

REPORT ON ICALP 2021

48th EATCS International Colloquium on Automata, Languages and Programming

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The *48th EATCS International Colloquium on Automata, Languages and Programming (ICALP 2021)*, the flagship conference and annual meeting of the *European Association for Theoretical Computer Science (EATCS)*, took place from the 13th to the 16th of July 2021. The event was held as online, hosted by the University of Glasgow.

The main conference was preceded by a series of workshops, which took place on July 11–12, 2021. The following workshops were held as satellite events of ICALP 2021:

- Flavours of Uncertainty in Verification, Planning and Optimization (FUNCTION),
- Verification of Session Types (VEST),
- Programming Research in Mainstream Languages (PRiML),
- Combinatorial Reconfiguration,
- Algorithmic Aspects of Temporal Graphs (AATG),
- Graph Width Parameters: from Structure to Algorithms (GWP),
- Formal Methods Education Online: Tips, Tricks & Tools.

The scientific programme of ICALP 2021 consisted of 3 unifying lectures and 3 invited lectures of the two tracks of ICALP, the presentation of 137 contributed papers (which were selected by the Program Committees out of 462 submissions) and award sessions with the lectures of the EATCS Award 2021 and the Presburger Award 2021 recipients.

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The online conference. The online conference was managed by the FATA research group of the School of Computing Science, University of Glasgow, led by Simon Gay. The organizers in Glasgow did their very best to make the online conference a lively experience and a scientific feast for all the participants.

ICALP 2021 used the Whova conference platform. Talks were pre-recorded, made available to registered participants two weeks before the conference, and archived on YouTube afterwards.

Each accepted paper had a 5-minute live presentation followed by a 5-minute live Q&A session. The live sessions were held daily (Tuesday – Friday, July 13–16) between 12:00 and 6pm CEST. They included plenary events for the Opening Ceremony, EATCS/ICALP Award sessions, EATCS General Assembly, and the six invited presentations.

The organizers succeeded to offer registration at a significantly reduced price compared to the normal cost. While typical ICALP registration costs are between €400 and €500, this year there were two types of event participation: *author registration* for €175 (€140 for students), and *non-author registration* for €50 (€30 for students). The author registration contributed to the fixed costs of the conference and to the costs of the LIPIcs proceedings.

On behalf of the entire community, we warmly thank the organizers in Glasgow for their fantastic efforts that helped to make ICALP 2021 a great success.

Paper selection and work of the Program Committee. After 15 years running the ICALP conference with three tracks, ICALP returned in 2020 to the original two-track format. The ICALP 2021 program had the following two tracks:

- Track A: Algorithms, Complexity, and Games.
- Track B: Automata, Logic, Semantics, and Theory of Programming.

The PC chairs for the two tracks of ICALP 2021 were Nikhil Bansal (Track A) and James Worrell (Track B). Their efforts were supported by 70 members of the Program Committees (44 in track A and 26 in track B). In response to the call for papers, a total of 462 submissions were received: 361 for Track A and 101 for Track B. Each submission was assigned to at least three Program Committee members, aided by 761 external subreviewers. The Program Committees decided to accept 137 papers for inclusion in the scientific program: 108 papers for Track A and 29 for Track B. This gives the acceptance rate for the entire conference to be 29.6%. The selection was made by the Program Committees based on originality, quality, and relevance to theoretical computer science. The quality of the submitted manuscripts was very high, and unfortunately many strong papers could not

| | 2021 | 2020 | 2019 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 |
|---------|------|------|------|------|------|------|------|------|------|------|
| Total | 462 | 470 | 490 | 502 | 459 | 515 | 507 | 477 | 423 | 433 |
| Track A | 361 | 347 | 316 | 346 | 296 | 319 | 328 | 312 | 249 | 249 |
| Track B | 101 | 123 | 103 | 96 | 108 | 121 | 114 | 106 | 114 | 105 |
| Track C | — | — | 71 | 60 | 55 | 75 | 65 | 59 | 60 | 79 |

Table 1: Number of submitted papers at ICALP 2012–2021.

be selected. We take this opportunity of thanking all of them, the Program Committees and the subreviewers for doing an exceptional job in these particularly challenging times.

