

Preface

This joint volume of proceedings gathers the papers from the workshops, Doctoral Program (DP) and Work in Progress (WiP) section of the 12th Conference on Intelligent Computer Mathematics (CICM), held July 8–12 2019 at CIIRC, Prague, Czech Republic. CICM has been held annually since 2008. Papers from the main tracks at CICM 2019 (Calculus, Mathematical Knowledge Management, Systems & Projects) have been published in Springer Lecture Notes on Artificial Intelligence (LNAI).

This volume includes the papers selected for the workshops held at CICM 2019:

- FMM 2019 – Fourth workshop on Formal Mathematics for Mathematicians. The FMM workshop series allows mathematicians interested in computer assistance and researchers in formal and computer-understandable mathematics to meet and exchange ideas. Members of the program committee include:
 - Claudio Sacerdoti Coen, University of Bologna, Italy
 - Adam Grabowski, University of Białystok, Poland
 - Ievgen Ivanov, Taras Shevchenko National University of Kyiv, Ukraine
 - Cezary Kaliszyk, University of Innsbruck, Austria
 - Artur Kornilowicz, University of Białystok, Poland
 - Peter Lammich, Technical University of Munich, Germany
 - Adam Naumowicz, University of Białystok, Poland
 - Karol Pąk, University of Białystok, Poland
 - Josef Urban, Czech Technical University in Prague, Czech Republic
- LML 2019 – Workshop on Large Mathematics Libraries. Large formal and semiformal mathematics libraries are needed to support mathematics research, mathematics education, rigorous software development, and formal proof development. This workshop will explore methods for designing, constructing, and maintaining large mathematics libraries as well as for finding, comparing, and applying the knowledge residing in these libraries. Members of the program committee include:
 - Frédéric Blanqui, INRIA, France.
 - William M. Farmer, McMaster University, Canada
 - Dennis Müller, FAU Erlangen-Nürnberg, Germany
 - Florian Rabe, FAU Erlangen-Nürnberg, Germany

CICM also gives the opportunity for researchers to present Work in Progress (WiP) papers that are not yet ready for formal presentation but are of interest to the community. Three such papers have been included in the WiP proceedings.

Finally, CICM organizes a “Doctoral Program (DP)”, where doctoral students can present their achievements and future plans to the community and receive mentoring by experienced members of the CICM community.

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In: C. Kaliszyk, E. Brady, J. Davenport, W.M. Farmer, A. Kohlhase, M. Kohlhase, D. Müller, K. Pąk, and C. Sacerdoti Coen (eds.): Joint Proceedings of the FMM and LML Workshops, Doctoral Program and Work in Progress at the Conference on Intelligent Computer Mathematics 2019 co-located with the 12th Conference on Intelligent Computer Mathematics (CICM 2019), Prague, Czech Republic, July 8–12, 2019, published at <http://ceur-ws.org>

The workshop programs were managed independently by the respective organizers. In total, 11 papers have been accepted by the CICM 2019 workshops. Please see the individual prefaces for more details.

The editors of this volume were:

- Karol Pał: FMM editor
- William M. Farmer and Dennis Müller: LML editors
- Edwin Brady: Calculemus track chair
- Andrea Kohlhasse: MKM track chair
- Claudio Sacerdoti Coen: Systems & Projects track chair
- Dennis Müller: Doctoral Programme chair
- Cezary Kaliszyk: General CICM PC chair

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