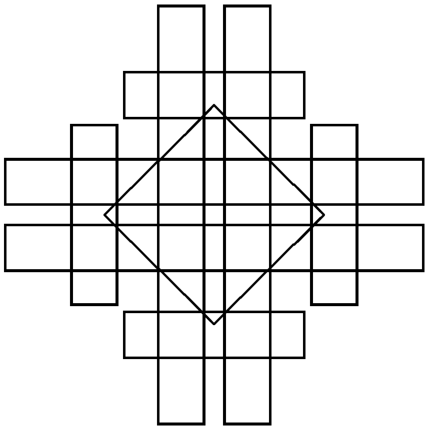
14th Annual ACM Symposium on

COMPUTATIONAL GEOMETRY



June 7–10, 1998

Minneapolis, Minnesota

http://www.cs.umn.edu/scg98

Sponsors: ACM Special Interest Groups on
Graphics (SIGGRAPH) and
Algorithms and Computation Theory (SIGACT)

With support from:
The Geometry Center at the UNIVERSITY OF MINNESOTA
and Lucent Technologies

14th Annual ACM Symposium on Computational Geometry

Registration Form

Please fill out and send this form by *priority mail* to the following address. (If paying by credit card, you may also fax your registration.)

2198 Registrar
45 Wesbrook Hall
77 Pleasant Street S.E.,
University of Minnesota
Minneapolis, MN 55455–0216
U.S.A.
Phone: +1 (612) 625-3850
Fax: +1 (612) 625-1511

Important : Registration can only be accepted if payment instructions are duly followed. In particular, don't forget to give your card number, expiration date, and signature if paying by credit card. Advance registration can only be accepted if received by **May 18, 1998**.

First Name ....

Last Name ....

Affiliation : ....

Street Address : ....

....

City .... ZIP Code ....

State .... Country ....

Phone ....

Fax ....

Email ....

I agree to be listed on the registrant list for distribution to conference participants ☐ Yes ☐ No

Date of arrival ....

Date of departure ....

Special needs (e.g., Vegetarian/Kosher): ....

Preferred video standard
☐ NTSC ☐ Pal ☐ Secam

Please register me as follows:

	Advance	Late
	by May 18	after May 18
ACM Members	☐ US$315	☐ US$355
Non-ACM Members	☐ US$355	☐ US$405
Students	☐ US$165	☐ US$195

ACM Membership Number, if applicable: ....

The registration fee (both regular and student) includes all technical sessions, the proceedings, video, four lunches, coffee breaks, reception, and banquet. Extra copies of the proceedings or video, and extra banquet tickets may be purchased on-site at the following rates:

Proceedings US$37, Video US$10, Banquet US$35

Payment
Payment can be made in one of two ways, and must accompany your registration form:

• Credit card
☐ Visa ☐ Mastercard ☐ AmEx ☐ Discover

Card Number : ....

Expiration Date : .... Signature : ....

• Check/Bank draft
This must be in US$ and drawn on a US Bank. Make checks/bank draft payable to "**UM/ACM SCG 98**".

Refunds
Registration fee may be refunded in full if a written request is received by **May 26, 1998**.

Hotel Reservation
The Symposium will be at the Radisson Hotel Metrodome, 615 Washington Avenue S.E., Minneapolis, MN 55414. A block of rooms has been reserved at the hotel, at the rates given on the attached Hotel Reservation form. Rates are valid for the period June 4–12, 1998. **Please make your reservations as soon as possible. The HOTEL RESERVATION DEADLINE is MAY 9, 1998.** After this date, accommodations and prices cannot be guaranteed.

You can make your hotel reservation by calling the hotel at +1 (800)–822–6757 or +1 (612)–379–8888. Remember to mention that you are attending the "ACM Symposium on Computational Geometry". Alternatively, you can fill out the attached form and mail/fax it to the hotel.

