

Jeff Erickson

Curriculum Vitæ

Department of Computer Science
University of Illinois at Urbana-Champaign
201 North Goodwin Ave.
Urbana, IL 61801-2302
(217) 333-6769
jeffe@cs.uiuc.edu
<http://www.cs.uiuc.edu/~jeffe/>

415 West Indiana Ave.
Urbana, IL 61801-4940
(217) 365-0019

U.S. Citizen

Research Interests

Algorithms, data structures, and lower bounds; computational and discrete geometry and topology; applications of geometry and topology to computer graphics, computer vision, robotics, spatial databases, and mesh generation

Education

- 1992–1996 University of California, Berkeley: Ph.D. in Computer Science, July 1996
Advisor: Raimund Seidel
- 1990–1992 University of California, Irvine: M.S. in Information and Computer Science, June 1992
Advisor: David Eppstein
- 1983–1987 Rice University: B.A. in Computer Science/Mathematical Sciences, May 1987

Employment

- 2004–present Associate professor (with tenure), Department of Computer Science, University of Illinois at Urbana-Champaign
- Fall 2004 Research associate, Laboratoire lorrain de recherche en informatique et ses applications (LORIA), Nancy, France
- 1998–2004 Assistant professor, Department of Computer Science, University of Illinois at Urbana-Champaign
- 1996–1998 Research associate, Center for Geometric Computing, Department of Computer Science, Duke University
- 1992–1996 Graduate student researcher and graduate student instructor, Computer Science Division, University of California, Berkeley
- Fall 1994 Research assistant, Fachbereich Informatik, Universität des Saarlandes, and (unofficially) Max-Planck-Institut für Informatik, Saarbrücken, Germany
- 1990–1992 Graduate student researcher and graduate student instructor, Department of Information and Computer Science, University of California, Irvine
- 1988–1990 Software engineer, Claris Corporation, Santa Clara, CA (MacWrite II, MacWrite Pro, XTND)
- 1986–1988 Software engineer, StyleWare, Inc., Houston, TX (TopDraw, AppleWorks GS)
- 1984–1986 Laboratory assistant, Computer Science Department, Rice University

Awards and Honors

National and International

- 2001–2006 National Science Foundation CAREER Award (CCR-0093348)
- 1999–2002 Alfred P. Sloan Research Fellowship
- 1996–1998 NSF Mathematical Sciences Postdoctoral Research Fellowship (DMS-9627683)
- 1983–1987 National Merit Scholarship

Department, College, and University

Spring 1999, Fall 2000, Spring 2001[†], Fall 2001, Fall 2005, Fall 2006, Spring 2007, and Spring 2008

List of Teachers Ranked as Excellent by Their Students, University of Illinois at Urbana-Champaign (†outstanding rating)

- May 2007* Campus Award for Excellence in Undergraduate Teaching, University of Illinois at Urbana-Champaign (one of five awards campus-wide)
- April 2006* Honorable mention, Campus Award for Excellence in Graduate and Professional Teaching, University of Illinois at Urbana-Champaign
- Fall 2002* Computer Science Graduate Student Organization 2002–2003 T-shirt design, Computer Science Department, University of Illinois at Urbana-Champaign. (See my web page.)
- 2002–2009* Willett Faculty Scholar Award, College of Engineering, University of Illinois at Urbana-Champaign
- April 2001* C. W. Gear Outstanding Junior Faculty Award, Department of Computer Science, University of Illinois at Urbana-Champaign
- April 2001* William L. Everitt Award for Teaching Excellence, College of Engineering, University of Illinois at Urbana-Champaign (nominated by students)
- 1995–1996* Graduate Assistance in Areas of National Need Fellowship, Computer Science, University of California, Berkeley
- 1991–1992* University of California Regents Fellowship

Publications

All papers can be downloaded from <http://www.cs.uiuc.edu/~jeffe/pubs/>.

Each paper is listed once, even if it has appeared in multiple versions.

