CONFERENCE SERIES: FORMAL METHODS IN COMPUTER-AIDED DESIGN 6

Ahmed Irfan / Daniela Kaufmann (Eds.)

PROCEEDINGS OF THE 25TH CONFERENCE ON FORMAL METHODS IN COMPUTER-AIDED DESIGN – FMCAD 2025

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Conference Series: Formal Methods in Computer-Aided Design
Volume 6

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-fifth International Conference on Formal Methods in Computer-Aided Design (FMCAD), held in Menlo Park, California, USA, from October 6–10, 2025. The first FMCAD was organized in 1996, and the conference was held biennially until 2006, when it merged with the CHARME conference to become a single annual event. Since then, FMCAD has been held every year. FMCAD 2025 marked the twenty-fifth edition in the series, covering formal aspects of computer-aided system design, including verification, specification, synthesis, and testing. It served as a leading forum for researchers from academia and industry to present and discuss groundbreaking methods, technologies, theoretical results, and tools for formal reasoning about computing systems. The FMCAD 2025 program included two tutorials, two invited talks, the presentation of the Hardware Model Checking Competition (HWMCC'25), a student forum, and the main program featuring presentations of 27 peer-reviewed, accepted papers.

FMCAD 2025 was co-located with the VSTTE 2025 conference, which took place on October 6–7.

The joint VSTTE/FMCAD tutorial day (October 7) featured three tutorials:

- The VSTTE tutorial: *EasyCrypt,* by Pierre-Yves Strub
- The FMCAD tutorials:
  - *Verification Modulo Theories,* by Alberto Griggio
  - *Systems Correctness Practices at AWS: Leveraging Formal and Semi-formal Methods,* by Ankush Desai

The main FMCAD conference (October 8–10) featured two invited talks:

- *Program Synthesis: Pre-LLM and Post-LLM* by Ashish Tiwari
- *Integrating Large Language Models in Automated Program Verification* by Nina Narodytska

FMCAD 2025 received 82 abstracts, which resulted in 64 full submissions. Of these, the program committee selected 27 papers for publication. Each submission underwent a rigorous review process, receiving at least four reviews. The topics of the accepted papers span hardware and software validation, model checking, machine learning, SAT and SMT solving, and proof generation. Among the accepted papers, 17 are regular papers (15 long and 2 short), and 10 are tool or case study papers (6 long and 4 short). This year, FMCAD introduced voluntary artifact evaluation for the first time. The artifacts were assessed by selected members of the program committee. A total of 20 submissions included artifacts, 12 of which were associated with accepted papers.

FMCAD 2025 hosted the thirteenth edition of the FMCAD Student Forum, which has been held annually since 2013. The forum provides a platform for graduate students at any stage of their academic career to present their research to the FMCAD community. The FMCAD Student Forum 2025 was organized by Tanja Schindler and Lee Barnett and featured short presentations of 20 accepted contributions. The proceedings include a detailed description of the Student Forum and list all accepted contributions.

FMCAD 2025 was made possible through the support of many individuals and our generous sponsors. The program committee members and additional reviewers, listed on the following pages, provided detailed and insightful reviews. Their efforts not only helped us assemble a strong technical program but also guided authors in improving their submissions. We sincerely thank each and every one of them for dedicating their time and expertise.

We would like to thank the local organization chair, Stéphane Graham-Lengrand, and the registration chairs, Jenny McNeill and Trish Carrillo, who expertly managed the logistics and practical aspects of the conference. We thank our web master Thomas Hader, our sponsorship chair Alex Ozdemir, and the Student Forum organizers Tanja Schindler and Lee Barnett. We also thank the organizers of the HWMCC competition, Armin Biere, Nils Froleyks, and Mathias Preiner. Special thanks go to Georg Weissenbacher for his exceptional assistance in organizing the event, for serving as a liaison with the steering committee, and for his role as publication chair.

A conference like FMCAD would not be possible without the support of our sponsors. We gratefully acknowledge the contributions of (listed in alphabetical order): AWS, Cadence Design Systems Inc., Futurewei, General Electric Aerospace, Siemens, SRI, and TU Wien.

Last but not least, we thank all the authors who submitted their work to FMCAD 2025. Their contributions and presentations form the heart of the conference.

The conference proceedings are published as Open Access by TU Wien Academic Press, and are also available 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 2025

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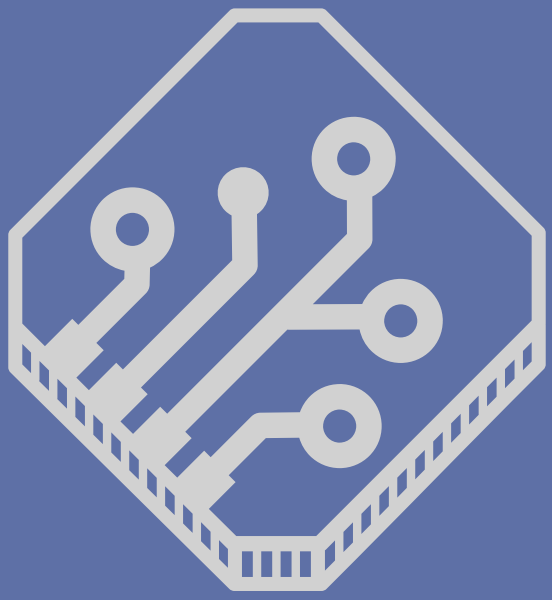

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