

Proceedings

**4th FME Workshop on Formal Methods
in Software Engineering
FormaliSE 2016**

**15 May 2016
Austin, Texas, USA**

Proceedings

**4th FME Workshop on Formal Methods
in Software Engineering
FormaliSE 2016**

**15 May 2016
Austin, Texas, USA**

The Association for Computing Machinery
2 Penn Plaza, Suite 701
New York New York 10121-0701

ACM COPYRIGHT NOTICE. Copyright © 2016 by the Association for Computing Machinery, Inc. Permission to make digital or hard copies of part or all of this work for personal or classroom use is granted without fee provided that copies are not made or distributed for profit or commercial advantage and that copies bear this notice and the full citation on the first page. Copyrights for components of this work owned by others than ACM must be honored. Abstracting with credit is permitted. To copy otherwise, to republish, to post on servers, or to redistribute to lists, requires prior specific permission and/or a fee. Request permissions from Publications Dept., ACM, Inc., fax +1 (212) 869-0481, or permissions@acm.org.

For other copying of articles that carry a code at the bottom of the first or last page, copying is permitted provided that the per-copy fee indicated in the code is paid through the Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923, +1-978-750-8400, +1-978-750-4470 (fax).

Notice to Past Authors of ACM-Published Articles

ACM intends to create a complete electronic archive of all articles and/or other material previously published by ACM. If you have written a work that was previously published by ACM in any journal or conference proceedings prior to 1978, or any SIG Newsletter at any time, and you do NOT want this work to appear in the ACM Digital Library, please inform permissions@acm.org, stating the title of the work, the author(s), and where and when published.

ACM ISBN: 978-1-4503-4159-2

Editorial production by Patrick Kellenberger
Cover art production by Mark Bartosik



IEEE Computer Society
Conference Publishing Services (CPS)

<http://www.computer.org/cps>

Message from the Workshop Chairs

FormaliSE 2016

Welcome to the 4th FME Workshop on Formal Methods in Software Engineering!

FormaliSE is a yearly workshop on Formal Methods in Software Engineering. FormaliSE is organised by FME (Formal Methods Europe) and is co-located with ICSE (International Conference on Software Engineering).

The software industry has a long-standing and well-earned reputation for failing to deliver on its promises and it is clear that still nowadays, the success of software projects with the current technologies cannot be assured. For large complex projects, many approaches have proven inadequate to assure the correct behaviour of the delivered software, despite the efforts of the (often very skilled) software engineers involved. The lack of formalization in key places makes software engineering overly sensitive to the weaknesses that are inevitable in the complex activities behind software creation. It is an increasingly complex task to develop large software systems because the systems are huge, with very complex behaviour, and many algorithms employed today are "pushing the limits" of what people can comprehend. This is where formal methods (FMs) have a huge opportunity.

The main goal of the workshop is to foster integration between the formal methods and the software engineering communities. This need to achieve dialogue between the fairly small formal methods community and the (much larger) community of software scientists and practitioners forms the principal motivation holding for our workshop, and for our desire to hold it at ICSE.

We have received 17 paper submissions coming from 14 different countries around the world. After being reviewed by at least 3 members of the program committee, 6 papers have been accepted as full papers and 2 for a short presentation, giving an acceptance rate of 35%.

In addition to the paper presentations, the workshop program includes two keynote speakers. We are grateful to Don Batory, University of Texas at Austin, USA, and Pamela Zave, AT&T Research, USA, for accepting our invitation to address the workshop with two inspiring talks.

The program has been organized dividing the presentation of the accepted papers in four sections, the first and the third one including the keynote. At the end of the workshop a panel is organized with the purpose of stimulating a discussion on the workshop's main themes.

We would like to thank the Program Committee members for their help in selecting the papers. We also would like to thank the members of the ICSE Workshop Organizing Committee. Particular thanks go to the Workshops Chairs, Marija Mikic and Mauro Pezzè.

