

## REPORT ON SEA 2018

The 17th International Symposium on Experimental Algorithms  
<http://cs.gssi.it/sea2018>  
L'Aquila, Italy, June 26–29, 2018

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Since 2002, the series of SEA symposia (previously known as Workshop on Experimental Algorithms, WEA) brings together specialists and young researchers working in experimental algorithms and algorithm engineering, encouraging high-quality research in the area. Previous WEA and SEA meetings have been held in Latvia, Switzerland, Brazil, Greece, Spain, Italy, USA, Germany, Denmark, France, Russia, and UK.



This year's edition, the 17th International Symposium on Experimental Algorithms (SEA 2018) was held at Gran Sasso Science Institute (GSSI) in the period

26–29 June 2018 and was organized by us in cooperation with Michele Flammini and Ludovico Iovino. GSSI is an international PhD school and a center for advanced studies in physics, mathematics, computer science and social sciences located in L’Aquila, Abruzzo (Italy). The symposium finished on Friday, 29 June, at around 17:00 after three days of scientific presentations. Essen-



tially all registered participants came from abroad, remarking how GSSI, L’Aquila and its University are very quickly becoming a very attractive destination for scientific events. Several talks were also attended by some local faculty members and students who were not officially registered for the symposium. All sessions, including the very last one, had lively discussions that were often interdisciplinary in nature, due to the participations of researchers coming from different fields of computer science (e.g. algorithms and operation research). In particular, we solicited papers in the broad area of design, analysis, and experimental evaluation and engineering of algorithms, as well as of combinatorial optimization and its applications. In response to the call for papers, we received 70 submissions, with the Program Committee deciding to accept 30 papers. Each submission was reviewed by at least three program committee members with the help of several external reviewers. Authors of accepted papers came from 20 countries, across five continents. Conference proceedings can be found at <http://www.dagstuhl.de/dagpub/978-3-95977-070-5>.

In addition, the symposium was enriched by three excellent invited speakers,

namely Giuseppe F. Italiano (University of Rome Tor Vergata, Italy), Simon J. Puglisi (University of Helsinki, Finland) and Dorothea Wagner (Karlsruhe Institute of Technology, Germany). The invited talks were delivered on the three days of the conference.

Simon kicked off the symposium with a talk entitled *Decompressing Massive Datasets*. Simple and fast decoding is one of the main advantages of LZ-type text encoding used in many popular file compressors and software systems. However, the standard LZ decoding algorithm - which has not changed for 40 years - makes random accesses to the text and cannot be trivially modified to deal with files whose decompressed size exceeds that of main memory. The talk by Simon explored two algorithmic approaches to scaling LZ decoding to massive datasets. One of these approaches constitutes the first external memory algorithms for LZ decoding. Simon showed that the I/O complexity of these algorithms is optimal and demonstrated, through an experimental evaluation, that they are very fast in practice. The second approach is a suite of algorithms that use working space proportional to the size of the compressed data and that streams their output - avoiding access to it during decoding.

Dorothea delivered the Thursday invited talk on *The Impact of Route Planning Algorithms in Practice*. Route planning systems belong to the most frequently used information systems at all. The algorithmic core problem of such systems, is the classical shortest paths problem that can be solved by Dijkstra's algorithm which, however, is too slow for practical scenarios. Algorithms for route planning in transportation networks have recently undergone a rapid development, leading to methods that are up to several million times faster than Dijkstra's algorithm. For example, for continent-sized road networks, newly-developed algorithms can answer queries in a few hundred nanoseconds, others can incorporate current traffic information in under a second on a commodity server, and many new applications can now be dealt with efficiently. Accordingly, route planning has become a showpiece of Algorithm Engineering demonstrating the engineering cycle that consists of design, analysis, implementation and experimental evaluation of practicable algorithms. Recently, new challenges like intermodal route planning, incorporating realtime traffic, journey planning with respect to multiple criteria or energy-aware route planning for electric vehicles came up. In her talk, Dorothea discussed such new problems and highlighted the impact of route planning algorithms for practical systems.

Last, but not least, Giuseppe (a.k.a. Pino) delivered an invited talk on *2-Connectivity in Directed Graphs*. Despite being complete analog of the corresponding notions on undirected graphs, in digraphs 2-connectivity has a much richer and more complicated structure. For undirected graphs it has been known for over 40 years how to compute all bridges, articulation points, 2-edge- and 2-vertex-connected components in linear time, by simply using depth first search.

In the case of digraphs, however, the very same problems have been much more challenging and have been tackled only recently. In his talk, Pino surveyed some recent theoretical and experimental results on 2-edge and 2-vertex connectivity in directed graphs.

All in all, we believe the SEA community is growing (the number of submissions we received this year was among the highest ever seen) and the symposium is in excellent health. We believe this growth will continue, along with the increasing interest in the area of Algorithm Engineering that is emerging in the Computer Science field of studies. The next edition of the symposium will be held in Kalamata (Greece), organized by Panos Pardalos and Ilias Kotsireas. We look forward to this new exciting edition and to the remarkable contributions it will surely bring to the community.