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Gwen Salaün · Anton Wijs (Eds.)

# Formal Aspects of Component Software

17th International Conference, FACS 2021  
Virtual Event, October 28–29, 2021  
Proceedings

*Editors*

Gwen Salaün  
Grenoble Alpes University  
Saint-Martin-d'Hères, France

Anton Wijs   
Eindhoven University of Technology  
Eindhoven, The Netherlands

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# Preface

This volume contains the proceedings of the 17th International Conference on Formal Aspects of Component Software (FACS 2021), held online, due to the COVID-19 pandemic, during October 28–29, 2021.

Component-based software development proposes sound engineering principles and techniques to cope with the complexity of present-day software systems. However, many challenging conceptual and technological issues remain in component-based software development theory and practice. Furthermore, the advent of service-oriented and cloud computing, cyber-physical systems, and the Internet of Things has brought to the fore new dimensions, such as quality of service and robustness to withstand faults, which require revisiting established concepts and developing new ones.

FACS 2021 was concerned with how formal methods can be applied to component-based software and system development. Formal methods have provided foundations for component-based software through research on mathematical models for components, composition and adaptation, and rigorous approaches to verification, deployment, testing, and certification.

We received 16 submissions for the conference, and all of them were reviewed by three reviewers. Based on their reports and subsequent discussions, the Program Committee (PC) decided to accept eight papers (seven regular papers and one tool paper) for inclusion in this volume and the program of FACS 2021. In addition, we invited Radu Calinescu and Corina Pasareanu to give keynotes. This volume contains an abstract of the talk given by Radu Calinescu and an invited paper by Corina Pasareanu.

We thank Radu Calinescu and Corina Pasareanu for accepting our invitations to give an invited talk, as well as all authors who submitted their work for FACS 2021. We thank the members of the PC for their effort to write timely and high-quality reviews, and their discussions to make the final selection of papers. We also thank the FACS Steering Committee for useful suggestions and support. Finally, we thank the other members of the FACS 2021 organizing committee, Radu Mateescu, Ajay Muroor Nadumane, and Ahang Zuo, for their contribution to organizing the conference.

September 2021

Gwen Salaün  
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# Parametric and Interval Model Checking: Recent Advances and Applications (Abstract of Invited Paper)

Radu Calinescu 

Department of Computer Science, University of York, UK  
radu.calinescu@york.ac.uk

**Abstract.** The model checking of Markov chains is a powerful technique for verifying performance, dependability and other key properties of systems with stochastic behaviour, both during development and at runtime. However, the usefulness of this technique depends on the accuracy of the models being verified, and on the efficiency of the verification. This invited talk will describe how recent advances in parametric and interval model checking address major challenges posed by these prerequisites, enabling the application of the technique to a broader range of component-based systems.

**Keywords:** Parametric model checking · Parametric Markov chains · Confidence-interval model checking · Interval Markov chains · Change-point detection

This talk is based on research reported in [1–7], and funded by the UK Research and Innovation project EP/V026747/1 ‘Trustworthy Autonomous Systems Node in Resilience’, the Assuring Autonomy International Programme, and the ORCA-Hub Partnership Resource Fund project ‘COVE’.

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# Contents

## Invited Paper

Learning Assumptions for Verifying Cryptographic Protocols Compositionally . . . . .	3
<i>Zichao Zhang, Arthur Azevedo de Amorim, Limin Jia, and Corina Păsăreanu</i>	

## Modelling and Composition

Component-Based Approach Combining UML and BIP for Rigorous System Design . . . . .	27
<i>Salim Chehida, Abdelhakim Baouya, and Saddek Bensalem</i>	
Composable Partial Multiparty Session Types . . . . .	44
<i>Claude Stolze, Marino Miculan, and Pietro Di Gianantonio</i>	
A Canonical Algebra of Open Transition Systems . . . . .	63
<i>Elena Di Lavore, Alessandro Gianola, Mario Román, Nicoletta Sabadini, and Paweł Sobociński</i>	
Corinne, a Tool for Choreography Automata . . . . .	82
<i>Simone Orlando, Vairo Di Pasquale, Franco Barbanera, Ivan Lanese, and Emilio Tuosto</i>	

## Verification

Specification and Safety Verification of Parametric Hierarchical Distributed Systems . . . . .	95
<i>Marius Bozga and Radu Iosif</i>	
A Linear Parallel Algorithm to Compute Bisimulation and Relational Coarsest Partitions . . . . .	115
<i>Jan Martens, Jan Friso Groote, Lars van den Haak, Pieter Hijma, and Anton Wijs</i>	
Automated Generation of Initial Configurations for Testing Component Systems . . . . .	134
<i>Frédéric Dadeau, Jean-Philippe Gros, and Olga Kouchnarenko</i>	

<b>Monitoring Distributed Component-Based Systems . . . . .</b>	<b>153</b>
<i>Yliès Falcone, Hosein Nazarpour, Saddek Bensalem, and Marius Bozga</i>	
<b>Author Index . . . . .</b>	<b>175</b>