

CONTENTS

Plenary Session I

Geometric enumeration without memory	1
<i>David Avis, McGill University</i>	

Session 1A: Intersections

An optimal parallel algorithm for determining the intersection type of two star-shaped polygons	2
<i>Subir Kumar Ghosh and Anil Maheshwari (TIFR)</i>	

Detecting and computing intersections of convex chains	7
<i>Mark Keil (Saskatchewan) and Godfried Toussaint (McGill)</i>	

Computational aspects of Helly's theorem and its relatives	11
<i>David Avis (McGill) and Michael E. Houle (Tokyo)</i>	

Session 1B: Layout

Bending and stretching orders into three channels	15
<i>Richard Nowakowski (Dalhousie) and Ivan Rival (Ottawa)</i>	

On computing depth of collision in two dimensions	19
<i>S. S. Keerthi (IISc) and K. Sridharan (RPI)</i>	

Bottlenecks identification in general junctions	26
<i>Ahsan Abdullah (USC)</i>	

Session 2A: Delaunay and Voronoi I

On delaunay and voronoi diagrams of order k in the plane	29
<i>Dominique Schmitt and Jean-Claude Spehner (Haute-Alsace)</i>	

Delaunay edge refinements	33
<i>Alan Saalfeld (Bureau of the Census)</i>	

Point placement for delaunay triangulation of polygonal domains	37
<i>Lee R. Nackman and Vijay Srinivasan (IBM Yorktown)</i>	

Session 2B: Robotics

Immobilizing a shape in the plane	41
<i>Jurek Czyzowicz (Hull), Ivan Stojmenovic, and Jorge Urrutia (Ottawa)</i>	

Immobilizing figures on the plane	46
<i>Luis Montejano and Jorge Urrutia (México)</i>	

Probing polygons minimally is hard	50
<i>Patrice Belleville (McGill)</i>	

Session 3A: Circumscribing

- On the perimeter of a point set in the plane 54
Vasilis Capoyleas and János Pach (Courant)

- Minimal circumscribing simplices 58
Gert Vegter (Groningen) and Chee Yap (Courant)

- Minimizing the sum of diameters efficiently 62
John Hershberger (DEC SRC)

Session 3B: Motion Planning

- Turning a polygon inside-out 66
William J. Lenhart (Williams) and Sue H. Whitesides (McGill)

- On a class of 2-D compliant motion planning problems 70
Jiandong Liang (Alberta)

- Computing Minkowski sums of regular polygons 74
A. Kaul (Columbia), M. A. O'Connor, and V. Srinivasan (IBM Yorktown)

Session 4A: Inscribing

- An efficient algorithm for the maximum empty rectangle problem in three dimensions 78
Amitava Datta and Kamala Krithivasan (IIT Madras)

- Finding all the largest circles in a 3-dimensional box 84
Hazel Everett and Sue Whitesides (McGill)

- Computing the wingspan of a butterfly 88
Binay Bhattacharya (Simon Fraser), Peter Egyed, and Godfried Toussaint (McGill)

Session 4B: Visibility

- Finding the closest and visible sites for a line in the presence of barriers 92
Cao An Wang and Y. H. Tsin (Memorial)

- A generalization of staircase visibility 96
Sven Schuierer (Freiburg), Gregory J. E. Rawlins (Indiana), and Derick Wood (Waterloo)

- The minimum cone-segment cover problem 100
Naji Mouawad (Waterloo)

Session 5A: Delaunay and Voronoi II

- An algorithm for computing compacted voronoi diagrams defined by convex distance functions 104
Thomas C. Kao and David M. Mount (Maryland)

- Output sensitive construction of the 3D delaunay triangulation of constrained sets of points 110
J.-D. Boissonnat (INRIA), A. Cérézo (Nice), Olivier Devillers, and M. Teillaud (INRIA)

- Properties and algorithms for constrained delaunay triangulations 114
Teofilo Gonzalez and Mohammadreza Razzazi (UC Santa Barbara)

Session 5B: Guarding and Illumination

Illuminating squares on a transversal	118
<i>H. Everett (McGill), K. Lyons (Queen's), B. Reed, and D. Souvaine (Rutgers)</i>	
Optimum placement of guards	122
<i>Simeon Ntafos and Markos Tsoukalas (UT Dallas)</i>	
Watchman routes for multiple guards	126
<i>Joseph S. B. Mitchell and Erik L. Wynters (Cornell)</i>	

