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Martina Seidl · Steffen Zschaler (Eds.)

Software Technologies: Applications and Foundations

STAF 2017 Collocated Workshops
Marburg, Germany, July 17–21, 2017
Revised Selected Papers

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Preface

This volume contains revised selected technical papers presented at the six satellite events collocated with Software Technologies: Applications and Foundations (STAF 2017), a federation of leading conferences on software technologies. The events took place in Marburg, Germany, during July 17–21, 2017.

STAF 2017 brought together researchers and practitioners from both academia and industry with an interest in all aspects of software technology. The satellite events added to this by providing a collaborative environment in which to discuss emerging areas in software engineering and, in particular, model-driven engineering (MDE). This year STAF included a projects showcase, enabling research project teams to present a coherent view of their results to the community. Also, for the first time, there was a workshop on grand challenges in MDE research, which provided some interesting insights into research directions of future relevance.

The events whose papers are included in this volume are:

- BigMDE 2017: 5th International Workshop on Scalable Model-Driven Engineering
- GCM 2017: 8th International Workshop on Graph Computation Models
- GRAND 2017: First International Workshop on Grand Challenges in Modeling
- MORSE 2017: 4th International Workshop on Model-Driven Robot Software Engineering
- OCL 2017: 17th International Workshop in OCL and Textual Modeling
- STAF Projects Showcase 2017: Third event dedicated to international and national project dissemination and cooperation

Additionally, a doctoral symposium was organized as part of STAF. The corresponding proceedings have been published separately as CEUR Volume 1955.

Brief messages from the events listed above follow this preface. We are grateful to EasyChair for the support with the paper submission and reviewing process for all workshops and with the preparation of this volume. For each of the workshops at STAF 2017, we thank the organizers for the interesting topics and resulting talks. We also thank the paper contributors to these workshops and those who attended them. We would like to extend our thanks to the members of each workshop's Program Committee. Finally, we would like to thank the organizers of STAF 2017 and, in particular, the general chair, Gabriele Taentzer.

December 2017

Martina Seidl
Steffen Zschaler

STAF 2017 Organizer's Message

Software Technologies: Applications and Foundations (STAF) is a federation of leading conferences on software technologies. It provides a loose umbrella organization with a Steering Committee that ensures continuity. The STAF federated event takes place annually. The participating conferences may vary from year to year, but they all focus on foundational and practical advances in software technology. The conferences address all aspects of software technology, from object-oriented design, testing, mathematical approaches to modeling and verification, transformation, model-driven engineering, aspect-oriented techniques, and tools.

STAF 2017 took place in Marburg, Germany, during July 17–21, 2017, and hosted the four conferences ECMFA 2017, ICGT 2017, ICMT 2017, and TAP 2017, the transformation tool contest TTC 2017, six workshops, a doctoral symposium, and a projects showcase event. STAF 2017 featured four internationally renowned keynote speakers, and welcomed participants from around the world.

The STAF 2017 Organizing Committee thanks (a) all the participants for submitting to and attending the event, (b) the Program Committees and Steering Committees of all the individual conferences and satellite events for their hard work, (c) the keynote speakers for their thoughtful, insightful, and inspiring talks, and (d) Philipps-Universität, the city of Marburg, and all sponsors for their support. A special thank you goes to Christoph Bockisch (local chair), Barbara Dinklage and further members of the Department of Mathematics and Computer Science of Philipps-Universität, for coping with all the foreseen and unforeseen work to prepare a memorable event.

December 2017

Gabriele Taentzer

BigMDE 2017 Organizers' Message

As model-driven engineering (MDE) is increasingly applied to larger and more complex systems, the current generation of modeling and model management technologies are being pushed to their limits in terms of capacity and efficiency. As such, additional research and development is imperative in order to enable MDE to remain relevant to industrial practice and to continue delivering its widely recognized productivity, quality, and maintainability benefits.

