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# Software Engineering and Formal Methods

SEFM 2019 Collocated Workshops:  
CoSim-CPS, ASYDE, CIFMA, and FOCLASA  
Oslo, Norway, September 16–20, 2019  
Revised Selected Papers

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# Preface

This volume contains the technical papers presented at the four workshops co-located with the 17th International Conference on Software Engineering and Formal Methods (SEFM 2019). The workshops were hosted by the Department of Computer Science, University of Oslo, and took place at the Oslo Science Park, during September 16–17, 2019, preceding the main conference held at the same place.

The SEFM 2019 conference brought together researchers and practitioners from academia, industry, and government, to advance the state of the art in formal methods, to facilitate their uptake in the software industry, and to encourage their integration within practical software engineering methods and tools. The satellite workshops provided an interactive and collaborative environment to discuss emerging areas of software engineering, software technologies, model-driven engineering, and formal methods. The four workshops whose contributions are included in this volume are:

- **CoSim-CPS 2019** – Third International Workshop on Formal Co-Simulation of Cyber-Physical Systems. Organized by: Cláudio Gomes, University of Antwerp, Belgium; Cinzia Bernardeschi, University of Pisa, Italy; Paolo Masci, National Institute of Aerospace (NIA), USA; and Peter Gorm Larsen, Aarhus University, Denmark.
- **ASYDE 2019** – International Workshop on Automated and verifiable Software sYstem DEvelopment. Organized by: Farhad Arbab, Centre for Mathematics and Computer Science (CWI), The Netherlands; Marco Autili, University of L'Aquila, Italy; Federico Ciccozzi, Malardalen University, Sweden; Pascal Poizat, Sorbonne Université, France; and Massimo Tivoli, University of L'Aquila, Italy.
- **CIFMA 2019** – International Workshop on Cognition: Interdisciplinary Foundations, Models and Applications. Organized by: Antonio Cerone, Nazarbayev University, Kazakhstan; and Alan Dix, Computational Foundry, Swansea University, UK.
- **FOCLASA 2019** – 17th International Workshop on Coordination and Self-Adaptiveness of Software Applications. Organized by: Ernesto Pimentel, University of Málaga, Spain; and Jacopo Soldani, University of Pisa, Italy.

We would like to thank all organizers of the workshops at SEFM 2019 for the interesting topics and resulting talks, as well as the respective Program Committee members and reviewers for their thorough and careful reviews, for selecting the program for each workshop, and for making the compilation of this volume possible. We also thank the paper contributors and attendees of all workshops, including the keynote speakers for their excellent presentations. Finally, we would like to thank the

organizers of general chairs of SEFM 2019, Peter Csaba Ölveczky and Gwen Salaün, and University of Oslo as hosting institution, for making the event possible.

June 2020

Javier Camara  
Martin Steffen

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