

## REPORT ON ICALP 2015

### The 42nd International Colloquium on Automata, Languages and Programming

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The 42nd International Colloquium on Automata, Languages and Programming (ICALP 2015), the main conference and annual meeting of the European Association for Theoretical Computer Science (EATCS), took place from the 6th to the 10th of July 2015 on the premises of the Grand Prince Hotel Kyoto. ICALP 2015 was held in co-location with the 30th Annual ACM/IEEE Symposium on Logic in Computer Science (LICS 2015). I note, in passing, that ICALP 2015 and LICS 2015 were truly co-located events. The two conferences took place in the same week and at the same location. There was only one registration fee and conference participants were able to attend whatever session they fancied at either conference. Moreover, the breaks, the invited talks, the award ceremony and a special session devoted to the 40th anniversary of the journal *Theoretical Computer Science* were plenary and provided a welcome opportunity for participants at both conferences to mingle and to exchange ideas.

On July 4 and 5, the main conference was preceded by the following workshops:

- Workshop on Logic and Computational Complexity (LCC 2015; organizers: Albert Atserias and Nao Hirokawa),
- Workshop on Natural Language and Computer Science 3 (NLCS 3; organizers: Larry Moss, Valeria de Paiva and Makoto Kanazawa),
- Workshop on Quantum Computational Complexity (QCC), organized by Shigeru Yamashita (chair), Akinori Kawachi, Francois Le Gall, Masaki Nakanishi and Harumichi Nishimura,
- WRAWN, Workshop on Realistic Models for Algorithms in Wireless Networks (organizers: Magnús M. Halldórsson (chair), David Peleg and Roger Wattenhofer),
- LOLA 2015, Workshop on Syntax and Semantics for Low-Level Languages (organizers: Shin-ya Katsumata and Ulrich Schöpp),
- Workshop on the Verification of Higher-Order Programs (HOPA; organizer: Matthew Hague),

- YR-ICALP 2015, Young Researchers Forum on Automata, Languages and Programming (organizers: Matias Korman (chair), Wolfgang Mulzer, André van Renssen, Marcel Roeloffzen and Rodrigo I. Silveira).

First of all, let me express my heartfelt thanks to the local organizers, led by Kazuo Iwama (the conference chair for ICALP 2015) and Masahito Hasegawa (the conference chair for LICS 2015), who did their very best to make the conference a festive occasion and a very pleasant experience for all the attendees. The organization of the conference was outstanding and the Grand Prince Hotel Kyoto was an excellent setting for the co-located conferences. All the attendees had a chance to enjoy the wonderful Japanese hospitality.

According to the data presented by Kazuo Iwama to the EATCS council and to the EATCS general assembly, there were a total of 438 people (excluding 11 invited speakers) registered for ICALP/LICS 2015, with a breakdown as follows: members 174, nonmembers 119, student members 63 and student nonmembers 82. There was no distinction between ICALP and LICS participants. A total of 192 people registered for a workshop, of which 149 also registered for the main conference. Future ICALP organizers might be interested in knowing that 400 participants registered by the early-registration deadline.

The budget for the conference was in the order of 192,000 euros. We gratefully acknowledge the generous financial support of the ERATO Kawarabayashi Large Graph Project, the project Exploring the Limits of Computation, the Research Institute for Mathematical Sciences (RIMS), Kyoto University, and the Tateisi Science and Technology Foundation. Thanks to the funding provided by these projects and institutions, as well as to the careful local organization, the conference registration fee was kept as low as possible.

ICALP/LICS 2015 was an action packed conference and I think that it was a resounding success, both scientifically and socially. The scientific programme for ICALP/LICS 2015 consisted of

- seven invited lectures,
- three tutorials,
- one ICALP masterclass,
- the presentation of 143 contributed papers (which were selected by the program committees out of an all-time-high 507 submissions),
- an award session and
- a session celebrating the 40th anniversary of the journal *Theoretical Computer Science*, which included a keynote address by Christos H. Papadimitriou.

