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# Formal Methods – The Next 30 Years

Third World Congress, FM 2019  
Porto, Portugal, October 7–11, 2019  
Proceedings



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# Preface

This volume contains the papers presented at the 23rd Symposium on Formal Methods (FM 2019), held in Porto, Portugal, in the form of the Third World Congress on Formal Methods, during October 7–11, 2019. These proceedings also contain five papers selected by the Program Committee (PC) of the Industry Day (I-Day).

FM 2019 was organized under the auspices of Formal Methods Europe (FME), an independent association whose aim is to stimulate the use of, and research on, formal methods for software development. It has been more than 30 years since the first VDM symposium in 1987 brought together researchers with the common goal of creating methods to produce high-quality software based on rigor and reason. Since then the diversity and complexity of computer technology has changed enormously and the formal methods community has stepped up to the challenges those changes brought by adapting, generalizing, and improving the models and analysis techniques that were the focus of that first symposium. The theme for FM 2019, “The Next 30 Years,” was a reflection on how far the community has come and the lessons we can learn for understanding and developing the best software for future technologies.

To reflect the fact that it has been 20 years since FM 1999 in Toulouse and 10 years since FM 2009 in Eindhoven, FM 2019 was organized as a World Congress, and we composed a PC of renowned scientists from 42 different countries spread across all continents except for Antarctica. We originally received a stunning total of 185 abstract submissions, which unfortunately resulted in ‘only’ 129 paper submissions from 36 different countries. Each submission went through a rigorous review process in which 95% of the papers were reviewed by four PC members. Following an in-depth discussion phase lasting two weeks, we selected 37 full papers and 2 short tool papers, an acceptance rate of 30%, for presentation during the symposium and inclusion in these proceedings. The symposium featured keynotes by Shriram Krishnamurthi (Brown University, USA), Erik Poll (Radboud University, The Netherlands), and June Andronick (CSIRO-Data61 and UNSW, Australia). We hereby thank these invited speakers for having accepted our invitation. The program also featured a Lucas Award and FME Fellowship Award Ceremony.

We are grateful to all involved in FM 2019. In particular the PC members and subreviewers for their accurate and timely reviewing, all authors for their submissions, and all attendees of the symposium for their participation. We also thank all the other committees (I-Day, Doctoral Symposium, Journal First Track, Workshops, and Tutorials), itemized on the following pages, and particularly the excellent local organization and publicity teams. In addition to FM 2019 they also managed the FM week consisting of another 8 conferences, 17 workshops, and 7 tutorials, as well as ‘X’, the secret project of a colloquium in honor of Stefania Gnesi based on a Festschrift to celebrate her 65th birthday.

We are very grateful to our platinum sponsors: Amazon Web Services (AWS), Google, and Sony; our gold sponsors: Springer, Semmler, ASML, and PT-FLAD Chair

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Finally, we thank Springer for publishing these proceedings in their FM subline and we acknowledge the support from EasyChair in assisting us in managing the complete process from submissions to these proceedings to the program.

August 2019

Maurice H. ter Beek  
Annabelle McIver  
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