Invited Papers in Refereed Journals

- [1] New lower bounds for Hopcroft’s problem. *Discrete & Computational Geometry* 16(4):389–418, 1996, special issue of invited papers from the 11th Annual ACM Symposium on Computational Geometry. Extended abstract in *Proceedings of the 11th Annual ACM Symposium on Computational Geometry*, 127–137, 1995.
- [2] Raising roofs, crashing cycles, and playing pool: Applications of a data structure for finding pairwise interactions. Written with David Eppstein. *Discrete & Computational Geometry* 22(4):569–592, 1999, special issue of invited papers from the 14th Annual ACM Symposium on Computational Geometry. Extended abstract in *Proceedings of the 14th Annual ACM Symposium on Computational Geometry*, 58–67, 1998.
- [3] Efficient searching with linear constraints. Written with Pankaj K. Agarwal, Lars Arge, Paolo G. Franciosa, and Jeffrey S. Vitter. *Journal of Computer and System Sciences* 61(2):192–216, 2000, special issue of invited papers from the 17th Annual ACM Symposium on Principles of Database Systems. Extended abstract in *Proceedings of the 17th Annual ACM Symposium on Principles of Database Systems*, 169–178, 1998.
- [4] Reconfiguring convex polygons. Written with Oswin Aichholzer, Erik D. Demaine, Ferran Hurtado, Mark Overmars, Michael A. Soss, and Godfried T. Toussaint. *Computational Geometry: Theory and Applications* 20(1–2):85–95, 2001, special issue of invited papers from the 12th Canadian Conference on Computational Geometry. Extended abstract in *Proceedings of the 12th Canadian Conference on Computational Geometry*, 17–20, 2000.
- [5] Flipping cubical meshes. Written with Marshall Bern and David Eppstein. *Engineering with Computers* 18(3):173–187, 2002, special issue of invited papers from the 10th International Meshing Roundtable. Extended abstract (without my contributions) in *Proceedings of the 10th International Meshing Roundtable*, 19–29, 2001.
- [6] Indexing moving points. Written with Pankaj K. Agarwal and Lars Arge. *Journal of Computer and System Sciences* 66:207–243, 2003, special issue of invited papers from the 19th ACM Symposium on Principles of Database Systems. Extended abstract in *Proceedings of the 19th ACM Symposium on Principles of Database Systems*, 175–186, 2000.

- [7] Nice point sets can have nasty Delaunay triangulations. *Discrete & Computational Geometry* 30:109–132, 2003, special issue of invited papers from the 17th Annual ACM Symposium on Computational Geometry. Extended abstract in *Proceedings of the 17th Annual ACM Symposium on Computational Geometry*, 96–105, 2001.
- [8] Optimally cutting a surface into a disk. Written with Sarel Har-Peled. *Discrete & Computational Geometry* 31(1):37–59, 2004, special issue of invited papers from the 18th Annual ACM Symposium on Computational Geometry. Extended abstract in *Proceedings of the 18th Annual ACM Symposium on Computational Geometry*, 244–253, 2002.
- [9] Local polyhedra and geometric graphs. *Computational Geometry: Theory and Applications* 31(1–2):101–125, 2005, special issue of invited papers from the 19th Annual ACM Symposium on Computational Geometry. Extended abstract in *Proceedings of the 19th Annual ACM Symposium on Computational Geometry*, 171–180, 2003.
- [10] Separating point sets in polygonal environments. Written with Erik D. Demaine, Ferran Hurtado, John Iacono, Stefan Langerman, Henk Meijer, Mark Overmars, and Sue Whitesides. *International Journal of Computational Geometry and Applications* 15(4):403–419, 2005, special issue of invited papers from the 20th Annual ACM Symposium on Computational Geometry. Extended abstract in *Proceedings of the 20th Annual ACM Symposium on Computational Geometry*, 10–16, 2004.
- [11] On the least median square problem. Written with Sarel Har-Peled and David Mount. *Discrete & Computational Geometry*, 36(4):593–607, 2006, special issue of invited papers from the 20th Annual ACM Symposium on Computational Geometry. Extended abstract in *Proceedings of the 20th Annual ACM Symposium on Computational Geometry*, 273–279, 2004.
- [12] Realizing partitions respecting full and partial order information. Written with Erik D. Demaine, Danny Krizanc, Henk Meijer, Pat Morin, Mark Overmars, and Sue Whitesides. *Journal of Discrete Algorithms* 6:51–58, 2008, special issue of invited papers from the 16th Australasian Workshop on Combinatorial Algorithms. Extended abstract in *Proceedings of the 16th Australasian Workshop on Combinatorial Algorithms*, 105–114, 2005.
- [13] Splitting (complicated) surfaces is hard. Written with Erin W. Chambers, Éric Colin de Verdière, Francis Lazarus, and Kim Whittlesey. *Computational Geometry: Theory and Applications* 41(1–2):94–110, 2008, special issue of invited papers from the 22nd European Workshop on Computational Geometry. Extended abstract in *Proceedings of the 22nd Annual ACM Symposium on Computational Geometry*, 421–429, 2006. Extended abstract in *Proceedings of the 22nd European Workshop on Computational Geometry*, 95–98, 2006, (<http://delaunay.tem.uoc.gr/~mkaravel/ewcg06/papers/23.pdf>).
- [14] Homotopic Fréchet distance between curves, or walking your dog in the woods in polynomial time. Written with Erin W. Chambers, Éric Colin de Verdière, Sylvain Lazard, Francis Lazarus, and Shripad Thite. *Computational Geometry: Theory and Applications*, in press, 2009, special issue of invited papers from the 24th Annual ACM Symposium on Computational Geometry. Extended abstract in *Proceedings of the 24th Annual ACM Symposium on Computational Geometry*, 101–109, 2008.
- [15] Finding one tight cycle. Written with Sergio Cabello, Matt de Vos, and Bojan Mohar. To appear in *ACM Transactions on Algorithms*, 2010, special issue of invited papers from the 19th Annual ACM-SIAM Symposium on Discrete Algorithms. *Proceedings of the 19th Annual ACM-SIAM Symposium on Discrete Algorithms*, 527–531, 2008.