	<b>2015</b>	2014	2013	2012	2011	2010
Total	<b>143</b>	136	124	123	114	106
Track A	<b>89</b>	87	71	71	68	60
Track B	<b>34</b>	31	33	30	29	30
Track C	<b>20</b>	18	20	22	17	16

Table 1: Number of accepted papers at ICALP 2010–2015

The 143 contributed papers for ICALP 2015 were divided into the three tracks of ICALP 2015 as follows:

- 89 papers for “Track A: Algorithms, Complexity and Games”, which were selected from 328 submissions (acceptance rate: 27.1%);
- 34 papers for “Track B: Logic, Semantics, Automata and Theory of Programming”, which were selected from 114 submissions (acceptance rate: 29.8%); and
- 20 papers for “Track C: Foundations of Networked Computation: Models, Algorithms and Information Management”, which were selected from 65 submissions (acceptance rate: 30.7%).

The PC chairs for the three tracks of ICALP 2015 were Bettina Speckmann (Track A), Naoki Kobayashi (Track B) and Magnús M. Halldórsson (Track C). I take this opportunity of warmly thanking them, their PCs and the sub-reviewers for doing an exceptional job.

Statistical information about the number of papers submitted and accepted for the last six editions of the ICALP conference, as well as acceptance rates, are available in Tables 1–3. The breakdown by country for tracks A and B of ICALP 2015 may be found in the slides available at

<http://icetcs.ru.is/icalp2015/PC-Chairs-Report-2015.pdf>.

I let you draw your own conclusions on how well each country did at ICALP 2015. The competition was hard and the quality of the submitted papers was very high indeed.

ICALP/LICS 2015 featured seven invited presentations, which were delivered by Ken-ichi Kawarabayashi (ICALP Keynote Speaker), Daniel Kifer (LICS Keynote Speaker), Valerie King (ICALP Keynote Speaker), Thomas Moscibroda (ICALP Keynote Speaker), Anca Muscholl (joint Keynote Speaker for ICALP and LICS), Peter O’Hearn (joint Keynote Speaker for ICALP and LICS) and Luke Ong (LICS Keynote Speaker). In addition, following the tradition of recent LICS

	<b>2015</b>	2014	2013	2012	2011	2010
Total	<b>507</b>	477	423	432	398	389
Track A	<b>328</b>	312	249	248	243	222
Track B	<b>114</b>	106	114	105	103	114
Track C	<b>65</b>	59	60	79	52	53

Table 2: Number of submitted papers at ICALP 2010–2015

	<b>2015</b>	2014	2013	2012	2011	2010
Total	28.2	28.5	29.3	28.5	28.6	27.2
Track A	27.1	28	28.5	28.6	28	27
Track B	29.8	29	28.9	28.6	28.2	26.3
Track C	30.7	31	33.3	27.9	32.7	30.2

Table 3: Acceptance rates for ICALP 2010–2015

conferences, there were three tutorials delivered by Piotr Indyk, Andrew Pitts and Geoffrey Smith. Finally, the roster of invited speakers also included Ryuhei Uehara (ICALP Masterclass Tutor) and Christos H. Papadimitriou (TCS 40th Anniversary Celebration Speaker).

All the invited presentations were excellent and accessible to a wide TCS audience, just like invited talks at a conference covering TCS broadly should be. I enjoyed them all and learned something from each talk. In case you are interested, you can also read my summaries of the invited talks in the ICALP-related posts that I wrote for my professional blog. (Point your browser at

<http://processalgebra.blogspot.com/2015/07/icalplics-2015-day-1.html>

and start reading!)

The best papers at ICALP 2015 were:

- Track A: Aaron Bernstein and Clifford Stein. *Fully Dynamic Matching in Bipartite Graphs*.
- Track B: Jarkko Kari and Michal Szabados. *An Algebraic Geometric Approach to Nivat’s Conjecture*.
- Track C: Yiannis Giannakopoulos and Elias Koutsoupias. *Selling Two Goods Optimally*.

The best student paper awards at ICALP 2015 went to

- Track A: Huacheng Yu. *An Improved Combinatorial Algorithm for Boolean Matrix Multiplication.*
- Track A: Radu Curticapean. *Block interpolation: A framework for tight exponential-time counting complexity.*
- Track B: Georg Zetsche. *An approach to computing downward closures.*

There was no best student paper for Track C.