All-day parking is available to hotel guests at the rate of $6.50 per day (rate subject to change). Hotel guests also enjoy complimentary access to the Univ. of Minnesota's $30 million state-of-the-art Recreation Center, located next to the hotel. The Center features an Olympic-size swimming pool, a variety of fitness equipment, as well as basketball, volleyball, racquetball, and badminton courts.

Note: Do not confuse the Symposium hotel with the many other Radisson hotels located in the Twin Cities of Minneapolis and St. Paul. The Symposium hotel is the Radisson Metrodome. It is located adjacent to the East Bank Campus of the Univ. of Minnesota, two blocks from the Geometry Center and the Computer Science & Engineering Department, and close to many campus attractions.

Important dates
Cut-off for hotel reservation: **May 9, 1998**.
Cut-off for advance registration: **May 18, 1998**.
Cut-off for receiving written request
for refund of registration fee: **May 26, 1998**.
Symposium: **June 7–10, 1998**.

Hotel Reservation Form

14th Annual ACM Symposium on Computational Geometry

June 7–10, 1998, Minneapolis, MN

Send to:
Radisson Hotel Metrodome
Reservation Desk
615 Washington Avenue S.E.
Minneapolis, MN 55414, U.S.A.
Phone: +1 (800) 822–6757 or +1 (612) 379–8888
Fax: +1 (612) 379–8682

First Name ....

Last Name ....

Affiliation : ....

Street Address : ....

....

City .... ZIP Code ....

State .... Country ....

Phone ....

Fax ....

Email ....

Date of arrival ....

Date of departure ....

Type of room:

☐ Single — \$90/night plus 12% tax
☐ Double — \$100/night plus 12% tax

If sharing a room, please list roommate's name below:

....

Please provide a major credit card to guarantee your room in case of late arrival (after 6 pm):

☐ Visa ☐ Mastercard ☐ AmEx ☐ Discover

Card Number : ....

Expiration Date : ....

Travel Information

Minneapolis–St. Paul International Airport is served by most major airlines. Northwest Airlines, the Preferred Airline for the Symposium, is pleased to offer discounted airfares. To take advantage of these savings, please call Northwest World Meetings and Incentives Reservations at 1-800-328-1111, between 7:30 AM and 7:30 PM Central Time, Monday–Friday. Please refer to WorldFile Number NEE66 to receive the discount, which ranges from 5–10% off published fares, for travel to the Symposium from within the U.S. and Canada.

Ground transportation

The Symposium hotel is located about 15 miles from the airport, near the University of Minnesota campus and close to downtown Minneapolis. Taxi fare from the airport is about US$15–20. Another option is to take the Airport Express shuttle service (1-800-333-1532), which costs US$10 one-way and US$16.50 round-trip, and departs the airport every twenty minutes. A third option is to rent a car. Note that the shuttle counter as well as all major automobile rental agencies are located one level below the baggage claim area at the airport.

Driving directions from:

(A) The airport: Take I 494 West to I 35W North. Follow I 35W North just past downtown Minneapolis, take Exit 17C (Minn. Hwy. 122), and then follow the signs for "U of M East Bank". After crossing the bridge over the Mississippi, you will be on Washington Avenue SE. Go to the third stoplight (Harvard Street), turn left, and then make an immediate right into the hotel.

(B) Points south of the Twin Cities: Take I 35 North to I 35W North (I 35 forks into I 35W and I 35E south of the Twin Cities) and follow the directions in (A) above.

(C) Points west of the Twin Cities: Take I 94 East to I 35W North and follow the directions in (A) above.

(D) Points north of the Twin Cities: Take I 35 South to I 35W South, to Exit 18 (University Ave./4th Street SE). Turn left on University Ave., then right on Oak Street, and then right on Washington Avenue. The hotel is one block down, on the right.

(E) Points east of the Twin Cities (and from St. Paul): Take I 94 West to Exit 235B (U of M) to Huron Blvd. Follow Huron to Washington Avenue and turn left. The hotel is three blocks down, on the right.

(F) Downtown Minneapolis: Take 4th Street SE (one-way eastbound), which becomes Washington Ave. SE, and then follow the directions in (A) above.

