how to define such a metric. By building on existing tools in the community (i.e., zbMATH), <http://swMATH.org> is one approach to measure the impact of mathematical software. This helps increase the visibility of research in mathematical software and build a community. Since mathematical software is used in applications outside of mathematics, the ability to measure this impact in applications outside of mathematics is also needed.

3.2. Software repository. In past meetings of ICMS, Knoppix was distributed that included mathematical software presented. This project has morphed into **MathLibre**.

A “lighter” option is to utilize software such as `docker` to distribute ones developed mathematical software package.

As a way to help with publications involving software, it was suggested that one option could be have a `docker` be a pre-requisite for submission.

If someone wants to start a cohesive library of mathematical software packages, the Advisory Board of ICMS would like to know about this to help publicize the work and avoid duplicating the effort.

3.3. Human capital. One key aspect to the growth of mathematical software is the development of human capital.

The ability to help foster a culture where early career researchers submit software publications. This will help in their career development by showcasing their abilities and impact in the area of mathematical software.

Modern “experimental mathematical labs” are built upon software. Such labs will require scientific and technical staff. By helping the early career researchers, one career track could be as “research software engineers” where the main key is their ability to both understand the mathematics as well as the software aspects.

A discussion regarding how to create new positions in such experimental labs focused on negotiating with university administrators.