It is interesting to see that two of the three best papers for 2015 are from Europe, as are two of the three best student papers. Congratulations to all the authors of the best papers. I hope that you will read their award-receiving work.

The EATCS Award and the Presburger Award were delivered during the award session on Wednesday, 8 July, during which LICS also presented the Kleene prize 2015 and the Test-of-Time Award. First, Xi Chen (Columbia University, New York, USA) received the 2015 Presburger Award for young scientists and delivered a talk covering work in algorithmic game theory and computational economics related to the computational complexity of Nash equilibria for various kinds of games. The EATCS Award 2016 was presented to Christos Papadimitriou (UC Berkeley, USA). In his entertaining and inspirational talk, Christos gave us an overview of his career and of the key developments in his work over the years, pointing out that, even though the EATCS award is given ‘to acknowledge extensive and widely recognized contributions to theoretical computer science over a life long scientific career’, he still plans to continue working for a while, or at least until 2041!

Christos started by talking about the early days, the influence of his parents and what it meant to grow up in a dictatorship. He conveyed to us the excitement of discovering the beautiful field of theoretical computer science during his doctoral studies at Princeton and then told us about his various appointments.

Christos surveyed the fields of CS from which the problems he has worked on stemmed, including

- Algorithms and complexity for combinatorial optimization,
- Relational database theory and concurrency,
- Logic and logic programming,
- Control theory, AI, robotics,
- Online and approximation algorithms, parallel algorithms and VLSI,
- The Internet,

and he conveyed to us the excitement of the ‘Algorithmic Lens’, that is, of thinking algorithmically about the great problems of science.

In his talk, Christos sang the praises of Berkeley and California, where he plans to be until 2041, of his teachers and his students (especially those who have been both), of the field of theoretical computer science as a whole (namely, the *mathematical study of computation*) and of its research community. He described the TCS community as consisting of clever, interesting, strange, competitive, open, generous and fun people, who value elegance, relevance, originality, position in the field’s research tradition and program, slogging/machinery, playfulness and humour.

Christos also expressed his view that the current fragmentation in TCS (volume A versus volume B, Europe versus USA) is regrettable (and reversible). (In passing, and for the little it is worth, let me say that I fully concur with Christos’ opinion. I do believe that the programme of talks for ICALP and LICS 2015 offers evidence that the above-mentioned fragmentation is, to a large extent, artificial.)

Christos closed his talk by paying tribute to his co-authors (including 29 students, one multi-billionaire who makes his co-authors very rich on average, the 13 he has never met, the 27 Greeks and the one and only Mihalis Yannakakis, amongst others).

In case you are interested, you can read more on Christos’ EATCS Award acceptance speech and on the wonderful talk he delivered in connection with the celebrations for the 40th birthday of the journal *Theoretical Computer Science* on my professional blog. (See [http://processalgebra.blogspot.is/2015\\_07\\_01\\_archive.html](http://processalgebra.blogspot.is/2015_07_01_archive.html).)

The general assembly of the EATCS decided that ICALP 2017 will be held in Warsaw, Poland. Mikolaj Bojanczyk presented the bid from Warsaw and will co-chair the organizing committee for the conference with Piotr Sankowski.

In case you are interested in having a look, you can read my report on the general assembly of the EATCS at ICALP 2015 elsewhere in this issue of the Bulletin.

I hope that this conference report gives you a glimpse of the rich scientific and social programme that made the 42nd ICALP in Kyoto an excellent conference. In my, admittedly biased, opinion, ICALP/LICS 2015 was a veritable festival of theoretical computer science. Everyone involved in the organization of this event deserves the warmest thanks from the TCS community for making it possible.

ICALP 2016 and its colocated workshops will be held from Monday, 11 July 2015, to Friday, 15 July 2015, in Rome, Italy. I hope that you will make plans to submit your best work to ICALP 2016 and to travel to the eternal city for the conference. I heartily recommend it and look forward to seeing you there.