Things to see/do
The Minneapolis–St. Paul (Twin Cities) metropolitan area is a vibrant and dynamic one, and provides opportunities for a variety of activities, both outdoor and indoor. Outdoor activities include walking/hiking/biking along numerous park trails in the Cities and along the shorelines of the many lakes that dot the metro area, the Valleyfair Family Amusement Park, the Minnesota and Como Zoos, and historic Fort Snelling. A bit further out (about 45 minutes by car) is the scenic St. Croix River Valley. Up north (about three to five hours away) are the spectacular North Shore of Lake Superior, the Voyageurs National Park, and the Boundary Waters Canoe Area. Among indoor activities, a must-see is the Mall of America, the largest enclosed shopping and entertainment complex in the U.S. It covers over 4 million square feet, and includes more than 500 shops, numerous fine restaurants, a theme park (Camp Snoopy), and an underwater aquarium (Underwater World) featuring exotic marine life. (Plan on spending all day at the Mall.) The Twin Cities also offer a diverse collection of theaters, museums, and art galleries including: the Walker Art Center, the Minneapolis Institute of Arts, the Sculpture Garden, and the Orpheum and Guthrie Theaters, all in Minneapolis; the Ordway Music Theater, the Landmark Center, the Science Museum and Omnitheater, the Children's Museum, and the State Capitol, all in St. Paul; the Weisman Art Museum and the Bell Museum of Natural History on the U of M campus; and the Chanhassen Dinner Theaters in the West metro. Both downtowns also feature excellent restaurants, offering a variety of dining experiences. If baseball catches your fancy, then you can watch the Minnesota Twins (in possibly their last season here) in the nearby Metrodome. Please see the Symposium web-page for more information.

Getting around town: The Metropolitan Transit Commission (612–349–7000) provides bus service to both downtowns and to surrounding suburbs.

Climate
The weather in the Twin Cities in June is pleasant. Daytime temperatures are generally in the low-70$°F$ (21° C) range, with plenty of sunshine. However, it would be prudent to bring along a sweater or light jacket and an umbrella. (This is Minnesota, after all!)

Symposium web-page
Updated information about the Symposium will be posted, as needed, at `http://www.cs.umn.edu/scg98` . Please check this from time to time.

Program

In addition to forty-four contributed talks and a video review, this year's Symposium also features six invited talks, a panel discussion, and a problem session. *The invited talks and panel discussion, as well as the Saturday reception, are supported by the Geometry Center—a National Science Foundation Science and Technology Center at the University of Minnesota.* All Symposium activities will be at the Radisson.

Saturday, June 6

19:00–22:00 Reception and Registration at the Radisson: Hosted by the Geometry Center

Sunday, June 7

09:00 Registration re-opens

10:30 Welcoming Remarks: Ken Clarkson *(Bell Labs)*; Jarek Rossignac *(GVU/Georgia Tech)*

Session 1: Applied Track
Chair: Jarek Rossignac, GVU/Georgia Tech

10:40 Rotational Polygon Containment and Minimum Enclosure: Victor J. Milenkovic *(Univ. of Miami)*

11:00 A General Framework for Assembly Planning: The Motion Space Approach: Dan Halperin *(Tel Aviv Univ.)*; Jean-Claude Latombe, Randall H. Wilson *(Stanford Univ.)*

11:20 Multi-criteria Geometric Optimization Problems in Layered Manufacturing: Jayanth Majhi, Ravi Janardan *(Univ. of Minnesota)*; Michiel Smid, Jörg Schwerdt *(Univ. of Magdeburg)*

11:40 Design and Analysis of Planar Shape Deformation: Siu-Wing Cheng *(Hong Kong Univ. of Science and Technology)*; Herbert Edelsbrunner *(Univ. of Illinois at Urbana-Champaign and Raindrop Geomagic)*; Ping Fu *(Raindrop Geomagic, Inc. and NCSA, Univ. of Illinois)*; Ka-Po Lam *(Hong Kong Univ. of Science and Technology)*

