CONFERENCE SERIES: FORMAL METHODS IN COMPUTER-AIDED DESIGN 5

Nina Narodytska / Philipp Rümmer (Eds.)

PROCEEDINGS OF THE 24TH CONFERENCE ON FORMAL METHODS IN COMPUTER-AIDED DESIGN – FMCAD 2024

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Conference Series: Formal Methods in Computer-Aided Design
Volume 5

Conference Series: Formal Methods in Computer-Aided Design

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The Conference on Formal Methods in Computer-Aided Design (FMCAD) is an annual conference on the theory and applications of formal methods in hardware and system verification. FMCAD provides a leading forum to researchers in academia and industry for presenting and discussing groundbreaking methods, technologies, theoretical results, and tools for reasoning formally about computing systems. FMCAD covers formal aspects of computer-aided system design including verification, specification, synthesis, and testing.

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Preface

These are the proceedings of the twenty-fourth International Conference on Formal Methods in Computer-Aided Design (FMCAD), which was held in Prague, Czech Republic, October 14–18, 2024. The first FMCAD was organized in 1996, and FMCAD was a bi-annual conference until 2006, when the FMCAD and CHARME conferences merged into a single FMCAD. Since then, FMCAD has been an annual event. FMCAD 2024 was the twenty-fourth edition in the series, covering formal aspects of computer-aided system design including verification, specification, synthesis, and testing. It provided a leading forum to researchers in academia and industry to present and discuss groundbreaking methods, technologies, theoretical results, and tools for reasoning formally about computing systems. The program of FMCAD 2024 consisted of one tutorial, three invited talks, the presentation of the Hardware Model Checking Competition HWMCC'24, a student forum, and the main program consisting of presentations of 29 accepted peer-reviewed papers. FMCAD 2024 was co-located with the VSTTE 2024 conference, when took place on October 14–15.

The joint VSTTE/FMCAD tutorial day (October 15) featured two tutorials:

- The VSTTE tutorial: *The Lean Programming Language and Theorem Prover,* given by Sebastian Ullrich and Joachim Breitner;
- The FMCAD tutorial: *Writing proofs in Dafny,* given by Rustan Leino.

The main FMCAD conference (October 16–18) featured three invited talks:

- *Tackling Scalability Issues in Bit-Vector Reasoning* by Aina Niemetz;
- *Some Adventures in Learning Proving, Instantiation and Synthesis* by Josef Urban;
- *Harnessing SMT Solvers for Reasoning about DeFi Protocols* by Mooly Sagiv.

FMCAD 2024 received 56 submissions, out of which the committee decided to accept 29 for publication. Each submission received at least four reviews. The topics of the accepted papers include machine learning, model checking, hardware and software validation, SAT&SMT solving and proofs generation. Among the accepted papers, there are 26 regular papers (23 long and 3 short) and 3 tool/case study papers (all short). FMCAD 2024 hosted the twelfth edition of the FMCAD Student Forum, which has been held annually since 2013 and provides a platform for graduate students at any career stage to introduce their research to the FMCAD community. The FMCAD Student Forum 2024 was organized by Martin Blicha and Nestan Tsiskaridze and featured short presentations of 23 accepted contributions. The proceedings provide a detailed description of the Student Forum and lists all accepted contributions.

FMCAD 2024 was made possible by the support of a large number of people, as well as our sponsors. The program committee members and additional reviewers, listed on the following pages, did an excellent job providing detailed and insightful reviews. The reviews helped us build a strong program and helped the authors improve their submissions. We thank each and everyone of them for dedicating their time and providing their expertise. We would like to thank the local organization chair, Mikoláš Janota, and the registration chair, Milena Zeithamlová, who did an amazing job taking care of the organization and all practical matters. We thank our web master Julie Cailler, our sponsorship chair Guy Amir, and the Student Forum organizers Martin Blicha and Nestan Tsiskaridze. We thank the organizers of the HWMCC competition, Armin Biere, Nils Froleyks, and Mathias Preiner. We thank Georg Weissenbacher, both for his exceptional assistance in organizing the event, communicating to us the decisions of the steering committee, as well as being the publication chair.

Holding a conference like FMCAD would not be feasible without the financial support of our sponsors. We would like to express our gratitude to the sponsors, given here in alphabetical order: AWS, Cadence, General Electric Aerospace, Intel, NSF, Toyota, and VMware by Broadcom.

Last but not least, we thank all authors who submitted their papers to FMCAD 2024, and whose contributions and presentations form the core of the conference. The conference proceedings are available as Open Access Proceedings published by TU Wien Academic Press, and through the IEEE Xplore Digital Library.

We are grateful to everyone who presented their paper, gave a keynote or gave a tutorial. We thank all attendees of FMCAD for supporting the conference and making FMCAD an engaging and enjoyable event.

October 2024

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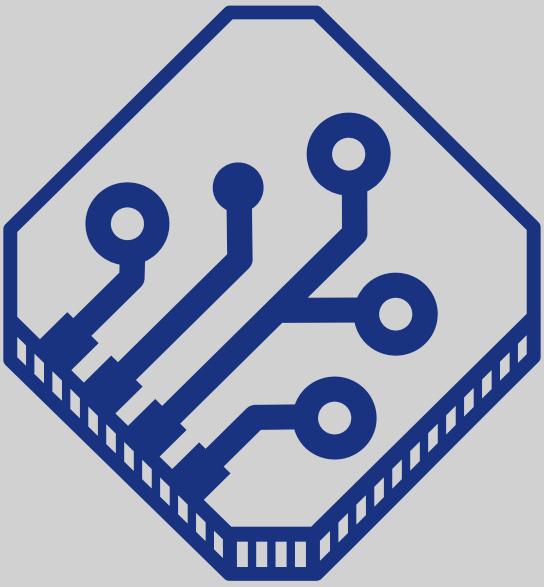

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