Lecture Notes in Computer Science 12709

More information about this subseries at http://www.springer.com/series/7407

Alexander Raschke · Dominique Méry (Eds.)

Rigorous State-Based Methods

8th International Conference, ABZ 2021
Ulm, Germany, June 9–11, 2021
Proceedings

Springer

Editors
Alexander Raschke
Ulm University
Ulm, Germany

Dominique Méry
University of Lorraine
Vandœuvre-lès-Nancy, France

ISSN 0302-9743 ISSN 1611-3349 (electronic)
Lecture Notes in Computer Science
ISBN 978-3-030-77542-1 ISBN 978-3-030-77543-8 (eBook)
https://doi.org/10.1007/978-3-030-77543-8

LNCS Sublibrary: SL1 – Theoretical Computer Science and General Issues

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

Preface

The International Conference on Rigorous State-Based Methods (ABZ 2021) is an international forum for the cross-fertilization of related state-based and machine-based formal methods, mainly Abstract State Machines (ASM), Alloy, B, TLA+, VDM, and Z. Rigorous state-based methods share a common conceptual foundation and are widely used in both academia and industry for the design and analysis of hardware and software systems.

The name ABZ was invented at the first conference held in London in 2008, where the ASM, B, and Z conference series merged into a single event. The second conference, ABZ 2010, was held in Orford, Canada, where the Alloy community joined the event; ABZ 2012 was held in Pisa, Italy, which saw the inclusion of the VDM community in the conference series (but not in the title); and ABZ 2014 was held in Toulouse, France, which brought the inclusion of the TLA+ community. Lastly, ABZ 2016 was held in Linz, Austria, and ABZ 2018 in Southampton, UK. In 2018 the Steering Committee decided to retain the (well-known) acronym ABZ and add the subtitle "International Conference on Rigorous State-Based Methods" to make more explicit the intention to include all state-based formal methods.

In 2020, the ABZ conference should have been held in Ulm, Germany. Unfortunately, the conference had to be cancelled at short notice due to the worldwide rampant COVID-19 virus and was postponed to this year, with the hope of welcoming all participants personally in Ulm. Unfortunately this hope did not come true, so we had to organize the conference as a virtual event after all. Since the proceedings were ready before the cancellation of the 2020 conference, we decided to publish them immediately. We also launched a new call for papers for ABZ 2021 so that researchers had the opportunity to publish new results in a timely manner.

Because the ABZ conference is normally hosted every two years we had not defined a new case study, and with the restrictions of the pandemic and the associated increased efforts, for example for teaching, being felt in the research community, significantly fewer papers were submitted to ABZ 2021. There were 15 papers submitted from authors in 8 countries spread over Europe, Asia, and America. Fortunately, the submitted papers were of very high quality, so that the four reviews per paper were consistently positive and only one paper had to be rejected. A total of 6 full research papers and 8 short research papers were accepted. All accepted papers cover broad research areas on theoretical, systems, or practical aspects of state-based methods.

The doctoral symposium, which was organized for the first time in 2020, also took place in 2021. Three PhD students submitted a four-page abstract describing their research projects and received constructive feedback from the senior researchers of the ABZ community. Each of the submitted abstracts was also evaluated by a separate Program Committee.

The conference was due to be held during June 9–11, 2021, in Ulm, Germany, but unfortunately the successes of the COVID-19 vaccination program will probably not be seen for several months, so the conference was held virtually. In addition to the new submissions, the authors of ABZ 2020 were also invited to present their papers, which fortunately many took advantage of and thus a comprehensive program could be put together.

Unfortunately, due to consequences of the COVID-19 crisis in the personal environment, one of the keynote speakers understandably had to cancel at short notice. However, we were all the more pleased to listen to the keynotes of Ana Cavalcanti, University of York, UK, on "RoStar technology — a roboticist's toolbox for combined proof and sound simulation" and Gilles Dowek, Inria/ENS Paris-Saclay, France, on "Sharing proofs across logics and systems: a boost for formal methods?"