12:00–13:30 Lunch: Radisson

Invited Talk 1

13:30–14:30 Shape Space from Deformation: Herbert Edelsbrunner *(Univ. of Illinois at Urbana-Champaign and Raindrop Geomagic)*

Session 2: Theoretical Track

Chair: Michiel Smid, Univ. Magdeburg

14:40 **Surface Reconstruction by Voronoi Filtering:** Nina Amenta *(Univ. of Texas, Austin)*; Marshall Bern *(Xerox PARC)*

15:00 **Cross Ratios and Angles Determine a Polygon:** Jack Snoeyink *(INRIA & Univ. of British Columbia)*

15:20 **Raising Roofs, Crashing Cycles, and Playing Pool: Applications of a Data Structure for Finding Pairwise Interactions:** David Eppstein *(Univ. of California, Irvine)*; Jeff Erickson *(Duke Univ.)*

15:40 **Construction of Contour Trees in 3D in $O(n \log n)$ steps:** Sergey P. Tarasov, Michael N. Vyalyi *(Russian Academy of Science, Computing Center)*

16:00–16:30 Coffee Break

Invited Talk 2

16:30–17:30 Computational Geometry Issues of Statistical Depth: Peter Rousseeuw *(Univ. of Antwerp)*

20:30–22:30 Business Meeting: Radisson

Monday, June 8

Session 3: Applied and Theoretical Track

Chair: Steve Fortune, Bell Labs

08:50 **A Condition Guaranteeing the Existence of Higher-Dimensional Constrained Delaunay Triangulations:** Jonathan Richard Shewchuk *(Carnegie Mellon Univ.)*

09:10 **Tetrahedral Mesh Generation by Delaunay Refinement:** Jonathan Richard Shewchuk *(Carnegie Mellon Univ.)*

09:30 **Implementations of the LMT Heuristic for Minimum Weight Triangulation:** Ron Beirouti *(Univ. of British Columbia)*; Jack Snoeyink *(INRIA & Univ. of British Columbia)*

09:50 Improved Incremental Randomized Delaunay Triangulation: Olivier Devillers *(INRIA Sophia-Antipolis)*

10:10–10:40 Coffee Break

Session 4: Theoretical Track
Chair: Ken Clarkson, Bell Labs

10:40 Vertex-Rounding a Three-dimensional Polyhedral Subdivision: Steven Fortune *(Bell Laboratories, Lucent Technologies)*

11:00 Exact Algorithms for Circles on the Sphere: Marcus Vinícius A. Andrade *(Univ. of Viçosa)*; Jorge Stolfi *(Univ. of Campinas)*

11:20 Cutting Cycles of Rods in Space: Alexandra Solan *(Tel-Aviv Univ.)*

11:40 Fly Cheaply: On the Minimum Fuel-Consumption Problem: Alon Efrat, Sariel Har-Peled *(Tel-Aviv Univ.)*

12:00–13:30 Lunch: Radisson

Invited Talk 3
13:30–14:30 Title to be announced: James Sethian *(Univ. of California, Berkeley)*

Session 5: Applied Track
Chair: Leonidas Guibas, Stanford Univ.

14:40 Designing a Data Structure for Polyhedral Surfaces: Lutz Kettner *(ETH Zürich)*

15:00 Improved Algorithms for Robust Point Pattern Matching and Applications to Image Registration: David M. Mount *(Univ. of Maryland)*; Nathan S. Netanyahu *(Univ. of Maryland and NASA Goddard Space Flight Center)*; Jacqueline LeMoigne *(Universities Space Research Association)*

15:20 Interval Arithmetic Yields Efficient Dynamic Filters for Computational Geometry: Hervé Brönnimann *(INRIA Sophia-Antipolis)*; Christoph Burnikel *(Max-Planck-Institut für Informatik)*; Sylvain Pion *(INRIA Sophia-Antipolis)*

15:40 Exact Arithmetic using Cascaded Computation: Christoph Burnikel, Stefan Funke, Michael Seel *(Max-Planck-Institut für Informatik)*

16:00–16:30 Coffee Break

Session 6: Theoretical Track
Chair: Micha Sharir, Tel Aviv Univ.