Session 6A: Randomized Algorithms

A simple randomized sieve algorithm for the closest pair problem	130
<i>Samir Khuller and Yossi Matias (Maryland)</i>	
A randomized algorithm for slope selection	135
<i>Michael B. Dillencourt (Irvine), David M. Mount, and Nathan S. Netanyahu (Maryland)</i>	
Simple randomized $O(n \log^* n)$ algorithms	141
<i>Olivier Devillers (INRIA)</i>	
The sum of smaller endpoint degree over edges of graphs and its applications to geometric problems	145
<i>Tatsuya Akutsu (MEL Tsukuba), Yasukazu Aoki, Susumu Hasegawa, Hiroshi Imai (Tokyo), and Takeshi Tokuyama (IBM Tokyo)</i>	

Session 6B: Shortest Paths

Computing efficiently shortest paths for degenerate metrics	149
<i>Marc Espie (LIENS, Stanford)</i>	
Bicriteria shortest path problems in the plane	153
<i>Esther M. Arkin, Joseph S. B. Mitchell, and Christine D. Piatko (Cornell)</i>	
Around and around: computing the shortest loop	157
<i>John Hershberger (DEC SRC) and Jack Snoeyink (Utrecht)</i>	
Finding smallest paths in rectilinear polygons on a hypercube multiprocessor	162
<i>Afonso Ferreira (Lyon) and Joseph G. Peters (Simon Fraser)</i>	

Plenary Session II

Computational geometry and linear programming	166
<i>Hiroshi Imai, University of Tokyo</i>	

Session 7A: Pointsets

- Optimal algorithms for determining regularity in pointsets 167
Andrew Kahng and Gabriel Robins (UC Los Angeles)

- The exact fitting problem for points 171
Leonidas Guibas (MIT), Mark Overmars (Utrecht), and Jean-Marc Robert (McGill)

- Computing the minimum weight triangulation of a set of linearly ordered points 175
Henk Meijer and David Rappaport (Queen's)

Session 7B: Approximation

- Robust point location in approximate polygons 179
A. James Stewart (Cornell)

- An approximation algorithm for partitioning a hyperrectilinear polytope with holes 183
Teofilo Gonzalez and Mohammadreza Razzazi (UC Santa Barbara)

- Polyhedral approximation of bivariate functions 187
Per-Olof Fjällström (Linköping)

Session 8A: Stabbing and Separation

- Every arrangement extends to a spread 191
Jacob E. Goodman (CUNY), Richard Pollack (Courant), Raphael Wenger (Ohio State), and Tudor Zamfirescu (Dortmund)

- A search approach to general stabbing problems 195
Carl Ponder (Lawrence Livermore)

- A property of convex polygons 203
Eduardo Rivera-Campo (México) and Jorge Urrutia (Ottawa)

Session 8B: Grids and Subnetworks

- Approximating the d -dimensional complete Euclidean graph 207
Jim Ruppert and Raimund Seidel (UC Berkeley)

- Two-dimensional grid spanners 211
Arthur L. Liestman and Thomas C. Shermer (Simon Fraser)

- On the maximal number of edges of convex digital polygons included into a grid square 215
Dragan M. Acketa and Žunić Joviša (Yugoslavia)

Plenary Session III

- Robertson-Seymour Posets and Computational Geometry 219
Mike Fellows, University of Victoria

Session 9A: Arrangements

Shattering configurations of points with hyperplanes	220
<i>Robert Freimer (Cornell)</i>	
Primal canoes: optimal arrangements of segments	224
<i>H. Edelsbrunner (UI Urbana-Champaign), J. W. Jaromczyk, J. W. Penny (Kentucky), and G. Świątek (SUNY Stony Brook)</i>	
Point location in zones of k -flats in arrangements	228
<i>Mark de Berg, Marc van Kreveld, and Jack Snoeyink (Utrecht)</i>	
On the zone of a co-dimension p surface in a hyperplane arrangement	233
<i>M. Pellegrini (Courant)</i>	

Session 9B: Applications and General Techniques

Sorting does not always help in computational geometry	239
<i>Binhai Zhu and Andranik Mirzaian (York)</i>	
Automatic marker making	243
<i>Victor Milenkovic, Karen Daniels, and Zhenyu Li (Harvard)</i>	
Applications of computational geometry to volume visualization	247
<i>Peter L. Williams (UI Urbana-Champaign)</i>	
Computational geometry on the star and pancake networks	252
<i>S.G. Akl, K. Qui (Queen's), and I. Stojmenovic (Ottawa)</i>	

