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EDITORIAL

Special Issue Dedicated to the 14th International Symposium on Parameterized and Exact Computation

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1 Foreword

We are pleased to present this special issue of Algorithmica dedicated to the 14th International Symposium on Parameterized and Exact Computation (IPEC) which took place September 11–13 in Munich, Germany. IPEC (formerly IWPEC) is a series of international symposia covering research in all aspects of parameterized and exact algorithms and complexity. Launched in 2004 as a biennial workshop, it became an annual event in 2009 and is now a highly recognized annual meeting. This special issue is a successor of the following special issue volumes of Algorithmica:

- Volumes 64(1)-2012 and 65(4)-2013 dedicated to IPEC 2010, held in Chennai (India);
- Volume 71(3)-2015 dedicated to IPEC 2013, held in Sophia Antipolis (France);
- Volume 75(2)-2016 dedicated to IPEC 2014, held in Wrocław (Poland);
- Volume 79(1)-2017 dedicated to IPEC 2015, held in Patras (Greece);
- Volume 81(2)-2019 dedicated to IPEC 2016, held in Aarhus (Denmark);
- Volume 81(10)-2019 dedicated to IPEC 2017, held in Vienna (Austria); and
- Volume 82(8)-2020 dedicated to IPEC 2018, held in Helsinki (Finland).

This special issue comprises a selection of seven extended journal papers that were presented at IPEC 2019. Among the twenty-four papers presented at IPEC, eight were originally invited to submit their full version to this volume. After a rigorous

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reviewing phase, according to the high standard of the journal, seven of them were accepted for publication.

The paper "C-Planarity Testing of Embedded Clustered Graphs with Bounded Dual Carving-Width" by Giordano Da Lozzo, David Eppstein, Michael T. Goodrich, and Siddharth Gupta is the extended journal version of the winner of the Best Paper Award at IPEC 2019. The authors provide parameterized algorithms for computing graph embeddings that visualize a recursive clustering structure.

In the paper "Improved Analysis of Highest-Degree Branching for Feedback Vertex Set" by Yoichi Iwata and Yusuke Kobayashi, the authors give a theoretical explanation of the empirically observed effectiveness of branching on high-degree vertices for solving the Feedback Vertex Set problem in undirected graphs. A non-trivial analysis shows that the algorithm runs in time $\mathcal{O}(3.460^k n)$ when testing for a solution of size k in an n-vertex graph.

In "Beating Treewidth for Average-Case Subgraph Isomorphism", which is the extended journal version of the winner of the Best Student Paper Award at IPEC 2019, Gregory Rosenthal investigates the relation between several complexity parameters for a colored version of the Subgraph Isomorphism problem. His work reveals that the average-case complexity can be $n^{o(\mathrm{tw}(G))}$ for certain families of graphs, thereby beating treewidth.

In "Finding and Counting Permutations via CSPs", the authors Benjamin Aram Berendsohn, László Kozma, and Dániel Marx show how the lens of constraint-satisfaction can be used to give improved algorithms for testing whether an input permutation contains a given pattern. The paper provides both polynomial-space and exponential-space algorithms, and generalizes the results to counting pattern occurrences.

In the paper "Faster Algorithms for Counting Subgraphs in Sparse Graphs", Marco Bressan introduces the notion of DAG-width and uses it as the foundation of a parameterized algorithm for counting induced subgraphs of a given pattern graph H in a host graph G of bounded degeneracy. Since its introduction in this paper, several follow-up papers have highlighted the importance of the concept of DAG-width.

In "Metric Dimension Parameterized By Treewidth" by Édouard Bonnet and Nidhi Purohit, the authors resolve an open problem concerning the parameterized complexity of the Metric Dimension problem: it is W[1]-hard parameterized by the treewidth of the input graph.

Finally, the paper "Subexponential-Time Algorithms for Finding Large Induced Sparse Subgraphs" by Jana Novotná, Karolina Okrasa, Michał Pilipczuk, Paweł Rzążewski, Erik Jan van Leeuwen, and Bartosz Walczak presents a general recipe for obtaining subexponential-time algorithms for finding large induced subgraphs of an input graph $G \in \mathcal{D}$ belonging to a prescribed class of sparse graphs $\mathcal{C}$, by combining balanced separators and treewidth-based algorithms.

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