The 15th Annual International Symposium on Algorithms and Computation (ISAAC 2004) was held in Hong Kong on December 20-22, 2004, with 164 participants from 18 countries. The international program committee had selected 76 papers from 228 submissions to be presented at the conference. From these papers, the program committee further selected nine outstanding computational geometry papers to be invited for this special issue of IJCGA. All papers were accepted for publication.

The articles span many areas of computational geometry. B. Aronov et al. study the problem of fitting a $k$-joint polyline to a given set of points in the plane, minimizing min-sum criteria with respect to $L_1$ and $L_2$ metrics. For $k = 1$, they give an efficient algorithm, and for $k \geq 2$ they propose a fully polynomial-time approximation scheme. S. W. Bae and K.-Y. Chwa show how to compute Voronoi diagrams for transportation networks in the plane.

T. M. Chan and B. S. Sadjad maintain a $(1 + \epsilon)$-factor approximation of the diameter of a stream of points in the sliding window model. This paper won the best student paper award of ISAAC 2004. C. Chen and A. H.-L. Cheng study another application of Voronoi diagrams for reconstructing deformed shapes. They use the common Voronoi complexes of synthesized shapes in a deformation sequence to compute the deformed shapes in real time.

In a very practical paper, D. Z. Chen et al. help cancer patients to get better treatment by proposing an algorithm for the static leaf sequencing problem with a tradeoff between treatment time and machine delivery error. K.-Y. Chwa et al. give a polynomial time algorithm to compute a witness set of a polygon with holes, if a finite witness set exists. A witness set is a set of points such that any set of guards watching the witness set can see the entire polygon. O. Daescu and J. Luo propose new approximation algorithms for cutting out a convex polygon from another convex polygon by line cuts and ray cuts.
K. Miura et al. exhibit the equivalence between rectangular drawings of a planar graph and perfect matchings in a certain bipartite graph derived from the planar graph. Finally, R. J. Nowakowski and N. Zeh propose an efficient algorithm to color the faces of a planar triangulation black one by one, at any time keeping small the number of regions and the number of edges separating different colored faces.

We would like to thank all contributors to ISAAC 2004 and this special issue for their efforts to prove exciting new results, and all program committee members and reviewers for their efforts to select interesting papers and to suggest valuable improvements to their presentation.