Lecture Notes in Computer Science 12546

Formal Methods

Subline of Lectures Notes in Computer Science

More information about this series at http://www.springer.com/series/7408

Brijesh Dongol · Elena Troubitsyna (Eds.)

Integrated Formal Methods

16th International Conference, IFM 2020
Lugano, Switzerland, November 16–20, 2020
Proceedings

Springer

Editors
Brijesh Dongol
University of Surrey
Guildford, UK

Elena Troubitsyna
Royal Institute of Technology - KTH
Stockholm, Sweden

ISSN 0302-9743 ISSN 1611-3349 (electronic)
Lecture Notes in Computer Science
ISBN 978-3-030-63460-5 ISBN 978-3-030-63461-2 (eBook)
https://doi.org/10.1007/978-3-030-63461-2

LNCS Sublibrary: SL2 – Programming and Software Engineering

This Springer imprint is published by the registered company Springer Nature Switzerland AG
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Preface

In recent years, we have witnessed a proliferation of approaches that integrate several modeling, verification, and simulation techniques, facilitating more versatile and efficient analysis of computation-intensive systems. These approaches provide powerful support for the analysis of different functional and non-functional properties of the systems, different hardware and software components, and their interaction, as well as design and validation of diverse aspects of system behavior.

This volume contains the papers presented at the 16th International Conference on integrated Formal Methods (iFM 2020), which has taken place virtually due to the COVID-19 pandemic. The iFM conference series is a forum for discussing recent research advances in the development of integrated approaches to formal modeling and analysis. The conference covers all aspects of the design of integrated techniques, including language design, system verification and validation, automated tool support, and the use of such techniques in practice. We are also seeing increasing interest in the integration of fields such as machine learning and program synthesis with traditional formal approaches.

iFM 2020 solicited high-quality papers reporting novel research results as well as tool papers and experience reports. The Program Committee (PC) received 63 submissions and selected 24 for the publication, of which 2 are short papers. The acceptance rate is 38% (which also includes short papers). Each paper received three reviews. The PC members thoroughly discussed the merits of each paper before making the final decisions.

The program of iFM 2020 also includes keynote talks given by three prominent researchers:

- Edward A. Lee from the University of California, Berkeley, USA
- David Parker from the University of Birmingham, UK
- Hongseok Yang from the School of Computing, KAIST, South Korea

We would like to thank the invited speakers for accepting our invitation and agreeing to share their research results and aspirations with the iFM 2020 audience.

The PC co-chairs would like to thank the PC members for their active work in advertising iFM 2020, contributing to the program and reviewing submissions. We also thank all our subreviewers for providing expert guidance and contributing to the PC discussions. Despite the pandemic, the PC members and subreviewers stayed active throughout the entire review and discussion processes. We are especially grateful to the general chair Carlo A. Furia from Università della Svizzera italiana, Switzerland, for organizing the conference, and Springer for sponsoring iFM 2020. Finally, we would like to thank all the authors, who despite hard pandemic times, prepared submissions and helped us to build a strong and interesting iFM 2020 program.

We hope you enjoyed the conference!

November 2020

Brijesh Dongol
Elena Troubitsyna

Organization

Program Committee

Erika Abraham	RWTH Aachen University, Germany
Wolfgang Ahrendt	Chalmers University of Technology, Sweden
Yamine Ait Ameur	IRIT, INPT-ENSEEIHT, France
Étienne André	Université de Lorraine, CNRS, Inria, LORIA, France
Richard Banach	The University of Manchester, UK
Pierre-Evariste Dagand	LIP6, CNRS, France
Ferruccio Damiani	Universitá degli Studi di Torino, Italy
John Derrick	The University of Sheffield, UK
Brijesh Dongol	University of Surrey, UK
Marc Frappier	Université de Sherbrooke, Canada
Carlo A. Furia	Università della Svizzera italiana, Switzerland
Marieke Huisman	University of Twente, The Netherlands
Fuyuki Ishikawa	National Institute of Informatics, Japan
Einar Broch Johnsen	University of Oslo, Norway
Stephan Merz	Inria, France
Paritosh Pandya	TIFR, India
Patrizio Pelliccione	Chalmers University of Technology, Sweden
Luigia Petre	Åbo Akademi University, Finland
R. Ramanujam	Institute of Mathematical Sciences, Chennai, India
Steve Schneider	University of Surrey, UK
Emil Sekerinski	McMaster University, Canada
Silvia Lizeth Tapia Tarifa	University of Oslo, Norway
Maurice H. ter Beek	ISTI-CNR, Italy
Stefano Tonetta	FBK-irst, Italy
Elena Troubitsyna	KTH, Sweden
Juri Vain	Tallinn University of Technology, Estonia
Tomáš Vojnar	Brno University of Technology, Czech Republic
Farn Wang	National Taiwan University, Taiwan
Heike Wehrheim	Paderborn University, Germany
Kirsten Winter	The University of Queensland, Australia
Naijun Zhan	Institute of Software, Chinese Academy of Sciences, China

Additional Reviewers

An, Jie
Armborst, Lukas
Audrito, Giorgio
Bai, Yunjun
Baldan, Paolo
Bettini, Lorenzo
Bubel, Richard
Bussi, Laura
Casadei, Roberto
Coughlin, Nicholas
D'Souza, Deepak
Din, Crystal Chang
Fava, Daniel
Fiedor, Jan
Guha, Shibashis
Haltermann, Jan
Havlena, Vojtěch
Kamburjan, Eduard
Keiren, Jeroen J. A.
Kirsten, Michael
Kobayashi, Tsutomu
Konnov, Igor
König, Jürgen
Lengal, Ondrej
Lin, Shang-Wei
Lööw, Andreas
Maarand, Hendrik
Monti, Raúl E.
Owe, Olaf
Pauck, Felix
Petrocchi, Marinella
Pianini, Danilo
Pun, Violet Ka I.
Richter, Cedric
Saivasan, Prakash
Schiffl, Jonas
Schlatte, Rudolf
Sharma, Arnab
Srivathsan, B.
Steffen, Martin
Stolz, Volker
Sundararajan, Vaishnavi
Suresh, S. P.
Torta, Gianluca
Turin, Gianluca
Tveito, Lars
Wang, Qiuye
Yan, Rongjie
Zhan, Bohua
Zuleger, Florian

Contents

Integrating Machine Learning and Formal Modelling

Modelling and Verification in B and Event-B

Program Analysis and Testing

Verification of Interactive Behaviour

Formal Verification

Static Analysis

Domain-Specific Approaches

Algebraic Techniques