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# Guest Editor's Foreword

This special issue consists of six selected articles presented at the Seventh Annual Symposium on Computational Geometry held June 10–12, 1991 in North Conway, New Hampshire. The submission of the papers was solicited and all six papers were subjected to the usual refereeing process of this journal.

The six articles vary in topic and flavor. By definition, all share the aspect of constructability and computational complexity. The geometry is predominantly topological and combinatorial. The first article, by Boris Aronov and Joseph O'Rourke, studies a particular kind of unfolding of the boundary of a three-dimensional convex polytope. This star unfolding is shown to be without self-overlap. It has applications to algorithmic questions about distance and shortest paths on the boundary of the polytope. Claire and Richard Kenyon consider rectifiable curves in the plane and construct short cuts that bring any two points on the curve within a constant times their Euclidean distance. The total length of the short cuts does not exceed some constant times the length of the curve. Distance is also an important geometric concept in the third article authored by Clyde Monma and Subhash Suri. It studies the variation of the minimum spanning tree of a finite but changing set of points in the plane. The results are predominantly combinatorial and computational, counting and constructing different trees for certain restricted kinds of dynamic changes. The classical problem of enumerating the vertices of a convex polytope in $d$ dimensions is investigated by David Avis and Komei Fukuda in the fourth article. The novelty of their algorithm is that it travels from vertex to vertex without repetition and without memory of its history. The topic of the fifth article, by Jiří Matoušek, are data structures for simplex range searching in $d$ dimensions. Based on a new theorem about partitioning finite point sets he obtains improved complexity results that get very close to the optimum. In the sixth article, Ketan Mulmuley and Sandeep Sen tackle the problem of maintaining a hyperplane arrangement so that the location of a query point can always be found efficiently. The algorithms use random bits for the construction. No assumptions on the distribution of the hyperplanes or the sequence of updates are made.

What is the direction in which the field of geometric algorithms is moving? Perhaps a close reading of the articles presented here can provide a snapshot answer. I wish everyone happy reading.

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Guest Editor