The EasyChair conference management system was set up for ABZ 2021, supporting submissions and the review process.

We would like to thank all the authors who submitted their work to ABZ 2021. We are grateful to the Program Committee members for their high-quality reviews and discussions. Finally, we wish to thank the Organizing Committee members for their continuous support.

We hope the vaccination program will also reach poor countries as fast as possible such that the COVID-19 crisis will decrease within the next two years and we can meet together in person at ABZ 2023 in France.

For readers of these proceedings, we hope these papers are interesting and they inspire ideas for future research that can be presented at the next ABZ!

April 2021

Alexander Raschke
Dominique Méry

Organization

General Chairs

Alexander Raschke	Ulm University, Germany
Dominique Méry	Université de Lorraine, LORIA, France

Program Committee

Yamine Ait Ameur	IRIT/INPT-ENSEEIHT, France
Paolo Arcaini	National Institute of Informatics, Japan
Richard Banach	University of Manchester, UK
Egon Boerger	Università di Pisa, Italy
Eerke Boiten	De Montfort University, UK
Michael Butler	University of Southampton, UK
Andrew Butterfield	Trinity College Dublin, Ireland
David Deharbe	ClearSy System Engineering, France
Juergen Dingel	Queen's University, Canada
Flavio Ferrarotti	Software Competence Centre Hagenberg, Austria
Mamoun Filali-Amine	IRIT, France
Marc Frappier	Université de Sherbrooke, Canada
Angelo Gargantini	University of Bergamo, Italy
Vincenzo Gervasi	University of Pisa, Italy
Gudmund Grov	Norwegian Defence Research Establishment (FFI), Norway
Stefan Hallerstede	Aarhus University, Denmark
Klaus Havelund	Jet Propulsion Laboratory, USA
Ian J. Hayes	The University of Queensland, Australia
Thai Son Hoang	University of Southampton, UK
Frank Houdek	Daimler AG, Germany
Alexei Iliasov	Newcastle University, UK
Felix Kossak	Software Competence Center Hagenberg, Austria
Regine Laleau	Paris-Est Créteil University, France
Thierry Lecomte	ClearSy, France
Michael Leuschel	University of Düsseldorf, Germany
Alexei Lisitsa	University of Liverpool, UK
Atif Mashkoor	Johannes Kepler University, Austria
Jackson Mayo	Sandia National Laboratories, USA
Stephan Merz	Inria Nancy, France
Stefan Mitsch	Carnegie Mellon University, USA
Rosemary Monahan	Maynooth University, Ireland
Mohamed Mosbah	University of Bordeaux, France
Cesar Munoz	NASA, USA

Shin Nakajima	National Institute of Informatics, Japan
Uwe Nestmann	TU Berlin, Germany
Jose Oliveira	University of Minho, Portugal
Philipp Paulweber	Vienna University of Technology, Austria
Luigia Petre	Åbo Akademi University, Finland
Andreas Prinz	University of Agder, Norway
Shengchao Qin	Teesside University, UK
Philippe Queinnec	Université de Toulouse, France
Elvinia Riccobene	University of Milan, Italy
Victor Rivera	Australian National University, Australia
Thomas Santen	TU Berlin, Germany
Patrizia Scandurra	University of Bergamo, Italy
Gerhard Schellhorn	Universitaet Augsburg, Germany
Klaus-Dieter Schewe	Zhejiang University, China
Steve Schneider	University of Surrey, UK
Jun Sun	Singapore Management University, Singapore
Maurice H. ter Beek	ISTI-CNR, Italy
Laurent Voisin	Systerel, France
Virginie Wiels	ONERA/DTIM, France
Uwe Zdun	University of Vienna, Austria
Wolf Zimmermann	Martin Luther University Halle-Wittenberg, Germany

Contents

Regular Research Articles

Short Articles