REPORT ON HALG 2016/2017

HALG: Highlights of Algorithms
(http://highlightsofalgorithms.org/)
Paris, France, June 6–8, 2016 and Berlin, Germany, June 9–11, 2017

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Most of the conferences in theoretical computer science (such as FOCS, ICALP, SODA and STOC) have the following format: several days of talks selected by a program committee, with all these talks, except for a few invited presentations, presenting results that are new and unpublished before. Most of us would agree that if one attended all these conferences, then one would get a very good overview of most of the important results in theoretical computer science. However, once a result has been presented in one of these conferences, then it is hard to see it elsewhere, making it quite challenging for the researchers to follow the developments in the field, unless they go to all the relevant conferences.

The newly established series of ***Highlights of Algorithms (HALG)*** conferences is trying to address this challenge by taking a different approach, drawing some inspiration from other communities. HALG is designed to be a forum for presenting the highlights of recent developments in algorithms and for discussing potential further advances in this area. The conference aims to provide a broad picture of the latest research in algorithms through a series of survey and invited

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talks. It also includes a possibility for all researchers and students to present their recent results via short talks and poster presentations. HALG aims to be a venue one can go to to catch up on the hottest results and topics at the moment, as well as what one missed by not being able to attend all the relevant algorithmic conferences, such as STOC/FOCS/SODA/ICALP/ESA/ITCS, that year. Attending HALG should also constitute an opportunity for networking and meeting leading researchers in algorithms.

As part of a broader effort in this direction led by the *Interest Group on Algorithmic Foundations of Information Technology (IGAFIT)*, the first Highlights of Algorithms (HALG 2016) conference (http://2016.highlightsofalgorithms.org/) took place in Paris in June 2016, and the 2nd Highlights of Algorithms (HALG 2017) conference (http://2017.highlightsofalgorithms.org/) has just taken place in Berlin in June 2017. HALG 2016 attracted over 200 participants and HALG 2017 brought over 250 participants, with a significant proportion of students and early career researchers. Special thanks should be given to the organizers in Paris (Pierre Fraigniaud, Varun Kanade, Claire Mathieu, Marc Lelarge) and in Berlin (Stephan Kreutzer, Martin Skutella, Dorothea Kiefer, Miriam Schlöter), who did amazing job in organizing the events on the highest scientific level and at a low cost (an early registration fee, which included reception, lunches, and coffee breaks, was € 150 in Berlin, with € 110 for students, and the registration fees were even lower in Paris).

The scientific programs of the first two HALG conferences were designed around 25+ invited talks, and were accompanied by a selection of very short contributed talks and poster presentations. There were no conference proceedings. There were two types of invited talks: survey presentations and invited presentations showcasing best algorithmic results published in other conferences. Survey presentations were typically 1 hour long, given by world-leading researchers in the field and presenting the most recent advances and trends. The invited presentations were 30 minutes long, typically each presenting a single, outstanding paper from one of the best conferences. Short contributed talks were selected from among submitted works, providing the community with the opportunity to present the research in 7.5/10-minute-long talks and in poster presentations; the works already published at different venues (or to be submitted there) were welcomed and encouraged. All invited talks, short contributed talks, and posters were carefully selected by the conference Program Committee, chaired by Stefano Leonardi in 2017 and by Artur Czumaj in 2016.

HALG 2016 and 2017 put together an impressive program with a number of world-class speakers. The invited survey presentations in 2016 were delivered by

- Constantinos Daskalakis (MIT), on the reductions from mechanism design to optimization,

- Aleksander Mądry (MIT), on recent advances in the design of fast graph algorithms and their relations to continuous optimization,

- Daniel Marx (Hungarian Academy of Sciences, Budapest), on the newest progress in the area of parameterized algorithms,

- Aaron Sidford (MIT), on advances in the design of faster algorithms for convex optimization,

- Virginia Vassilevska Williams (Stanford), on recent studies on the complexity and hardness in $\mathcal{P}$, and

- Ryan Williams (Stanford), on new applications of the polynomial method to algorithm design.

