Guest Editors' Foreword

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This special issue of *Discrete & Computational Geometry* contains a selection of seven papers whose preliminary versions appeared in the Proceedings of the Annual Symposium on Computational Geometry, Kyoto, Japan, June 8–11, 2014. The seven papers in this issue were invited, submitted, and then reviewed according to the usual, high standards of the journal. These papers cover a wide spectrum of topics in computational geometry.

Chan and Lee propose algorithms for a number of geometric problems in the comparison-based model that achieve optimality in the constant factors of the leading terms. The problems include 2D and 3D maxima, 2D convex hull, segment intersection searching, and point location among axis-parallel boxes in 3D or in a 3D box subdivision.

Bonichon, Kanj, Perković, and Xia study the maximum degree of a plane spanner with constant stretch. There is a known lower bound of three, and there has been a series of results that gradually reduce the maximum degree to six. This paper presents a new upper bound of four which almost closes the gap between the upper and lower bounds.

Har-Peled and Raichel give a near linear bound on the expected complexity of the multiplicatively weighted Voronoi diagram of n sites in the plane. The locations of the sites are fixed, and the sites can be points, segments, or convex sets. The weights of the sites may be a random sample from a distribution or a random permutation of n

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fixed weights. This is in sharp contrast to the quadratic complexity in the worst-case deterministic setting.

Abdallah and Mérigot consider the reconstruction of an unknown convex body in $\mathbb{R}^d$. If the directions of boundary normals can be uniformly and independently sampled (without revealing the locations of these normals), the authors bound the number of samples required for reconstructing the body with a given success probability bound that satisfies a prescribed bound on the Hausdorff distance error (up to translation).

Colin de Verdière, Hubard, and de Mesmay use Riemannian systolic inequalities to study cuts on a triangulated surface. They bound the lengths of cuts for producing a pants decomposition as well as the time to compute such a decomposition. They also give a lower bound on the problem of embedding a cut graph with a given combinatorial map on a triangulated surface.

Chazal, Huang, and Sun study the reconstruction of branching filamentary structures exhibited in some real-world data. Using well-chosen Reeb graphs, the authors show that these underlying filamentary structures can be approximated in terms of the Gromov–Hausdorff distance in almost linear time.

Dwork, Nikolov, and Talwar use geometric techniques, including the Frank–Wolfe algorithm, to answer k -way marginal queries on a database. They present a polynomial-time algorithm to introduce error into the query answer in order to protect privacy. When $k = 2$, the error introduced matches the information-theoretic bounds. When k is greater than 2 but small, it is an improvement over previous work.

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