| | 2021 | 2020 | 2019 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 |
|---------|------|------|------|------|------|------|------|------|------|------|
| Total | 137 | 138 | 146 | 147 | 137 | 146 | 143 | 136 | 124 | 123 |
| Track A | 108 | 102 | 94 | 98 | 88 | 89 | 89 | 87 | 71 | 71 |
| Track B | 29 | 36 | 31 | 30 | 32 | 36 | 34 | 31 | 33 | 30 |
| Track C | — | — | 21 | 19 | 17 | 21 | 20 | 18 | 20 | 22 |

Table 2: Number of accepted papers at ICALP 2012–2021.

| | 2021 | 2020 | 2019 | 2018 | 2017 | 2016 | 2015 | 2014 | 2013 | 2012 |
|---------|------|------|------|------|------|------|------|------|------|------|
| Total | 29.6 | 29.4 | 29.8 | 29.3 | 29.8 | 28.3 | 28.2 | 28.5 | 29.3 | 28.4 |
| Track A | 29.9 | 29.4 | 29.7 | 28.3 | 29.7 | 27.9 | 27.1 | 27.9 | 28.5 | 28.5 |
| Track B | 28.7 | 29.3 | 30.1 | 31.3 | 29.6 | 29.8 | 29.8 | 29.2 | 28.9 | 28.6 |
| Track C | — | — | 29.6 | 31.7 | 30.9 | 28.0 | 30.8 | 30.5 | 33.3 | 27.8 |

Table 3: Acceptance rates (in %) for ICALP 2012–2021.

Statistical information about the number of papers submitted and accepted for the last several editions of the ICALP conference, as well as acceptance rates, are available in Tables 1–3.

Invited presentations. In addition to the contributed talks, ICALP 2021 featured three invited presentations by Christel Baier (Track B), Keren Censor-Hillel (Track A), and David Woodruff (Track A), and three unifying talks by Andrei Bulatov, Toniann Pitassi and Adi Shamir:

- Christel Baier (Technical University of Dresden): *From Verification to Causality-Based Explications*.
- Keren Censor-Hillel (Technion): *Distributed Subgraph Finding: Progress and Challenges*.
- David Woodruff (Carnegie Mellon University): *A Very Sketchy Talk*.
- Andrei Bulatov (Simon Fraser University): *Symmetries and Complexity*.
- Toniann Pitassi (University of Toronto): *Algebraic Proof Systems*.
- Adi Shamir (Weizmann Institute of Science): *Error Resilient Space Partitioning*.

ICALP Proceedings. As it has been the tradition since 2016, ICALP proceedings were published with *LIPICs*. *LIPICs – Leibniz International Proceedings in Informatics* is a series of high-quality conference proceedings across all fields in informatics established in cooperation with Schloss Dagstuhl–Leibniz Center for Informatics. All 137 ICALP 2021 contributed papers presented at the conference, papers accompanying the invited talks of Christel Baier, Andrei Bulatov, Keren Censor-Hillel, and Adi Shamir, and abstracts of the invited presentation of Toniann Pitassi and David Woodruff were published according to the principle of Open Access in *LIPICs Proceedings* volume 198, and made available online and free of charge at <https://drops.dagstuhl.de/opus/portals/lipics/index.php?semnr=16196>. The proceedings editors are Nikhil Bansal, Emanuela Merelli and James Worrell.

ICALP and EATCS Awards. The EATCS sponsors awards for both a best paper and a best student paper in each of the two tracks at ICALP, as selected by the Program Committees. During the general assembly, the ICALP Best Paper and Best Student Paper Awards were presented to the authors of the following papers:

Best Paper in Track A: Sayan Bhattacharya and Peter Kiss. *Deterministic Rounding of Dynamic Fractional Matchings*.

Best Paper in Track B: Antoine Amarilli, Louis Jachiet and Charles Paperman. *Dynamic Membership for Regular Languages*.

Best Student Paper in Track A: Or Zamir. *Breaking the 2^n barrier for 5-coloring and 6-coloring*.

Best Student Paper in Track B: none.

