

REPORT ON HALG 2018

3rd Highlights of Algorithms (HALG 2018)
(<http://highlightsofalgorithms.org/>)
Amsterdam, the Netherlands, June 4–6, 2018

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Abstract

The 3rd edition of the Highlights of Algorithms (HALG) conference took place in Amsterdam, June 4–6, 2018. In this report, the chairs of the Steering Committee and the Program Committee discuss the role, format and impact of the conference until now, and describe their goals and motivation for the future.

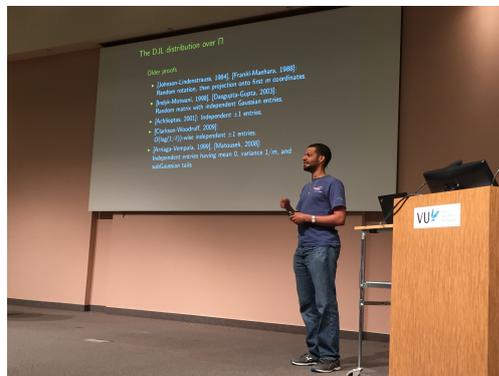
The recently established Highlights of Algorithms (HALG) conference series is designed to provide a broad picture of the latest research in the area of algorithms, by bringing to Theoretical Computer Science a new conference format, that is inspired by other communities. Most of the program consists of invited talks, aiming to cover the hottest results and topics in recent relevant conferences, such as STOC, FOCS, SODA, ICALP, ESA, and ITCS. The program also features contributed presentations (with no conference proceedings), where all researchers, including students, can present their recent results and more generally can network and meet leading researchers in the area of algorithms.

The 3rd edition of HALG, which took place in Amsterdam, June 4–6, 2018, offered an exciting program in an attractive location and at a low cost (see more below). These guiding principles were laid out at the inaugural HALG 2016 in Paris and HALG 2017 in Berlin. Indeed, the early registration fee was €150 (and €110 for students), and included lunches, coffee breaks, and drinks (over the poster session). It is thus no wonder that the conference has attracted over 200 participants, who visibly filled the lecture hall all throughout the day. We should point out that this conference series was initiated by the *Interest Group on Algorithmic Foundations of Information Technology (IGAFIT)*, as part of a broader effort to increase research activities and awareness in Europe, and the HALG conference series certainly makes significant strides in this direction.

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The venue. The Amsterdam venue was simply fantastic from every aspect. The location was a central city in Europe that is convenient for travelers, in addition to being an attractive destination in this season, and the university setting at Vrije University was remarkably pleasant, combining an academic setting with superb functionality. Specifically, the auditorium was beautiful and spacious, yet visibly filled throughout the day, and the foyer area used for coffee breaks, lunches, and poster sessions was airy and conducive for personal interactions and networking. We are thus indebted to the local organizing committee, consisting of Nikhil Bansal (TU Eindhoven and CWI), Neil Olver (VU Amsterdam and CWI), Rene Sitters (VU Amsterdam and CWI), Leen Stougie (CWI and VU Amsterdam), and Hedda Werkman (VU Amsterdam), for their impeccable planning and execution.



HALG 2018 Auditorium

Scientific program. The scientific program of HALG 2018 was designed around 26 invited talks of two types: 6 survey presentations that feature a recently active topic, and 20 invited presentations that showcase the best algorithmic results published in other conferences. The survey presentations were one-hour long, given by world-leading researchers and presented recent advances and trends. The invited presentations were 30-minute long, each presenting a single outstanding conference paper by one of the authors.

Altogether, these invited talks featured an impressive number of world-class speakers. The invited survey presentations at HALG 2018 were delivered by

- Timothy Chan (University of Illinois at Urbana-Champaign) on *geometric problems in moderate dimensions*,
- Fabian Kuhn (University of Freiburg) on *the role of randomization in local distributed algorithms*,
- Ankur Moitra (Massachusetts Institute of Technology) on *robustness meeting algorithms*,

- Danupon Nanongkai (KTH Royal Institute of Technology) on *dynamic graph algorithms and complexity*,
- Jelani Nelson (Harvard University) on *recent advances concerning the Johnson-Lindenstrauss Lemma*, and
- Barna Saha (University of Massachusetts Amherst) on *space and time efficient algorithms for Lipschitz problems*.

Survey presentations were accompanied by invited talks presenting the best algorithmic results published in the strongest academic conferences, which provided a broad and accurate overview of recent highlights of algorithmic research worldwide. The research presented consisted of 6 papers from STOC'2017, 6 from FOCS'2017, 4 from SODA'2017/18, and one paper from each of ICALP'2017, SPAA'2017, COLT'2017, and NIPS'2017. The list of speakers was truly impressive and consisted of

