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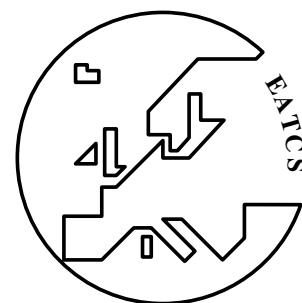
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■ Preface

This volume contains the papers presented at the *51st EATCS International Conference on Automata, Languages and Programming (ICALP 2024)*, held in Tallinn, Estonia, during July 8–12, 2024. ICALP is a series of annual conferences of the *European Association for Theoretical Computer Science (EATCS)*, which first took place in 1972. This year, ICALP was co-located with the 39th Annual ACM/IEEE Symposium on Logic in Computer Science (LICS) and the 9th International Conference on Formal Structures for Computation and Deduction (FSCD).

The ICALP 2024 program consisted of two tracks:

Track A: Algorithms, Complexity, and Games

Track B: Automata, Logic, Semantics, and Theory of Programming

In response to the call for papers, a total of 519 eligible, anonymous submissions were received: 404 for Track A and 115 for Track B. The committees decided to accept 153 papers for inclusion in the scientific program: 119 papers for Track A and 34 for Track B. The selection was made by the program committees based on originality, quality, and relevance to theoretical computer science. The quality of the submissions was very high, and many deserving papers could not be selected.

The EATCS sponsored awards for both a best paper and a best student paper in each of the two tracks, selected by the program committees. The **best paper awards** were given to the following papers:

Track A: Yuda Feng and Shi Li. *A Note on Approximating Weighted Nash Social Welfare with Additive Valuations.*

Track B: Dmitry Chistikov, Alessio Mansutti, and Mikhail Starchak. *Integer Linear-Exponential Programming in NP by Quantifier Elimination.*

The **best student paper awards**, for papers that are solely authored by students, were given to the following papers:

Track A: Ce Jin and Hongxun Wu. *A Faster Algorithm for Pigeonhole Equal Sums.*

Track A: Kingsley Yung. *Limits of Sequential Local Algorithms on the Random k -XORSAT Problem.*

Track B: Roland Guttenberg. *Flattability of Priority Vector Addition Systems.*

ICALP 2024 included invited presentations by

- Anuj Dawar, University of Cambridge,
- Edith Elkind, University of Oxford (joint with LICS 2024),
- Danupon Nanongkai, MPI Saarbrücken,
- Merav Parter, Weizmann Institute,
- Stephanie Weirich, University of Pennsylvania (joint with LICS 2024 and FSCD 2024).

This volume contains all the contributed papers presented at the conference, and an abstract or paper accompanying some of the invited talks.

The program of ICALP 2024 also included presentations of

- the Gödel Prize 2024 (joint with ACM SIGACT) awarded to Ryan Williams (MIT) for the paper *Non-Uniform ACC Circuit Lower Bounds: IEEE Conference on Computational Complexity (CCC) 2011. Journal of the ACM 61(1):1–32 (2014).*
- the Alonzo Church Award 2024 (joint with LICS), awarded to Thomas Ehrhard (CNRS / IRIF) and Laurent Regnier (Université d’Aix-Marseille).

51st International Colloquium on Automata, Languages, and Programming (ICALP 2024).

Editors: Karl Bringmann, Martin Grohe, Gabriele Puppis, and Ola Svensson

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- the EATCS Award 2024 to Samson Abramsky (Department of Computer Science, Oxford University),
- the Presburger Award 2024, awarded jointly to Justin Hsu (Cornell University) and Pravesh Kothari (Princeton University).

The EATCS Distinguished Dissertation Award 2023 was awarded jointly to the following PhD dissertations:

- William Kuszmaul (MIT). *Randomized Algorithms that Achieve the Unexpected.*
- Nathan Klein (University of Washington). *Finding Structure in Entropy: Improved Approximation Algorithms for TSP and other Graph Problems.*
- Ruiwen Dong (University of Oxford). *Algorithmic Problems for Subsemigroups of Infinite Groups.*

There was also the announcement of the new EATCS Fellows for 2024, who are:

- Yossi Azar (Blavatnik School of Computer Science, Tel-Aviv University),
- Friedhelm Meyer auf der Heide (Heinz Nixdorf Institute and Department of Computer Science, Paderborn University).

The following workshops were held as satellite events of ICALP 2024, LICS 2024, and FSCD 2024 during July 6-9, 2024:

- Algorithmic Aspects of Temporal Graphs VII (AATG 2024)
- Geometric and Topological Methods in Computer Science (GETCO 2024)
- Intersection Types and Related Systems (ITRS 2024)
- International Workshop on Confluence (IWC 2024)
- Learning and Automata (LearnAut 2024)
- Logical Frameworks and Meta-Languages: Theory and Practice (LFMTP 2024)
- Logic Mentoring Workshop (LMW 2024)
- Mathematically Structured Functional Programming (MSFP 2024)
- Parameterized Approximation Algorithms Workshop (PAAW 2024)
- Parameterized Algorithms and Constraint Satisfaction (PACS 2024)
- Structure meets Power (SmP 2024)
- Trends in Arithmetic Theories (TAT 2024)
- Trends in Linear Logic and Applications (TLLA 2024)
- Women in Logic 2024

We wish to thank all authors who submitted extended abstracts for consideration, the program committees for their scholarly effort, and all the reviewers who assisted the program committees in the evaluation process.

We are very grateful to the Conference General Chair, Pawel Sobocinski, his colleagues from Tallinn University of Technology, and EATCS, for hosting ICALP 2024 in Tallinn.

Finally, we would like to thank Anca Muscholl, the Chair of the ICALP Steering Committee, for her continuous support, Artur Czuma, the president of EATCS, for his generous advice on the organization of the conference, as well as the editorial office of LIPIcs for their support in editing these proceedings.

July 2024

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