Preface

These are the proceedings of the twenty-third International Conference on Formal Methods in Computer-Aided Design (FMCAD), which was held in Ames, Iowa, USA from October 24 – October 27, 2023. FMCAD was first held in 1996, and was a bi-annual conference until 2006, when the FMCAD and CHARME conferences merged into a single FMCAD conference, and since then has been held annually. FMCAD 2023 is the twenty-third edition in the series, covering formal aspects of computer-aided system design including verification, specification, synthesis, and testing. It provides 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 2023 consists of four tutorials, three invited talks, a student forum, and the main program consisting of presentations of 31 accepted peer-reviewed papers.

The tutorial day featured four presentations:

- *Developing an Open-Source, State-of-the-Art Symbolic Model-Checking Framework for the Model-Checking Research Community* by The NSF:CCRI Project Investigators (Kristin Y. Rozier, Natarajan Shankar, Cesare Tinelli, Moshe Vardi)
- *MiniZinc for Formal Methods* by Peter J. Stuckey
- *Local Search and Its Application in CDCL/CDCL(T) solvers for SAT/SMT* by Shaowei Cai
- *NASA's core Flight System Framework Overview/Tutorial* by David Swartwout

and the main conference featured three invited talks:

- *Reasoning about quantifiers in SMT: the QSMA algorithm* by Maria Paola Bonacina
- *Distribution Testing: The New Frontier for Formal Methods* by Kuldeep Meel
- *Formal Methods for Trusted AI* by Bettina Könighofer

FMCAD 2023 received 73 submissions out of which the committee decided to accept 31 for publication. Each submission received at least four reviews, except for two submissions which received three reviews. The topics of the accepted papers include machine learning, model checking, hardware validation, SAT & SMT solving, avionics, security, synthesis and others. Among the accepted papers, there are 23 regular papers (20 long and 3 short) and 8 tool/case study papers (all long).

FMCAD 2023 hosted the eleventh edition of the 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 2023 was organized by Mikoláš Janota and Nina Narodytska and featured short presentations of 16 accepted contributions. The proceedings provide a detailed description of the Student Forum and lists all accepted contributions.

Organizing this event was made possible by the support of a large number of people and 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 thank our web master Yogev Shalmon, our sponsorship chair Yoni Zohar and the Student Forum organizers Mikoláš Janota and Nina Narodytska. 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 our sponsors (in alphabetical order): AWS, Cadence, Futurewei, GE Aerospace, Siemens, Synopsys and Toyota.

The conference proceedings are available as Open Access Proceedings published by TU Wien Academic Press, and through the IEEE Xplore Digital Library. Last but not least, we thank all authors who submitted their papers to FMCAD 2023 (accepted or not), and whose contributions and presentations form the core of the conference.

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 2023

Kristin Y. Rozier Iowa State University, IA, USA
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