- Nikhil Bansal (CWI & TU Eindhoven): *Faster space-efficient algorithms for subset sum and k -sum* (STOC 2017);
- Aaron Bernstein (TU Berlin): *Online bipartite matching with amortized $O(\log^2 n)$ replacements* (SODA 2018);
- Sergio Cabello (University of Ljubljana): *Subquadratic algorithms for the diameter and the sum of pairwise distances in planar graphs* (SODA 2017);
- Parinya Chalermsook (Aalto University): *From gap-ETH to FPT-inapproximability: Clique, dominating set, and more* (FOCS 2017);
- Moses Charikar (Stanford University): *A hitting time analysis of stochastic gradient Langevin dynamics* (COLT 2017);
- Chandra Chekuri (University of Illinois at Urbana-Champaign): *Approximating the Held-Karp bound for metric TSP in nearly-linear time* (FOCS 2017);
- Anindya De (Northwestern University): *Optimal mean-based algorithms for trace reconstruction + Trace reconstruction with $\exp(O(n^{1/3}))$ samples* (STOC 2017);
- Yuval Filmus (Technion): *Twenty (simple) questions* (STOC 2017);
- Magnús Halldorsson (Reykjavik University): *Universal framework for wireless scheduling problems* (ICALP 2017);
- Jonathan Kelner (MIT): *Almost-linear-time algorithms for Markov Chains and new spectral primitives for directed graphs* (STOC 2017);
- Sanjeev Khanna (University of Pennsylvania): *Randomized composable coresets for matching and vertex cover* (SPAA 2017);



HALG 2018 foyer area used for coffee breaks, lunches, and poster sessions

- Pasin Manurangsi (UC Berkeley): *Almost-polynomial ratio ETH-hardness of approximating densest k -subgraph* (STOC 2017)
- Krzysztof Nowicki (University of Wrocław): *MST in $O(1)$ round of Congested Clique* (SODA 2018);
- Rotem Oshman (Tel-Aviv University): *A rounds vs. communication trade-off for multi-party set disjointness* (FOCS 2017);
- Seth Pettie (University of Michigan): *A time hierarchy theorem for the LOCAL model* (FOCS 2017);
- Aviad Rubinfeld (Stanford University): *Distributed PCP Theorems for hardness of approximation in P* (FOCS 2017);
- Tselil Schramm (Harvard & MIT): *The power of sum-of-squares for detecting hidden structures* (FOCS 2017);
- Uri Stemmer (Weizmann Institute): *Practical locally private heavy hitters* (NIPS 2017);
- Inbal Talgam-Cohen (Hebrew University of Jerusalem): *Approximate modularity revisited* (STOC 2017);
- Vera Traub (University of Bonn): *Approaching $3/2$ for the s - t -path TSP* (SODA 2018).

Short contributed talks and poster sessions. In addition to these 26 invited talks, the program included two great events: short contributed talks, and their associated poster presentations. 60 short contributed presentations were selected from among submitted works, providing the community with an opportunity to present the latest research. Work that was already published at different venues (or to be submitted there) was welcomed and encouraged, and we have seen many top-quality results, including research that has already appeared or will appear at STOC, FOCS, SODA, ICALP 2017 and 2018 conferences. Each presentation

consisted of a 6-minute-long talk and a poster presentation later that evening. The poster sessions were very well attended, and the organizers provided a wonderful, spacious venue, and drinks and nibbles, to make these sessions another highlight of the conference, giving the participants and the presenters a great opportunity to show and discuss their results and most recent advances in algorithmic research.

All invited talks, short contributed talks, and posters were carefully selected by the conference Program Committee.

Selecting invited talks. The Program Committee (PC) first solicited external nominations for invited talks, in addition to many nominations made by the PC itself. The PC then deliberated and selected the talks (topics/papers and speakers) from this pool of nominations. The survey talks were chosen first, which may sometime affect the choice of papers to be presented. The main consideration was the quality of the talk as a learning experience, which depends both on the results and on the anticipated speaker, and is quite different from our usual conference selection. The PC made an effort to create an interesting and balanced program, taking into account several aspects, like scope (relevance to algorithms) and diversity of topics and people (e.g., seniority, gender), and setting a higher bar for past HALG speakers and for PC members (indeed, some PC members presented papers that won a best-paper award in the past year).

The procedure for external nomination will surely improve over time. This year, the number of external nominations was not large, and their contents was sometimes of limited usefulness, e.g., a too broad topic, or a too technical justification (repeating a paper's abstract). This suggests that the nomination guidelines do not explain well the expectations from a good nomination. On a positive note, very few invited speakers declined, and almost all the invitations were accepted, even though invited speakers are expected to cover their own travel expenses (to keep the registration cost low).

Outlook. Seeing the enthusiasm of the speakers and the participants at the HALG conferences, a large number of graduate students and early career researchers attending the events, we believe that this kind of venue is very much needed today, and that it makes our community stronger and more cohesive. In particular, we hope that the success of the first three HALG conferences will make HALG a recurring event and an important part of our conference calendar.

Finally, we are happy to announce that the *Highlights of Algorithms 2019* conference (HALG 2019) will take place in Copenhagen, Denmark, June 14–16, 2019, organized by Mikkel Thorup and his Center for Basic Algorithms Research Copenhagen. The Program Committee will be chaired by Piotr Sankowski.

Hope to see many of you there!