16:30 Geometric Graphs with Few Disjoint Edges: Géza Tóth *(Courant Institute, NYU and DIMACS Center, Rutgers Univ.)*; Pavel Valtr *(Charles Univ., Prague and DIMACS Center, Rutgers Univ.)*

16:50 Results on k-sets and j-facets via Continuous Motions: Artur Andrzejak *(ETH Zürich)*; Boris Aronov *(Polytechnic Univ., Brooklyn)*; Sariel Har-Peled *(Tel-Aviv Univ.)*; Raimund Seidel *(Univ. des Saarlandes)*; Emo Welzl *(ETH Zürich)*

17:10 Point Sets with few k-sets: Helmut Alt, Stefan Felsner *(Freie Universität Berlin)*; Ferran Hurtado, Marc Noy *(Departament de Matemática Aplicada II)*

17:30 On the Union of κ-Curved Objects: Alon Efrat *(Tel-Aviv Univ.)*; Matthew J. Katz *(Ben-Gurion Univ.)*

19:00–21:30 Conference Dinner and After-Dinner Talk: Radisson

Invited Talk 4
20:30–21:30 The Art and Mathematics of Geometric Dissections: Greg Frederickson *(Purdue Univ.)*

Tuesday, June 9

Session 7: Applied Track
Chair: Fred Bookstein, Univ. of Michigan

08:50 Features of Deformation Grids: An Approach via Singularity Theory: Fred L. Bookstein *(Univ. of Michigan)*

09:10 Effective Nearest Neighbors Searching on the Hyper-Cube, with Applications to Molecular Clustering: Frederic Cazals *(INRIA)*

09:30 Matching 2D Patterns of Protein Spots: Frank Hoffmann, Klaus Kriegel, Carola Wenk *(Freie Universität Berlin)*

09:50 Multiresolution Banded Refinement to Accelerate Surface Reconstruction from Polygons: James D. Fix, Richard E. Ladner *(Univ. of Washington)*

10:10–10:40 Coffee Break

Session 8: Theoretical Track
Chair: Mariette Yvinec, CNRS, I3S

10:40 Degenerate Convex Hulls On-line in any Fixed Dimension: Hervé Brönnimann *(INRIA Sophia-Antipolis)*

11:00 Randomized External-Memory Algorithms for some Geometric Problems: A. Crauser, P. Ferragina, K. Mehlhorn, U. Meyer, E. Ramos *(Max-Planck-Institut für Informatik)*

11:20 Geometric Applications of a Randomized Optimization Technique: Timothy M. Chan *(Univ. of Miami)*

11:40 On Enumerating and Selecting Distances: Timothy M. Chan *(Univ. of Miami)*

12:00–13:30 Lunch: Radisson

Invited Talk 5
13:30–14:30 Progressive Representations for Geometry: Hugues Hoppe *(Microsoft)*

Session 9: Theoretical Track
Chair: John Hershberger, Mentor Graphics

14:40 Drawing Planar Partitions I: LL-Drawings and LH-Drawings: Therese C. Biedl *(McGill Univ.)*

15:00 Approximation Algorithms for Multiple-Tool Milling: Sunil Arya *(Hong Kong Univ. of Science & Technology)*; Siu-Wing Cheng *(Hong Kong Univ. of Science and Technology)*; David M. Mount *(Univ. of Maryland)*

15:20 Resource-Constrained Geometric Network Optimization: Esther M. Arkin, Joseph S. B. Mitchell *(State Univ. of New York, Stony Brook)*; Giri Narasimhan *(Univ. of Memphis)*

15:40 Efficiently Approximating Polygonal Paths in Three and Higher Dimensions: Gill Barequet *(Johns Hopkins Univ.)*; Danny Z. Chen, Ovidiu Daescu *(Univ. of Notre Dame)*; Michael T. Goodrich *(Johns Hopkins Univ.)*; Jack Snoeyink *(INRIA & Univ. of British Columbia)*

