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Guest Editor's Foreword

This special issue of *Discrete & Computational Geometry* contains a selection of eight papers whose preliminary versions appeared in the Theoretical Track of the 1998 ACM Symposium on Computational Geometry. These papers show a rich variety of algorithmic, combinatorial, and topological techniques, and the broad range of discrete and computational geometry.

Amenta and Bern use Delaunay triangulations to find a piecewise-linear approximation of a smooth surface, given a sample set of points from the surface. They prove that the surface converges to the original, for a sufficiently dense sample. This sampling density can vary with local feature size, which often allows fewer sample points for smooth surfaces.

Aronov, de Berg, van der Stappen, Švestka, and Vleugels improve results for motion planning for multiple robots, by showing that it is enough to consider plans constrained to have some of the robots touching; such constraints reduce the dimension of the robots' configuration space, and this simplifies planning.

Brönnimann gives a randomized incremental algorithm for convex hulls in general dimension; in contrast to previous randomized incremental algorithms for this problem and other problems, his algorithm can be proven worst-case optimal even when the input set is degenerate.

Chan gives a randomized technique for reducing geometric optimization problems to geometric decision problems. Parametric search is a previous, deterministic, approach to such reductions. In comparison, Chan's technique seems to be as widely applicable, but generally gives relatively simple algorithms.

Eppstein and Erickson give an algorithm for the straight skeleton of a polygon; while the straight skeleton is a natural variation on the medial-axis transform, it is surprisingly difficult to compute. The new algorithm is the first to have a subquadratic worst-case complexity.

Fortune gives an algorithm for "rounding" polyhedral subdivisions, that is, given a subdivision, his algorithm finds a similar one whose vertices can be represented with few bits. The resulting subdivision has topological consistency properties not proven in earlier work.

Snoeyink shows that a simple polygon is determined by the interior angles at its vertices, together with the cross-ratios of diagonals of a triangulation. His result helps prove the correctness of an algorithm for finding Schwarz–Christoffel transforms.

Tóth and Valtr show that a graph drawn in the plane with n vertices and at least $k^3 n$ edges has some set of $k + 1$ edges that are pairwise disjoint. They also construct graphs with $\frac{3}{2}(k - 1)n$ edges, and no $k + 1$ pairwise disjoint edges.

A selection of papers from the Applied Track of the symposium will appear in the journal *Computational Geometry*: *Theory and Applications*.

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