PREFACE

This special issue collects extended versions of five papers presented at the second CALCO 2007 in Bergen, Norway. CALCO, the Conference "Algebraic and Coalgebraic Methods in Computer Science", has been founded by joining forces of WADT, the International Workshop on Algebraic Development Techniques, and CMCS, the International Workshop on Coalgebraic Methods in Computer Science. CALCO 2007 received 57 submissions (including four tool papers), out of which 26 (including two tool papers) were selected for presentation at the conference and for publication in Springer Lecture Notes in Computer Science 4624. The five papers of this special issue underwent a new and thorough reviewing process.

The present volume starts with a survey article by Jan Rutten, who is one of the co-founders of the field of coalgebra. *Rational streams coalgebraically* gives an equivalence proof for four representations of infinite streams at an elementary level, illustrating the benefit of coinduction, the central coalgebraic proof method.

The paper *Bisimilarity and Behaviour-Preserving Reconfigurations of Open Petri Nets* by Paolo Baldan, Andrea Corradini, Hartmut Ehrig, Reiko Heckel and Barbara König studies open Petri nets, a reactive extension of standard Petri nets. Central to this work is the identification of several different notions of bisimilarity, proofs that these are congruences, and the development of methods for bisimilarity proofs. Although no explicit reference to the notion of coalgebra is made, the questions and methods of this paper are clearly coalgebraic.

Lutz Schröder continues with an interplay of algebra and coalgebra: *Bootstrapping Inductive and Coinductive Types in HasCASL* addresses the construction of inductive datatypes and coinductive process types over an arbitrary quasitopos with natural numbers object, and examines under which conditions these constructions are conservative.

While the natural logic of algebra is equational logic, the natural logic of coalgebra is modal logic. Consequently, the semantics of non-normal modal logics given by neighbourhood structures (generalising normal modal logics with Kripke semantics) is best studied in a coalgebraic setting. In their paper *Neighbourhood Structures: Bisimilarity and Basic Model Theory*, Helle Hvid Hansen, Clemens Kupke and Eric Pacuit complement the standard notion of bisimilarity and behavioural equivalence with a notion of precongruence that better captures the intuition of behavioural equivalence. With this, the authors prove a Hennessy-Milner theorem and an analogue of Van Benthem's characterisation theorem.

Finally, in *Applications of Metric Coinduction*, Dexter Kozen and Nicholas Ruozzi again address coinduction, which is here specialised to metric coinduction, which is a kind of fixed-point theorem for eventually contractive maps on metric spaces. The authors illustrate the use of metric coinduction in such diverse areas as infinite streams, Markov chains, Markov decision processes, and non-well-founded sets.

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

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Guest Editors