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## Preface

This special issue contains extended versions of papers selected from those presented at the 31st International Colloquium on Automata, Languages and Programming (ICALP 2004) held on 12–16 July 2004 in Turku, Finland.

In 2004, ICALP had two tracks:

*Track A:* Algorithmic aspects of parallel and distributed computing; algorithms and data structures; algorithms and models for large networks; algorithms for computationally hard problems; automata theory and formal languages; bioinformatics; computational complexity; combinatorics and structures in computer science; cryptography; machine learning; molecular computing, neural and evolutionary algorithms; proof complexity; quantum computing.

*Track B:* Algebraic and categorical models; applications of automata in logic; concurrency, mobility and distributed systems; databases, semi-structured data and finite model theory; logics and their applications; principles of programming languages; program logics, formal methods and model checking; security analysis and verification; semantics of programming languages; specification, refinement and verification; type systems and typed calculi.

This special issue covers track B; a separate special issue of *Theoretical Computer Science*, edited by Josep Díaz, will cover track A.

ICALP is the annual conference of the European Association for Theoretical Computer Science (EATCS). In 2004 it was co-located with the 19th Annual IEEE Symposium on Logic in Computer Science (LICS 2004) and 11 satellite workshops, and was hosted by the Mathematics Department of Turku University and the Turku Centre for Computer Science. ICALP 2004 received more submissions to both track A and track B than any previous ICALP, and as a result the conference programme was of unusually high quality. There were 107 submissions to track B, of which 28 were selected for presentation at the conference and publication in the proceedings which appeared as volume 3142 of Springer's Lecture Notes in Computer Science series. Revised and extended versions of ten of these papers are in this special issue. All of these have undergone a further round of refereeing to usual journal standards. Among them are both of the papers receiving best paper awards in track B: "Tree-walking automata cannot be determinized" by Mikołaj Bojańczyk and Thomas Colcombet (best paper); and "Games with winning conditions of high Borel complexity" by Olivier Serre (best student paper).

The members of the ICALP 2004 track B Programme Committee were:

R.-J. Back, P.-L. Curien, A. Gordon, S. Hayashi, T. Henzinger, M. Hofmann, B. Jacobs, E. Moggi, J. Parrow, C. Palamidessi, B. Pierce, A. Rabinovich, D. Sannella (chair), W. Thomas, I. Walukiewicz.

I would like to thank these colleagues and the referees of both the original submissions and the extended versions herein for their hard work and constructive comments, and of course also the authors themselves for entrusting their work to ICALP 2004 and to this special issue. Finally, many thanks to Juhani Karhumäki, Arto Lepistö, and Mika Hirvensalo for a flawless organization.

Edinburgh, April 2005

Donald Sannella  
*Laboratory for Foundations of Computer Science,*  
*School of Informatics,*  
*University of Edinburgh,*  
*Edinburgh EH9 3JZ, Scotland*  
*E-mail address: [dts@inf.ed.ac.uk](mailto:dts@inf.ed.ac.uk)*