

50th International Colloquium on Automata, Languages, and Programming

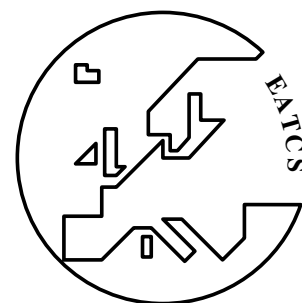
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■ Preface

This volume contains the papers presented at the *50th EATCS International Conference on Automata, Languages and Programming (ICALP 2023)*, held in Paderborn, Germany, during July 10–14, 2023. ICALP is a series of annual conferences of the *European Association for Theoretical Computer Science (EATCS)*, which first took place in 1972.

This year, the ICALP 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 443 eligible, anonymous submissions were received: 346 for Track A and 97 for Track B. The committees decided to accept 132 papers for inclusion in the scientific program: 103 papers for Track A and 29 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: Tsun-Ming Cheung, Hamed Hatami, Pooya Hatami, and Kaave Hosseini. *Online Learning and Disambiguations of Partial Concept Classes*.

Track A: Miguel Bosch Calvo, Fabrizio Grandoni, and Afrouz Jabal Ameli. *A 4/3 Approximation for 2-Vertex-Connectivity*.

Track B: Marvin Künnemann, Filip Mazowiecki, Lia Schütze, Henry Sinclair-Banks, and Karol Węgrzycki. *Coverability in VASS Revisited: Improving Rackoff's Bound to Obtain Conditional Optimality*.

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

Track A: Manuel Cáceres. *Minimum Chain Cover in Almost Linear Time*.

Track B: Ruiwen Dong. *The Identity Problem in $\mathbb{Z} \wr \mathbb{Z}$ is decidable*.

Apart from the contributed talks, ICALP 2023 included invited presentations by

- Anna Karlin, University of Washington, USA,
- Rasmus Kyng, ETH Zurich, Switzerland,
- Rupak Majumdar, Max Planck Institute for Software Systems, Germany,
- Thomas Vidick, California Institute of Technology, USA, and Weizmann Institute of Science, Israel,
- James Worrell, University of Oxford, UK.

This volume contains all the contributed papers presented at the conference, and an abstract or paper accompanying each of the invited talks by Anna Karlin, Rasmus Kyng, Rupak Majumdar, Thomas Vidick, and James Worrell.

For this special 50th anniversary of ICALP 2023, the conference program also included a special session with two invited talks by

- Kurt Mehlhorn, Max Planck Institute for Computer Science, Germany,
- Thomas A. Henzinger, Institute of Science and Technology, Austria.

50th International Colloquium on Automata, Languages, and Programming (ICALP 2023).

Editors: Kousha Etessami, Uriel Feige, and Gabriele Puppis

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Although they did not provide abstracts for the proceedings, we acknowledge their involvement and contribution.

The program of ICALP 2023 also included presentations of the EATCS Award 2023 to Amos Fiat (Tel Aviv University), the Presburger Award 2023 to Aaron Bernstein (Rutgers University) and to Thatchaphol Saranurak (University of Michigan), the Alonzo Church Award 2023 to the following group of papers:

- Ralf Jung, David Swasey, Filip Sieczkowski, Kasper Svendsen, Aaron Turon, Lars Birkedal, Derek Dreyer: “Iris: Monoids and Invariants as an Orthogonal Basis for Concurrent Reasoning”. POPL 2015.
- Ralf Jung, Robbert Krebbers, Lars Birkedal, Derek Dreyer: “Higher-order ghost state”. ICFP 2016.
- Robbert Krebbers, Ralf Jung, Aleš Bizjak, Jacques-Henri Jourdan, Derek Dreyer, Lars Birkedal: “The Essence of Higher-Order Concurrent Separation Logic”. ESOP 2017.
- Ralf Jung, Robbert Krebbers, Jacques-Henri Jourdan, Aleš Bizjak, Lars Birkedal, Derek Dreyer: “Iris from the ground up: A modular foundation for higher-order concurrent separation logic”. J. Funct. Program. 28 (2018).

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

- Kuikui Liu (University of Washington): “Spectral Independence: A New Tool to Analyze Markov Chains” (supervisor Shayan Oveis Gharan).
- Alex Lombardi (MIT, Department of Electrical Engineering and Computer Science): “Provable Instantiations of Correlation Intractability and the Fiat-Shamir Heuristic” (supervisor Vinod Vaikuntanathan).
- Lijie Chen (MIT, Department of Electrical Engineering and Computer Science): “Better Hardness via Algorithms, and New Forms of Hardness versus Randomness” (supervisor Ryan Williams).

There was also the announcement of the new EATCS Fellows for 2023, who are:

- Michael A. Bender (Stoney Brook University),
- Leslie Ann Goldberg (University of Oxford),
- Claire Mathieu (CNRS, IRIF, Université de Paris).

The following workshops were held as satellite events of ICALP 2023 on July 10, 2023:

- Combinatorial Reconfiguration
- Graph Width Parameters: from Structure to Algorithms (GWP 2023)
- Algorithmic Aspects of Temporal Graphs VI
- Adjoint Homomorphism Counting Workshop (ad hoc)
- Congestion Games
- Workshop On Reachability, Recurrences, and Loops '23 (WORReLL'23)
- Workshop on Recent Trends in Online Algorithms
- Quantum Computing with Qiskit, and why Classical Algorithms still matter!
- Algebraic Complexity Theory
- Computer Science for CONTINUOUS Data

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 also grateful to the Conference General Chair, Sevag Gharibian, his colleagues from Paderborn University, and EATCS, for organizing ICALP 2023.

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

July 2023

Kousha Etessami
Uriel Feige
Gabriele Puppis

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