

Preface

Mathematical Aspects of Computer and Information Sciences (MACIS) is a series of biennial conferences focusing on research in mathematical and computational aspects of computing and information science. It is broadly concerned with algorithms, their complexity, and their embedding in larger logical systems. At the algorithmic level, there is a rich interplay along the numerical/algebraic/geometric/topological axes. At the logical level, there are issues of data organization, interpretation, and associated tools. These issues often arise in scientific and engineering computation where we need experimental and case studies to validate or enrich the theory. MACIS is interested in outstanding and emerging problems in all these areas. Previous MACIS conferences have been held in Beijing (2006, 2011), Paris (2007), Fukuoka (2009), and Nanning (2013). MACIS 2015 was held at the Zuse Institute Berlin (ZIB) located in the capital of Germany, in the vicinity of the Freie Universität Berlin. Named after Konrad Zuse, the inventor of the first programmable computer, ZIB is an interdisciplinary research institute for applied mathematics and data-intensive high-performance computing. Its research areas in modeling, simulation, and optimization in partnership with academia and industry are exemplary of the goals of MACIS.

We are grateful to the session organizers (and their referees) for their critical role in putting together the successful technical program. We also wish to extend our gratitude to all MACIS 2015 conference participants—all of them contributed in making the conference a success. The conference would not have been possible without the hard work of the local organizers from ZIB, Winfried Neun, and Benedikt Bodendorf, and the generous support of our sponsors, namely, Maplesoft and Zuse Institute Berlin (ZIB).

This volume contains 55 refereed papers, i.e., seven invited papers and 48 submitted papers, all of which were presented at MACIS. The papers are organized in sections corresponding to 12 special sessions featured in the MACIS 2015 conference. The topics of the MACIS 2015 sessions cover a wide array of research areas as follows:

- SS1: Vikram Sharma: Curves and Surfaces
- SS2: Jon Hauenstein: Applied Algebraic Geometry
- SS3: Johannes Blömer: Implementations of Cryptography
- SS4: Takeshi Ogita: Verified Numerical Computation
- SS5: Johannes Blömer and Jan Camenisch: Cryptography and Privacy
- SS6: Chengji Mou and Eric Schost: Polynomial System Solving
- SS7: Maxime Crochemore and Costas Iliopoulos: Managing Massive Data
- SS8: Viktor Levandovskyy, Alexey Ovchinnikov, Michael Wibmer: Computational Theory of Differential and Difference Equations
- SS9: Xiaoyu Chen and Jie Luo: Data and Knowledge Exploration
- SS10: Rudolf Fleischer and Stefan Schirra: Algorithm Engineering in Geometric Computing

SS11: Akitoshi Kawamura and Martin Ziegler: Real Complexity: Theory and Practice

SS12: Jordan Ninin: Global Optimization

We wish to thank all the session organizers for their hard work in putting together these sessions.

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