Other Refereed Journal Papers

- [16] Iterated nearest neighbors and finding minimal polytopes. Written with David Eppstein. *Discrete & Computational Geometry* 11(4):321–350, 1994. Portions also appeared in *Proceedings of the 4th Annual ACM-SIAM Symposium on Discrete Algorithms*, 64–73, 1993.
- [17] Better lower bounds on detecting affine and spherical degeneracies. Written with Raimund Seidel. *Discrete & Computational Geometry* 13(1):41–57, 1995. Erratum in *Discrete & Computational Geometry* 18(2):239–240, 1997. Extended abstract in *Proceedings of the 34th Annual IEEE Symposium on Foundations of Computer Science*, 528–536, 1993.

- [18] New lower bounds for convex hull problems in odd dimensions. *SIAM Journal on Computing* 28(4): 1198–1214, 1999. Extended abstract in *Proceedings of the 12th Annual ACM Symposium on Computational Geometry*, 1–9, 1996.
- [19] Lower bounds for linear satisfiability problems. *Chicago Journal of Theoretical Computer Science* 1999(6), 1999. Extended abstract in *Proceedings of the 6th Annual ACM-SIAM Symposium on Discrete Algorithms*, 388–395, 1995.
- [20] Space-time tradeoffs for emptiness queries. *SIAM Journal on Computing* 29(6):1968–1996, 2000. Extended abstract in *Proceedings of the 13th Annual ACM Symposium on Computational Geometry*, 304–313, 1997. Includes results from [39].
- [21] Flipping polygons. Written with Oswin Aichholzer, Carmen Cortés, Vida Dujmović, Erik D. Demaine, Henk Meijer, Mark Overmars, Belén Palop, Suneeta Ramaswami, and Godfried T. Toussaint. *Discrete & Computational Geometry* 28:231–253, 2002.
- [22] Algorithmic issues in modeling motion. Written with Pankaj K. Agarwal, Leonidas J. Guibas, and 18 others. *ACM Computing Surveys* 34(4):550–572, 2002.
- [23] Preprocessing chains for dihedral rotations is hard or even impossible. Written with Michael A. Soss and Mark Overmars. *Computational Geometry: Theory and Applications* 26(3):235–246, 2003.
- [24] Kinetic collision detection for two simple polygons. Written with Julien Basch, Leonidas J. Guibas, John Hershberger, and Li Zhang. *Computational Geometry: Theory and Applications* 27(3):211–235, 2004. Extended abstract in *Proceedings of the 10th Annual ACM-SIAM Symposium on Discrete Algorithms*, 102–111, 1999.
- [25] Dense point sets have sparse Delaunay triangulations. *Discrete & Computational Geometry* 33:83–115, 2005. Extended abstract in *Proceedings of the 13th Annual ACM-SIAM Symposium on Discrete Algorithms*, 125–134, 2002.
- [26] Output-sensitive algorithms for computing nearest-neighbor decision boundaries. Written with David Bremner, Erik D. Demaine, John Iacono, Stefan Langerman, Pat Morin, and Godfried Toussaint. *Discrete & Computational Geometry* 33(4):593–604, 2005. Extended abstract in *Proceedings of the 8th International Workshop on Algorithms and Data Structures*, 451–461. *Lecture Notes in Computer Science* 2748, Springer-Verlag, 2003.
- [27] Building space-time meshes over arbitrary spatial domains. Written with Damrong Guoy, John M. Sullivan, and Alper Üngör. *Engineering with Computers* 20(4):342–353, 2005. Extended abstract in *Proceedings of the 11th International Meshing Roundtable*, 391–402, 2002.
- [28] An h -adaptive spacetime-discontinuous Galerkin method for linearized elastodynamics. Written with Reza Abedi, Robert B. Haber, and Shripad Thite. *Revue Européenne de Mécanique Numérique [European Journal of Computational Mechanics]* 15(6):619–642, 2006.
- [29] Capturing a convex object with three discs. Written with Jean Ponce, Fred Rothganger, and Shripad Thite. *IEEE Transactions on Robotics* 23(6):1133–1140, 2007. Extended abstract in *Proceedings of the 2003 IEEE International Conference on Robotics and Automation*, 2242–2247, 2003.
- [30] Centerpoint theorems for wedges. Written with Ferran Hurtado and Pat Morin. *Discrete Mathematics and Theoretical Computer Science* 11(1):45–54, 2009.
- [31] Vietoris-Rips complexes of planar point sets. Written with Erin W. Chambers, Vin de Silva, and Robert Ghrist. *Discrete & Computational Geometry*, in press, 2009. (<http://arxiv.org/abs/0712.0395>).
- [32] Computing the shortest essential cycle. Written with Pratik Worah. To appear in *Discrete & Computational Geometry*, 2010. (<http://www.cs.uiuc.edu/~jeffe/pubs/essential.html>).

