

Preface

This volume contains the papers presented at CICM 2017: the 10th Conference on Intelligent Computer Mathematics held during July 17–21, 2017 in Edinburgh.

Mathematics is “the queen of the sciences” (Friedrich Gauss), and “the language with which God has written the universe” (Galileo Galilei). This language is at the same time flexible enough to describe a wide variety of complex phenomena and rigorous enough to be verified in detail based on a small set of assumptions. But the collection of mathematical knowledge is exploding, and it can no longer be handled by the paradigmatic “pencil and paper” approach: Each year there are 120,000 new articles and some proofs are so large and complicated that human verification has become infeasible.

The Conference on Intelligent Computer Mathematics (CICM) offers a venue for discussing and developing ways of involving computers in the process of “doing mathematics” in the broadest sense. The conference is the result of merging three independent meetings with considerable overlap: *Calculus* (integration of deduction and symbolic calculation), *Mathematical Knowledge Management* (MKM), and *Digital Mathematical Libraries* (DML). CICM has been held annually since 2008, with previous meetings in Birmingham (UK 2008), Grand Bend (Canada 2009), Paris (France 2010), Bertinoro (Italy 2011), Bremen (Germany 2012), Bath (UK 2013), Coimbra (Portugal 2014), Washington, DC (USA 2015), and Białystok (Poland 2016). As in previous years, we had several tracks: *Calculus*, *Digital Mathematics Libraries* (DML), and *Mathematical Knowledge Management* (MKM), which mirror the three main communities that form CICM, and a track on “Systems and Projects.”

The papers accepted to these four tracks form the content of these proceedings. CICM 2017 had invited talks by Alan Bundy (University of Edinburgh), Grant Olney Passmore (University of Cambridge), and Przemysław Chojceki (Polish Academy of Sciences). Additionally, the conference had two workshops, a doctoral mentoring program, and an informal track for presenting work in progress; the proceedings of these events are published with CEUR-WS. The program of the meeting, as well as additional materials, is available at <http://cicm-conference.org/2017/>.

The track structure of CICM provides a framework for organizing the conference. The *Calculus* track examines the integration of symbolic computation and mechanized reasoning. The *Digital Mathematics Libraries* track deals with math-aware technologies, standards, algorithms, and processes. The *Mathematical Knowledge Management* track is concerned with all aspects of managing mathematical knowledge in informal, semi-formal, and formal settings. The *Systems and Projects* track contains descriptions of systems and relevant projects, both of which are key to a research topic where theory and practice interact on explicitly represented knowledge.

This year, CICM had 40 submissions. Each submission received at least three reviews. The reviewing included a response period, in which authors could clarify points raised by the reviewers. This made for a highly productive round of deliberations

before the final decisions were taken. In the end, the Program Committees of the tracks decided to accept 24 papers for these proceedings.

The Program Committee work for the tracks was managed using the EasyChair system. This year we used the multi-track facility provided by EasyChair. This made track assignments, reviewing, and dealing with conflicts of interest very flexible. The fact that we had five chairs – the general chair and four track chairs – together with excellent conflict management made transparent and safe handling of submissions authored or co-authored by the track chairs very easy. As in previous years, several workshops and informal programs were organized in conjunction with CICM 2017. This year these were:

- The CICM Doctoral Program, providing a dedicated forum for PhD students to present their on-going or planned research and receive feedback, advice, and suggestions from a dedicated research advisory board.
- The CICM Work-in-Progress Session, a forum for the presentation of original work not yet in a suitable form for communication as a formal paper.
- MathUI 2017: 12th Workshop on Mathematical User Interfaces, an international workshop to discuss how users can be best supported when doing/learning/searching for/interacting with mathematics using a computer. MathUI was organized by Andrea Kohlhasse, University of Applied Sciences Neu-Ulm, Germany, and Marco Pollanen, Trent University Peterborough, Ontario Canada.
- The 28th OpenMath Workshop. OpenMath is a language for exchanging mathematical formulae across applications (such as computer algebra systems and theorem provers). The workshop was organized by James Davenport, the University of Bath, and Michael Kohlhasse, FAU Erlangen-Nürnberg, Germany

The conference was organized at the University of Edinburgh. We heart-fully thank the University of Edinburgh for the hospitality, and in particular we thank the local organizers, Jacques Fleuriot and Suzanne Perry, for all their good work.

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