The invited survey presentations in 2017 in Berlin were delivered by

- László Babai (Chicago), Open Lecture on his breakthrough work on the quasi-polynomial-time algorithm for the graph isomorphism problem,

- Sanjeev Arora (Princeton), on recent progress in unsupervised learning to uncover semantics of data and language,

- Claire Mathieu (CNRS, Paris), on the advances in local search for clustering problems,

- Tim Roughgarden (Stanford), on new efforts in the research beyond worst-case analysis, and

- Nikhil Bansal (TU Eindhoven), on recent advances in and applications of the algorithmic discrepancy method.

Survey presentations were accompanied by invited talks presenting the best algorithmic results published in other conferences, which provided a broad and accurate overview of recent highlights of algorithmic research worldwide. The research highlights presented consisted of 18 papers from STOC'2015/16, 11 from FOCS'2015/16, 7 from SODA'2016/17, 3 from ICALP'2015/16, and papers from SPAA'2015, PODC'2016, and SoCG'2016. The list of speakers was truly impressive and consisted of:
- S. Alstrup (U. Copenhagen),
- A. Andoni (Columbia),
- Y. Azar (Tel Aviv),
- A. Backurs (MIT),
- N. Bansal (TU Eindhoven),

- G. Bodwin (Stanford),
- K. Bringmann (MPI),
- S. Chechik (Tel Aviv),
- C. Daskalakis (MIT),
- I. Diakonikolas (USC),
- Z. Friggstad (U. Alberta),
- M. Henzinger (U. Vienna),
- M. Ghaffari (ETH),
- A. Gupta (CMU),
- B. M. P. Jansen (TU Eindhoven),
- D. Karger (MIT),
- K. Kawarabayashi (NII),
- S. Khanna (U. Pennsylvania),
- M. B. T. Knudsen (U. Copenhagen),
- R. Krauthgamer (Weizmann),
- S. Kreutzer (TU Berlin),
- M. Lewenstein (Bar Ilan),
- S. MacKenzie (CMU),
- A. Mądry (MIT),
- M. Mondelli (Stanford),
- D. Mount (U. Maryland),
- S. Oveis Gharan (U. Washington),
- R. Paes-Leme (Google),
- M. Parter (MIT),
- I. P. Razenshteyn (MIT),
- A. Rubinstein (Berkeley),
- A. Paz (Technion),
- S. Sachdeva (Google),
- C. Sohler (TU Dortmund),
- A. Srinivasan (U. Maryland),
- C. Stein (Columbia),
- O. Svensson (EPFL),
- G. Valiant (Stanford),
- S. M. Weinberg (Princeton), and
- H. Yu (Stanford).

While the programs of HALG 2016 and HALG 2017 were centered on the invited presentations, there have also been a large number of short contributed talks and poster presentations. In Paris, there were 35 short contributed talks (10 minutes long) and about 20 posters, and in Berlin, there were 46 contributed talks (7.5 minutes long and accepted out of 66 submissions) and 60 posters (including

all of the contributed talks). These short presentations were of a very high quality too — most of them were already accepted to or have already appeared at the best conferences, including papers from STOC, FOCS, ICALP, SODA, LICS, etc.

We hope that the attendees have enjoyed the opportunities provided by the Highlights of Algorithms conferences. By making special efforts to make HALG an affordable event with low registration fees, easily accessible in Europe, and with numerous affordable accommodation options in big cities, we have been trying to make it especially attractive for the broader TCS community, including students and early career researchers. The fact that the two HALGs have been so successful is largely thanks to the speakers, who accepted the invitations to the event; the organizers, who worked so hard to make these events happen; the Program Committees, which selected such a high quality program; and the audience, who so enthusiastically attended the events.

We believe that this kind of venue is very much needed today and will help to make our community stronger and more cohesive. In particular, we hope that the success of the first two HALG conferences will make HALG become a recurring event and an important part of our conference calendar. Finally, we are happy to announce that the Highlights of Algorithms 2018 conference (HALG 2018) will take place in Amsterdam, June 4–6, 2018 (with key organizers Neil Olver, Nikhil Bansal, and Leen Stougie), and with Robi Krauthgamer (Weizmann Institute) chairing the works of the Program Committee.

Hope to see many of you there!