16:00–16:30 Coffee Break

Panel Discussion
16:30–17:50 The Theory/Application Interface

Problem Session

20:30–22:30 Coordinator: Pankaj Agarwal *(Duke Univ.)*

Wednesday, June 10

Invited Talk 6

09:10–10:10 Algorithms in Real Algebraic Geometry: Richard Pollack *(Courant Institute, New York Univ.)*

10:10–10:40 Coffee Break

Session 10: Applied Track

Chair: Tamal Dey, I.I.T. Kharagpur

10:40 Constructing Cuttings in Theory and Practice: Sariel Har-Peled *(Tel-Aviv Univ.)*

11:00 Point Set Labeling with Sliding Labels: Marc van Kreveld, Tycho Strijk *(Utrecht Univ.)*; Alexander Wolff *(Freie Universität Berlin)*

11:20 A Unified Approach to Labeling Graphical Features: Konstantinos G. Kakoulis, Ioannis G. Tollis *(The Univ. of Texas at Dallas)*

11:40 An Output Sensitive Algorithm for Discrete Convex Hulls: Sariel Har-Peled *(Tel-Aviv Univ.)*

12:00–13:30 Lunch: Radisson

Session 11: Theoretical Track

Chair: Mark Overmars, Utrecht Univ.

13:30 Asymmetric Rendezvous on the Plane: Edward J. Anderson *(Univ. of New South Wales)*; Sándor P. Fekete *(Universität zu Köln)*

13:50 Motion Planning for Multiple Robots: Boris Aronov *(Polytechnic Univ., Brooklyn)*; Mark de Berg, Frank van der Stappen *(Utrecht Univ.)*; Peter Švestka *(CWI)*; Jules Vleugels *(Utrecht Univ.)*

14:10 Constructing Approximate Shortest Path Maps in Three Dimensions: Sariel Har-Peled *(Tel-Aviv Univ.)*

14:30 Curvature-Constrained Shortest Paths in a Convex Polygon: Pankaj Agarwal *(Duke Univ.)*; Therese C. Biedl, Sylvain Lazard, Steve Robbins *(McGill Univ.)*; Subhash Suri *(Washington Univ.)*; Sue Whitesides *(McGill Univ.)*

14:50 Adjourn

Video Review

Chair: Dan Halperin, Tel Aviv Univ.

- **Voronoi Diagram by Divergences with Additive Weights:** K. Sadakane, H. Imai, K. Onishi, M. Inaba, F. Takeuchi *(Univ. of Tokyo)*; K. Imai *(Chuo Univ.)*
- **GASP-II – A Geometric Algorithm Animation System for an Electronic Classroom:** Maria Shneerson *(The Weizmann Institute of Science)*; Ayellet Tal *(Technion – Israel Institute of Technology)*
- **Visualization of Color Image Quantization using Pairwise Clustering:** Luiz Velho, Jonas Gomes *(IMPA - Instituto de Matemática Pura e Aplicada)*; Marcos V. R. Sobreiro *(PUC-Rio)*
- **Optimal Floodlight Illumination of Stages:** Felipe Contreras *(Univ. of Ottawa)*; Jurek Czyzowicz *(Université du Quebec à Hull)*; Eduardo Rivera-Campo *(Univ. Autonóma Metropolitana-I)*; Jorge Urrutia *(Univ. of Ottawa)*
- **Gawain: Visualizing Geometric Algorithms with Web-based Animation:** Alejo Hausner, David P. Dobkin *(Princeton Univ.)*
- **Viewspace Partitioning of Densely Occluded Scenes:** Yiorgos Chrysanthou *(Univ. College London)*; Daniel Cohen-Or, Eyal Zadicario *(Tel-Aviv Univ.)*
- **A Path Router for Graph Drawing:** David P. Dobkin *(Princeton Univ.)*; Emden R. Gansner, Eleftherios Koutsofios, Stephen C. North *(AT&T Laboratories)*