Refereed Book Chapters

- [33] Sowing games. *Games of No Chance*, Richard J. Nowakowski, editor. *Mathematical Sciences Research Institute Publications* 29, Cambridge University Press, 1996, pp. 287–297.
- [34] New Toads and Frogs results. *Games of No Chance*, Richard J. Nowakowski, editor. *Mathematical Sciences Research Institute Publications* 29, Cambridge University Press, 1996, pp. 299–310.

- [35] Geometric range searching and its relatives. Written with Pankaj K. Agarwal. *Advances in Discrete and Computational Geometry*, Bernard Chazelle, Jacob E. Goodman, and Richard Pollack, editors. *Contemporary Mathematics* 223, American Mathematical Society Press, 1999, pp. 1–56.
- [36] Arbitrarily large neighborly families of congruent symmetric convex 3-polytopes. Written with Scott Kim. *Discrete Geometry: In Honor of W. Kuperberg's 60th Birthday*, Andras Bezdek, editor. *Lecture Notes in Pure and Applied Mathematics*, Marcel Dekker, 2003, pp. 267–278.
- [37] Vertex-unfoldings of simplicial manifolds. Written with Erik D. Demaine, David Eppstein, George W. Hart, and Joseph O'Rourke. *Discrete Geometry: In Honor of W. Kuperberg's 60th Birthday*, Andras Bezdek, editor. *Lecture Notes in Pure and Applied Mathematics*, Marcel Dekker, 2003, pp. 215–228. *Proceedings of the 18th Annual ACM Symposium on Computational Geometry*, 237–243, 2002.

