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Guest Editors' Foreword

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This special issue of *Discrete & Computational Geometry* contains a selection of the best papers that were presented at the *35th Annual Symposium on Computational Geometry*, which was held in Portland (Oregon), USA, on June 18–21, 2019. The seven papers in this special issue were invited, submitted, reviewed, and revised according to the usual high standards of the journal. It is our pleasure to briefly introduce these contributions.

Shay Moran and *Amir Yehudayoff* study weak epsilon-nets in abstract set-systems. Their main result identifies the Radon number as a parameter that characterizes the existence of weak epsilon-nets (in separable convexity spaces). In a sense, this means that Radon's theorem for convex sets is the key property behind the existence of weak epsilon-nets in Euclidean space.

Haitao Wang and *Jie Xue* study the single-source shortest-path (SSSP) problem in weighted unit-disk graphs (UDGs). An exact (and deterministic) algorithm is proposed to solve the problem in $O(n \log^2 n)$ time and linear space. In addition, a $(1+\varepsilon)$-approximation algorithm for the problem is given, with running time $O(n \log n + n \log^2(1/\varepsilon))$ and linear space. Both algorithms are based on reductions from the SSSP problem in weighted UDGs to 2-dimensional offline insertion-only weighted nearest-neighbor search, which is of independent interest.

Kevin Buchin, *Sariel Har-Peled*, and *Dániel Oláh* study the problem of how to construct a geometric spanner for points in Euclidean space, so that the spanner can withstand a system-wide catastrophic failure of nodes. In particular, they show that one can construct a spanner of near linear size, so that the surviving graph is a spanner for most of the surviving nodes.

Patrick Schnider studies the following question: Given a continuous assignment of mass distributions to certain subsets of the Euclidean space, is there a subset on which we can bisect more masses than what is guaranteed by the Ham-Sandwich

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theorem? A generalization of the center-transversal theorem is proven for assignments of masses to k-dimensional linear subspaces. For Ham-Sandwich cuts, it is shown that the considered subspaces can be further restricted, leading to a solution of a conjecture by Barba. The author also investigates subsets defined in a particular way by hyperplane arrangements, leading to a proof of a relaxed version of a conjecture by Langerman.

David Eppstein provides a careful polynomial-time counting reduction, proving that it is #P-complete to count the triangulations of a non-simple polygon, even when its vertices are restricted to a grid of polynomial size. Although there has been considerable research on problems of counting non-crossing configurations in the plane, this is the first hardness result in this area.

Timothy M. Chan revisits a number of fundamental problems about *dynamic geometric data structures*. Among the many new results is the first fully dynamic data structure that can maintain the volume of a three-dimensional convex hull in sublinear time, under insertions and deletions of points. His paper also describes new data structures for dynamic nearest-neighbor search and dynamic closest/farthest pairs in the plane, which improve previous results by logarithmic factors. A common thread in all these methods is the use of a known geometric decomposition technique called *shallow cuttings*.

Jeff Erickson and *Yipu Wang* describe efficient algorithms for finding several types of topologically-trivial closed walks in directed graphs embedded on surfaces. Their algorithms draw on a wide range of techniques, including careful analysis of strong connectivity in directed surface graphs and their duals, hyperbolic geometry, context-free grammars, and maximum flows. They also show that several natural variants are NP-hard.

We thank our anonymous referees for their careful diligence in reviewing the papers in this special issue, and we thank the authors for their contributions and revisions.