Message from the Guest Editors

This special issue contains selected papers of the 15th International Conference on Application of Concurrency to System Design (ACSD). ACSD is a forum for the development of leading research in concurrent systems, where the synergy between theory and practice is being explored. The aim is to bring theory and practice closer together by informing practitioners about the latest theoretical results and by challenging theoreticians with complex industrial problems.

This special issue, consisting of nine articles based on publications at the conference, stands representative for the bridge that ACSD builds between theoretical results and industrial applications. Starting from semantics, it contains articles on concurrency theory, verification, and system design.

The article “Testing Preorders for dMTS: Deadlock- and the New Deadlock/Divergence-Testing” received the ACSD 2015 Best Paper Award. It studies testing preorders on component specifications, which are designed in a way that replacing a specification by a refined one does not introduce unwanted behavior to the overall system. The second article on semantics is “Multivalued Abstraction Using Lattice Operations.” It studies mixed simulations as a relation between a concrete system and its abstraction. The contribution is an extension of mixed simulations to inconsistent values.

The second line of work is devoted to concurrency theory, more precisely partial-order models. The article “Preserving Partial-Order Runs in Parametric Time Petri Nets” studies the problem of parameter synthesis for timed systems. Partial-order models are not only versatile tools in the analysis of timed systems. They are also helpful when addressing security concerns, as developed in the article “Noninterference in Partial-Order Models.” The article “Unfolding Based Minimal Test Suites for Testing Multithreaded Programs” supports the claim for partial orders being useful in system analysis. It forms the transition to the articles on verification.

The first verification article, “Stop It, and Be Stubborn!,” is on partial-order reduction, a state-space exploration technique. The key observation is that may-termination is beneficial for both efficiency and precision of the method. The article “Incremental Inductive Verification of Parameterized Timed Systems” lifts the IC3 algorithm to the timed setting. Finally, “When Do We (Not) Need Complex Assume-Guarantee Rules?” studies circular proof rules in compositional verification and whether they can be replaced by simpler reasoning.

On the system design side, “Task-FIFO Co-Scheduling of Streaming Applications on MPSoCs with Predictable Memory Hierarchy” develops an iterative scheduling algorithm for streaming applications.

We are grateful to a number of people: We would like to thank the organizing committee for making ACSD 2015 happen. We are grateful to ACM *TECS* for agreeing to publish this special issue. Most of all, we thank the authors and the reviewers for their outstanding work that has allowed us to create a special issue of high quality.

Enjoy the study!

November 2016
Cachan & Braunschweig

Stefan Haar
Roland Meyer