Conference Papers with no Journal Version

- [38] On the relative complexities of some geometric problems. *Proceedings of the 7th Canadian Conference on Computational Geometry*, 85–90, 1995. Full version available at (<http://www.cs.uiuc.edu/~jeffe/pubs/relative.html>).
- [39] New lower bounds for halfspace emptiness. *Proceedings of the 37th Annual IEEE Symposium on Foundations of Computer Science*, 472–481, 1996. Merged into the journal version of [20].
- [40] Kinetic binary space partitions for intersecting segments and disjoint triangles. Written with Pankaj K. Agarwal and Leonidas J. Guibas. *Proceedings of the 9th Annual ACM-SIAM Symposium on Discrete Algorithms*, 107–116, 1998.
- [41] Separation-sensitive collision detection for convex objects. Written with Leonidas J. Guibas, Jorge Stolfi, and Li Zhang. *Proceedings of the 10th Annual ACM-SIAM Symposium on Discrete Algorithms*, 327–336, 1999.
- [42] Finite-resolution hidden surface removal. *Proceedings of the 11th Annual ACM-SIAM Symposium on Discrete Algorithms*, 901–909, 2000.
- [43] Flat-state connectivity of linkages under dihedral motions. Written with Greg Aloupis, Erik D. Demaine, Vida Dujmović, Stefan Langerman, Henk Meijer, Ileana Streinu, Joseph O'Rourke, Mark Overmars, Michael Soss, and Godfried Toussaint. *Proceedings of the 13th Annual International Symposium on Algorithms and Computation*, 369–380. *Lecture Notes in Computer Science* 2518, Springer-Verlag, 2002.
- [44] On the complexity of halfspace volume queries. Written with Erik D. Demaine and Stefan Langerman. *Proceedings of the 15th Canadian Conference on Computational Geometry*, 159–160, 2003.
- [45] Spacetime meshing with adaptive refinement and coarsening. Written with Reza Abedi, Shuo-Heng Chung, Yong Fan, Michael Garland, Damrong Guoy, Robert Haber, John Sullivan, Shripad Thite, and Yuan Zhou. *Proceedings of the 20th Annual ACM Symposium on Computational Geometry*, 300–309, 2004.
- [46] Efficient tradeoff schemes in data structures for querying moving objects. Written with Pankaj K. Agarwal, Lars Arge, and Hai Yu. *Proceedings of the 12th Annual European Symposium on Algorithms*, 4–15. *Lecture Notes in Computer Science* 3221, Springer-Verlag, 2004.
- [47] Automatic blocking scheme for structured meshing in 2d multiphase flow simulation. Written with Damrong Guoy. *Proceedings of the 13th Annual International Meshing Roundtable*, 121–132, 2004. (<http://www.andrew.cmu.edu/user/sowen/abstracts/Gu1003.html>)
- [48] Greedy optimal homotopy and homology generators. Written with Kim Whittlesey. *Proceedings of the 16th Annual ACM-SIAM Symposium on Discrete Algorithms*, 1038–1046, 2005.
- [49] Lower bounds for external algebraic decision trees. *Proceedings of the 16th Annual ACM-SIAM Symposium on Discrete Algorithms*, 755–761, 2005.
- [50] Tightening non-simple paths and cycles on surfaces. Written with Éric Colin de Verdière. *Proceedings of the 17th Annual ACM-SIAM Symposium on Discrete Algorithms*, 192–201, 2006. Full version submitted to *SIAM Journal on Computing*.
- [51] Minimum-cost coverage of point sets by disks. Written with Helmut Alt, Esther M. Arkin, Hervé Brönnimann, Sándor P Fekete, Christian Knauer, Jonathan Lenchner, Joseph S. B. Mitchell, and Kim Whittlesey. *Proceedings of the 22nd Annual ACM Symposium on Computational Geometry*, 449–458, 2006.

- [52] Necklaces, convolutions, and $X + Y$. Written with David Bremner, Timothy M. Chan, Erik D. Demaine, Ferran Hurtado, John Iacono, Stefan Langerman, Ileana Streinu, and Perouz Taslakian. *Proceedings of the 14th Annual European Symposium on Algorithms*, 160–171. *Lecture Notes in Computer Science* 4168, Springer-Verlag, 2006.
- [53] Empty-ellipse graphs. Written with Olivier Devillers and Xavier Goaoc. *Proceedings of the 19th Annual ACM-SIAM Symposium on Discrete Algorithms*, 1249–1257, 2008.
- [54] Testing contractibility in planar Rips complexes. Written with Erin W. Chambers and Pratik Worah. *Proceedings of the 24th Annual ACM Symposium on Computational Geometry*, 251–259, 2008.
- [55] Homology flows, cohomology cuts. Written with Erin W. Chambers and Amir Nayyeri. *Proceedings of the 41st Annual ACM Symposium on Theory of Computing*, 273–282, 2009. Full version invited and submitted to the special issue of *SIAM Journal on Computing* devoted to the symposium.
- [56] Minimum cuts and shortest homologous cycles. Written with Erin W. Chambers and Amir Nayyeri. *Proceedings of the 25th Annual ACM Symposium on Computational Geometry*, 377–385, 2009.
- [57] Maximum flows and parametric shortest paths in planar graphs. *Proceedings of the 21st Annual ACM-SIAM Symposium on Discrete Algorithms*, 794–804, 2010.

