Preface

This volume collects a set of papers accompanying the lectures of the 15th International School on Formal Methods for the Design of Computer, Communication and Software Systems (SFM). This series of schools addresses the use of formal methods in computer science as a prominent approach to the rigorous design of the above-mentioned systems. The main aim of the SFM series is to offer a good spectrum of current research in foundations as well as applications of formal methods, which can be of help to graduate students and young researchers who intend to approach the field. SFM 2015 was devoted to multicore programming and covered topics such as concurrency and coordination mechanisms, architecture and memory models, and type systems. The five papers of this volume represent the broad range of topics of the school.

The paper by Brandauer, Castegren, Clarke, Fernandez-Reyes, Johnsen, Pun, Tapia Tarifa, Wrigstad, and Yang presents Encore, an object-oriented parallel programming language specifically developed for supporting multicore computing and addressing performance and scalability issues. Arbab and Jongmans show how to use Reo, a language adhering to an interaction-centric model of concurrency, to coordinate multicore computing. Alglave's paper discusses concurrent programming together with the description of the execution models of the machines on which software is ran. Coppo, Dezani-Ciancaglini, Padovani, and Yoshida provide an introduction to multiparty session types, a class of behavioral types specifically targeted at describing protocols in distributed systems based on asynchronous communication. Finally, the paper by Castegren, Östlund, and Wrigstad proposes refined ownership types to reason about correctness on a local scale, for fine-grained parallelism, and for coarse-grained parallelism.

We believe that this book offers a useful view of what has been done and what is going on worldwide in the field of formal methods for multicore programming. This school was organized in collaboration with the EU FP7 project UpScale, whose support we gratefully acknowledge. We wish to thank all the speakers and all the participants for a lively and fruitful school. We also wish to thank the entire staff of the University Residential Center of Bertinoro for the organizational and administrative support.

June 2015

Marco Bernardo
Einar Broch Johnsen

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