Stefania Gnesi and Nico Plat
FormaliSE 2016 Program Committee Co-Chairs

Committees

FormaliSE 2016

Steering Committee

Stefania Gnesi	IST-CNR, Italy
Nico Plat	Thanos, The Netherlands

Program Committee

Keijiro Araki	Kyushu University, Japan
Andreas Bollin	Klagenfurt University, Austria
Ana Cavalcanti	York University, UK
Nancy Day	University of Waterloo, Canada
Ewen Denney	SGT/NASA Ames, United States
Cindy Eisner	IBM Haifa Research Laboratory, Israel
Alessandro Fantechi	University of Florence, Italy
Antonio Filieri	Universität Stuttgart, Germany
Stefania Gnesi	IST-CNR, Italy
Wolfgang Grieskamp	Google, United States
Jan Friso Groote	Eindhoven University of Technology, The Netherlands
Michaela Huhn	TU Clausthal, Germany
Nicolas D'Ippolito	Universidad de Buenos Aires, Argentina
Peter Gorm Larsen	Aarhus University, Denmark
Marc Lawford	MacMaster University, Canada
Thierry Lecomte	ClearSy, France
Yves Ledru	IMAG, France
Axel Legay	INRIA Rennes, France
Antónia Lopes	University of Lisbon, Portugal
Tiziana Margaria	University of Limerick and Lero, Ireland
Ravidra Metta	Tata Consultancy Services, India
Henry Muccini	Universita degli Studi dell'Aquila, Italy
Kenneth Pierce	University of Newcastle, UK
Nico Plat	Thanos, The Netherlands
Sanjai Rayadurgam	University of Minnesota, United States
Matteo Rossi	Politecnico di Milano, Italy
Thomas Santen	Microsoft, UK
Laura Semini	Pisa University, Italy
Marjan Sirjani	Reykjavik University, Iceland
Marcel Verhoef	European Space Agency, The Netherlands

Additional Reviewers

Kumar Madhukar	Tata Consultancy Services, India
Pedro Ribeiro	University of York, UK
Dongjiang You	University of Minnesota, United States

Sponsors and Supporters

ICSE 2016

Sponsors



Gold Benefactors



Silver Benefactors



Bronze Benefactors



IBM Research



Supporter



4th FME Workshop on Formal Methods in Software Engineering (FormaliSE 2016)

Table of Contents

Message from the Workshop Chairs.....	vii
Committees and Reviewers	viii
Sponsors and Supporters	x

Session 1

Deductive Evaluation: Formal Code Analysis with Low User Burden	1
<i>Ben L. Di Vito</i>	
— NASA Langley Research Center, USA	

Session 2

Undertaking the Tokeneer Challenge in Event-B	8
<i>Victor Rivera, Sukriti Bhattacharya, and Néstor Cataño</i>	
— Innopolis University, Russian Federation; University College London (UCL), United Kingdom	
Simple Synthesis of Reactive Systems with Tolerance for Unexpected Environmental Behavior	15
<i>Shigeki Hagihara, Atsushi Ueno, Takashi Tomita, Masaya Shimakawa,</i>	
<i>and Naoki Yonezaki</i>	
— Tokyo Institute of Technology, Japan; Japan Advanced Institute of Science	
and Technology, Japan	
Download Malware? No, Thanks. How Formal Methods Can Block Update Attacks	22
<i>Francesco Mercaldo, Vittoria Nardone, Antonella Santone, and Corrado Aaron Visaggio</i>	
— University of Sannio, Italy	
Validating Formal Specifications Using Testing-Based Specification Animation.....	29
<i>Shaoying Liu</i>	
— Hosei University, Japan	

Session 3

Towards Synthesis from Assume-Guarantee Contracts involving Infinite Theories: A Preliminary Report.....	36
<i>Andreas Katis, Andrew Gacek, and Michael W. Whalen</i>	
— University of Minnesota, USA; Rockwell Collins, USA	

Session 4

Toward Rigorous Design of Domain-Specific Distributed Systems	42
<i>Mohammed Al-Mahfoudh, Ganesh Gopalakrishnan, and Ryan Stutsman</i>	
<i>— The University of Utah, USA</i>	

Author Index	49
--------------------	----