The 5th BigMDE Workshop (<http://www.big-mde.eu/>) was co-located with the Software Technologies: Applications and Foundations (STAF 2017) conference. BigMDE 2017 provided a forum for developers and users of modeling and model management languages and tools to present and discuss problems and solutions related to scalability aspects of MDE, including:

- Working with large models
- Collaborative modeling (version control, collaborative editing)
- Transformation and validation of large models
- Model fragmentation and modularity mechanisms
- Efficient model persistence and retrieval
- Models and model transformations on the cloud
- Visualization techniques for large models
- High-performance MDE
- Identification of scalability and performance issues in MDE

Contributions from the community were essential for the success of BigMDE 2017. In particular, we would like to acknowledge the hard work of all Program Committee members for the timely delivery of reviews given the tight review schedule, and to thank the authors for submitting and presenting their work at the workshop.

July 2017

Dimitris Kolovos
Davide Di Ruscio
Nicholas Matragkas
Jesús Sánchez Cuadrado
István Ráth
Massimo Tisi

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GCM 2017 Organizers' Message

The 8th International Workshop on Graph Computation Models (GCM 2017) was held in Marburg, Germany, on July 17, 2017.

Graphs are common mathematical structures which are visual and intuitive. They constitute a natural and seamless way for system modeling in science, engineering and beyond, including computer science, life sciences, business processes, etc. Graph computation models constitute a class of very high level models where graphs are first-class citizens. They generalize classic computation models based on strings or trees, such as Chomsky grammars or term rewrite systems. Their mathematical foundation, in addition to their visual nature, facilitates specification, validation, and analysis of complex systems. A variety of computation models have been developed using graphs and rule-based graph transformation. These models include features of programming languages and systems, paradigms for software development, concurrent calculi, local computations and distributed algorithms, and biological and chemical computations.

The aim of GCM 2017 is to bring together researchers interested in all aspects of computation models based on graphs and graph transformation techniques. The workshop promotes the cross-fertilizing exchange of ideas and experiences among researchers and students from the different communities interested in the foundations, applications, and implementations of graph computation models and related areas. Previous editions of the GCM series were held in Natal, Brazil (GCM 2006), in Leicester, UK (GCM 2008), in Enschede, The Netherlands (GCM 2010), in Bremen, Germany (GCM 2012), in York, UK (GCM 2014), in L'Aquila, Italy (GCM 2015), and in Vienna, Austria (GCM 2016).

After a thorough review process, the Program Committee accepted five papers for publication in the proceedings and three additional papers for presentation and inclusion in the electronic pre-conference proceedings.

Several people contributed to the success of GCM 2017. I would like to thank the organizers of STAF 2017, and in particular the general chair, Gabriele Taentzer, and the workshop chairs, Martina Seidl and Steffen Zschaler. I would also like to express my thanks to the Program Committee and to the additional reviewers (Fabio Gadducci, Christian Sandmann, Timothy Atkinson, Berthold Hoffmann, Dennis Nolte, and Christoph Peuser) for their valuable help. The EasyChair system greatly facilitated the submission and program selection process.

I would furthermore like to thank all authors, speakers, and participants of the workshop.

GCM 2017 Program Committee

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Leila Ribeiro	Universidade Federal do Rio Grande do Sul, Brazil

GRAND 2017 Organizers' Message

The fields of modeling and model-driven engineering have made incredible contributions to leverage abstraction and automation in almost every area of software and systems development and analysis. In many domains, including automotive software engineering, embedded systems, and business process engineering, models are key to success in modern software engineering processes. However, this success has led to an even higher demand for better processes, tools, theories, and general awareness about modeling, its scope and application. Important questions have emerged about how our field can and should respond to this changing landscape in terms of identifying the main challenges in modeling and model-driven engineering. This includes not only the challenges for today, but for the next 3, 5, and 10 years; these challenges need to be cooperatively and collaboratively defined, to help produce a challenging research agenda for the field. The goal of the GrandMDE Workshop was to come up with such a list of *grand challenges* for model-driven engineering.

The workshop received 15 paper submissions from which 11 were selected for presentation at the workshop. Owing to the nature of the workshop, all papers were position papers, each one presenting a different challenge. Topics covered in the workshop included: adoption of MDE, temporal modeling, executable models, artificial intelligence for MDE, enterprise modeling and Industry 4.0, quality aspects, etc. Each paper was reviewed by at least three Program Committee members.