The program of ICALP 2021 included presentations of several prestigious scientific awards sponsored or co-sponsored by EATCS:

- The **EATCS Award 2021**, the annual EATCS Distinguished Achievements Award given to acknowledge extensive and widely recognized contributions to theoretical computer science over a life long scientific career, was awarded to **Toniann Pitassi** (University of Toronto) for her fundamental and wide-ranging contributions to computational complexity, which includes proving long-standing open problems, introducing new fundamental models, developing novel techniques and establishing new connections between different areas.²
- The **Presburger Award 2020** for Young Scientists was awarded to **Shayan Oveis Gharan** (University of Washington) for his creative, profound, and ambitious contributions to the Traveling Salesman problem.³
- The **EATCS Distinguished Dissertation Awards 2021**, to promote and recognize outstanding dissertations in theoretical computer science were awarded to three researchers:
 - **Talya Eden** for her dissertation *Counting, Sampling and Testing Subgraphs in Sublinear-Time*, advised by Dana Ron at Tel-Aviv University,
 - **Marie Fortin** for her dissertation *Expressivity of first-order logic, star-free propositional dynamic logic and communicating automata*, advised by Benedikt Bollig and Paul Gastin at ENS Paris-Saclay,
 - **Vera Traub** for her dissertation *Approximation Algorithms for Traveling Salesman Problems*, advised by Jens Vygen at the University of Bonn.
- The EATCS has recognized six of its members for their outstanding contributions to theoretical computer science by naming them **EATCS Fellows** class of 2021:
 - **Luca Aceto** (Reykjavik University and Gran Sasso Science Institute) for fundamental contributions to concurrency theory, and outstanding

²The laudatio for the EATCS Award 2021 is available at [https://eatcs.org/index.php/component/content/article/1-news/2877-the-eatcs-award-2021-laudatio-for-toniann-toni-pitassi-](https://eatcs.org/index.php/component/content/article/1-news/2877-the-eatcs-award-2021-laudatio-for-toniann-toni-pitassi)

³The laudatio for the Presburger Award 2021 is available at <https://eatcs.org/index.php/component/content/article/1-news/2886-presburger-award-2021-laudatio-for-shayan-oveis-gharan>

merits for the community of theoretical computer science, in particular as an inspiring president of EATCS.

- **Rajeev Alur** (University of Pennsylvania) for fundamental contributions to the theory of verification, especially of timed and hybrid, concurrent and multi-agent, and hierarchical and recursive systems.
- **Samir Khuller** (Northwestern University) for fundamental contributions to combinatorial approximation algorithms – specifically for work in graph algorithms and scheduling, and for mentoring and building community.
- **David Peleg** (Weizmann Institute of Science) for fundamental contributions to the areas of distributed graph algorithms, wireless networks, robotics and social networks, and his longstanding support for the development of theoretical computer science in Europe.
- **Davide Sangiorgi** (University of Bologna) for fundamental contributions to concurrency and the foundations of programming languages, contributing notably to the pi-calculus and to coinduction-based proofs.
- **Saket Saurabh** (The Institute of Mathematical Sciences, Chennai) for fundamental contributions to algorithms, including parameterized algorithms and kernelization.

The recipients of the EATCS Award 2021 (Toniann Pitassi), and of the Presburger Award 2021 (Shayan Oveis Gharan) gave online presentations in the Award Sessions at ICALP 2021.

We congratulate all the winners and we hope their achievements will put the highlights of research in theoretical computer science in the spotlight, and will serve as inspirations to young researchers in the years to come.

We hope that this conference report gives you a glimpse of the rich scientific and social programme that made the 48th ICALP an unforgettable conference. Everyone involved in the organization of ICALP 2021 deserves the warmest thanks from the TCS community.

We wish to thank all authors who submitted extended abstracts for consideration, the Program Committees for their effort, and all the referees who assisted the Program Committees in the evaluation process. We are also grateful to the Conference Chair Simon Gay and all the support staff of the Organizing Committee for organizing ICALP 2021. We also acknowledge support by the Scottish Informatics and Computer Science Alliance (SICSA) for sponsoring participation by PhD students from Scotland.

The General Assembly of the EATCS was informed about the progress of the organization of the *49th EATCS International Colloquium on Automata, Lan-*

guages and Programming, ICALP 2022, that will take place in Paris, France, on July 4–8, 2022, with Thomas Colcombet as the general chair for the conference. The ICALP 2022 Program Committee Chairs are David Woodruff (Track A) and Mikolaj Bojanczyk (Track B). The ICALP 2022 call for papers is available at https://icalp2022.irif.fr/?page_id=17.

We hope that you will make plans to submit your best work to ICALP 2022 and be able to go to Paris for the conference. We look forward to seeing you there.