

Guest Editors' Foreword

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This special issue of Discrete and Computational Geometry contains a selection of papers that were presented at the 27th Annual ACM Symposium on Computational Geometry, which was held in Paris, France, June 13–15, 2011. The five papers in this issue were invited, submitted, and then reviewed according to the usual, high standards of the journal. The revised versions of these papers are what you can find in this issue. A sixth paper was invited as well, namely “Sphere and dot product representations of graphs”, by Ross Kang and Tobias Müller. This paper had already been submitted before to the same journal, and it appeared separately in a different issue. It is our pleasure to briefly introduce the five papers that appear in the present issue.

The paper by René Brandenberg and Stefan König considers the size of core-sets for certain smallest-enclosing shape problems. If the shape is a d -ball, then there are dimension-independent size core-sets, and a tight bound is given. However, if the shape is convex and the smallest homothetic version is desired, then core-sets must have size linear in the dimension. Tightness of the given bound in the worst case is proved.

The paper by Leonidas Guibas, Quentin Merigot and Dmitriy Morozov considers the distance to a measure as a generalization to the distance of a compact subset of the Euclidean space. Given a noisy sample from a distribution with compact support K , the distance function gets approximated by a power distance to the set of barycenters of the $k - 1$ nearest neighbors for each sample point. The approximation

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is called witnessed distance, and constant factor approximation guarantees are given: the witnessed distance approximates the distance to K and the distance to the uniform measure on the sample up to a constant factor.

The paper by Tamal Dey and Yusu Wang is a representative of the computational topology area. It considers Reeb graphs and their approximate construction based on a sample of points from an unknown, smooth compact 2-manifold. A second result is the introduction of the concept of persistent Reeb graphs, where persistence is in the growing of the domain of the function whose level sets are considered.

The paper by Vida Dujmović and Stefan Langerman proves ham-sandwich and centerpoint type results for arrangements of lines and hyperplanes, and they derive some consequences on the combinatorial geometry of point sets. From a graph drawing perspective, which was the original motivation, the results answer in the negative a problem dealing with universal line sets for labeled planar graphs: Is there a set of n lines such that for any n -vertex planar graph G with a direct labeling of each vertex to a distinct line, the graph G can be drawn without crossings such that each vertex lies on its unique line?

The paper by Mashhood Ishaque, Diane Souvaine, and Csaba Tóth proves the conjecture that for any even set of n pairwise disjoint line segments in the plane, there is another set of n pairwise disjoint line segments in the plane such that the two sets of line segments together form a set of disjoint simple polygons. For odd sets it is known that the same result does not always hold.

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