The organizers would like to thank the authors and presenters of submitted papers, the Program Committee members, and the audience for the contribution to the success of the workshop.

November 2017

Jordi Cabot
Richard Paige
Alfonso Pierantonio

GRAND 2017 Program Committee

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McMaster University, Canada
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Politecnico di Milano, Italy
University of York, UK
University of Malaga, Spain

MORSE 2017 Organizers' Message

The 4th edition of the international Workshop on Model-Driven Robot Software Engineering (MORSE) was held at the International Conference on Software Technologies: Applications and Foundations (STAF). This year's edition took place in Marburg, Germany, on July 21, 2017 and focused on scenario-based development and interaction modeling. Previous editions were located at STAF 2014 (York, UK), STAF 2015 (L'Aquila, Italy), and RoboCup 2016 (Leipzig, Germany).

With the rise of standardized robotic hardware platforms and software platforms and the pace with which software ecosystems and app stores develop in application markets, the following research topics become increasingly important in software engineering for robotics: (1) model-driven development of robotic systems; (2) software and app reuse for robotics; (3) end-user robot app development; (4) compliance to legal and safety constraints; and (5) total cost of ownership.

Model-driven development facilitates designing and engineering complex systems through automatization and concentrating on different levels of abstraction. Advances in robotics research and the increasing complexity of robotic systems demand for both. Model-driven development can help to improve the quality (e.g., re-usability, reliability, maintainability) of the robotic systems. Hence, there is a need for a new paradigm of model-driven software and system engineering for robots. Besides six interesting paper presentations, the workshop program of MORSE 2017 was enriched by a keynote talk given by Davide di Ruscio, University of L'Aquila: "The Role of Models in Engineering the Software of Robotic Systems."

The need and timeliness of this topic, as well as the excellent support of its Program Committee, resulted in having a successful fourth edition of the MORSE workshop.

November 2017

Sebastian Götz
Christian Piechnick
Andreas Wortmann

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Heike Wehrheim	University of Paderborn, Germany
Sebastian Wrede	CoR-Lab, Bielefeld University, Germany

OCL 2017 Organizers' Message

The goal of the OCL 2017 workshop was to create a forum where researchers and practitioners interested in building models using OCL or other kinds of textual languages could directly interact, report advances, share results, identify tools for language development, and discuss appropriate standards. In particular, the workshop encouraged discussions for achieving synergy from different modeling language concepts and modeling language use. The close interaction enabled researchers and practitioners to identify common interests and options for potential cooperation.

The workshop received seven submissions from which five were selected as full papers. Each paper was reviewed by at least three Program Committee members. The workshop hosted an open session with Lightning Talks (5 min.) at the end of the day where speakers were given the opportunity to talk about whatever they wanted, as long as it was related to the topics of the workshop. Three presentations were given.

The organizers would like to thank the authors of submitted papers, the Program Committee members, the workshop speakers, and the workshop audience for the contribution to the success of the workshop.

November 2017

Robert Bill
Achim D. Brucker
Jordi Cabot
Martin Gogolla

OCL 2017 Program Committee

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Burkhard Wolff	University of Paris-Sud, France
Steffen Zschaler	King's College London, UK

Subreviewer

Olga Haubrich	RWTH Aachen University, Germany
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Projects Showcase 2017 Organizers' Message

The aim of the Projects Showcase event at STAF 2017 was to provide an opportunity for researchers and practitioners involved in ongoing or completed research projects related to foundations and applications of software technologies to share results, experiences, ideas, on-going work, and knowledge that could lead to fruitful inter-project collaboration.

The call for papers of the event solicited contributions disseminating the objectives and results of national and international research projects, including outcomes of specific deliverables, advances beyond the state of the art, overall innovation potential, exploitation approach and (expected) impact, marketing value, barriers, and obstacles.

Six papers were accepted for presentation and publication in the proceedings of the event, which reported on different types of national, international, and in-house research and development projects. We would like to acknowledge the hard work of the members of the Program Committee and the contribution of the authors of submitted papers to the success of this event.

November 2017

Massimo Tisi
Thanos Zolotas

Projects Showcase 2017 Program Committee

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