PREFACE

This special issue contains full versions of six papers presented at FSCD 2019, the Fourth International Conference on Formal Structures for Computation and Deduction that was held in Dortmund, Germany, on June 24–30, 2019.

FSCD (`http://fscd-conference.org/`) covers all aspects of formal structures for computation and deduction from theoretical foundations to applications. Initially building on two communities, RTA (Rewriting Techniques and Applications) and TLCA (Typed Lambda Calculi and Applications), FSCD embraces their core topics and broadens their scope to closely related areas in logic and proof theory, new emerging models of computation, semantics and verification in challenging areas.

The fourth edition of FSCD attracted 69 submissions, of which 30 were selected for presentation at the conference. We invited the authors of seven selected papers to submit an extended version to this special issue. These submissions received two or three additional reports and underwent several rounds of reviewing. One paper was in an early stage withdrawn by the authors, and six papers found their way to this special issue.

These six papers illustrate a variety of subjects and techniques that are typical for FSCD. The paper by Mirai Ikebuchi considers the question of how to find a lower bound on the number of axioms needed to define an equational theory using techniques from homology theory. Jonathan Sterling, Carlo Angiuli and Daniel Gratzer present a version of Cartesian cubical type theory for Bishop sets. These two papers were awarded a FSCD 2019 Best Paper Award for Junior Researchers by the Program Committee of FSCD 2019. The special issue contains four more papers. The paper by Domininique Larchey-Wendling and Yannick Forster presents a formalization in the proof assistant Coq of the undecidability of solvability of Diophantine equations. The paper by Thomas Ehrhard explores a semantical view on extending probabilistic programming languages with derivatives. The paper by Thierry Coquand, Simon Huber and Christian Sattler about cubical type theory uses a sconing argument to prove both a homotopy canonicity result and a canonicity result. Claudia Faggian's paper considers the classical rewriting concepts uniqueness of normal forms and strategies in a probabilistic setting.

We thank all who contributed to FSCD 2019. We thank the PC of FSCD 2019 for their advice in the selection process. We are very grateful to the referees for their valuable and constructive contribution and for the time they devoted to this work on top of the additional workload due to the Covid pandemic. We thank all authors for carefully preparing their papers. Finally, we are grateful to LMCS for making this special issue possible, and we in particular thank Brigitte Pientka for her support during the process.

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Herman Geuvers, Femke van Raamsdonk
Guest Editors of the FSCD 2019 Special Issue

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All articles have already been published in the regular issues of Logical Methods in Computer Science.