Current Submissions, Preprints, and Works in Progress

- [58] Shortest non-crossing walks in the plane. Written with Amir Nayyeri. Submitted to the 26th Annual ACM Symposium on Computational Geometry (2010). (<http://www.cs.uiuc.edu/~jeffe/pubs/noncrossing.html>).
- [59] Kinetic and multiple-source shortest paths in surface graphs. Work in progress with Sergio Cabello and Erin Chambers. Preliminary version (without my contributions) in *Proceedings of the 18th Annual ACM-SIAM Symposium on Discrete Algorithms*, 89–97, 2007.

Other Publications

- [60] New algorithms for minimum measure simplices and one-dimensional weighted Voronoi diagrams. Written with David Eppstein. Technical Report 92-55, U. C. Irvine, June 1992.
- [61] *Lower Bounds for Fundamental Geometric Problems*. Ph.D. dissertation, Computer Science Division, U.C. Berkeley, July 1996.
- [62] Plücker coordinates. *Ray Tracing News* 10(3), 1997. (<http://www.acm.org/tog/resources/RTNews/html/rtnv10n3.html>).
- [63] Finding longest arithmetic progressions. Unpublished manuscript, 1999. (<http://www.cs.uiuc.edu/~jeffe/pubs/arith.html>).
- [64] Guest editor's foreword. *Discrete & Computational Geometry* 42(1):1–2, 2009, special issue of invited papers from the 23rd Annual Symposium on Computational Geometry.
- [65] Algorithms Course Materials. Lecture notes (379 pages) and homework/exam problems (386 pages), most recently revised August 2009. (<http://www.cs.uiuc.edu/~jeffe/teaching/algorithms/>).

Teaching (all at UIUC)

Numbers in the right margin are student evaluations of instructor/course quality (max 5.0/5.0).

<i>Fall 2010</i>	CS 573: Graduate Algorithms [tentative]	
<i>Spring 2010</i>	CS 473: Undergraduate Algorithms	
<i>Fall 2009</i>	CS 598: Computational Topology	(4.56/4.44)
<i>Spring 2009</i>	CS 473: Undergraduate Algorithms	(4.76/4.15)
<i>Fall 2008</i>	CS 573: Graduate Algorithms	(4.65/4.33)
<i>Spring 2008</i>	CS 598: Computational Geometry*	(4.6/4.5)
<i>Fall 2007</i>	CS 173: Discrete Mathematical Structures [co-taught with Cinda Heeren]	(3.8/3.6)
<i>Spring 2007</i>	CS 473G: Graduate Algorithms*	(4.7/4.6)
<i>Fall 2006</i>	CS 473U: Undergraduate Algorithms*	(4.8/4.4)

<i>Spring 2006</i>	CS 573: Topics in Analysis of Algorithms: Advanced Data Structures	(4.7/4.3)
<i>Fall 2005</i>	CS 473G: Graduate Algorithms* ^o	(4.6/4.6)
<i>2004–2005</i>	— On sabbatical —	
<i>Spring 2004</i>	CS 373U: Combinatorial Algorithms, undergraduate section	(4.5/3.8)
<i>Fall 2003</i>	CS 473: Topics in Analysis of Algorithms: Algorithms for Massive Data	(no evaluations)
<i>Spring 2003</i>	CS 497: Concrete Models of Computation	(4.6/4.4)
<i>Fall 2002</i>	CS 373: Combinatorial Algorithms ^o <i>Enrollment: 180 undergraduates, 120 graduate students, and 20 online students.</i>	(4.5/4.1)
<i>Spring 2002</i>	CS 497: Computational Geometry	(4.8/4.4)
<i>Fall 2001</i>	CS 473: Topics in Analysis of Algorithms: Online Algorithms*	(5.0/4.8)
<i>Spring 2001</i>	CS 373: Combinatorial Algorithms ^{†o}	(4.9/4.7)
<i>Fall 2000</i>	CS 373: Combinatorial Algorithms*	(4.8/4.6)
<i>Spring 2000</i>	CS 497: Computational Geometry	(4.6/4.5)
<i>Fall 1999</i>	CS 173: Discrete Mathematical Structures	(4.4/4.1)
<i>Spring 1999</i>	CS 373: Combinatorial Algorithms* ^{oo}	(4.8/4.6)
<i>Fall 1998</i>	CS 497: Geometric Data Structures	(4.3/4.3)

* I was listed in the university’s “List of Teachers Ranked as Excellent by Their Students” (http://cte.illinois.edu/teacheval/ices/exc_teach.html) based on my teaching evaluations for these courses.

† I was listed in the university’s “List of Teachers Ranked as Excellent by Their Students” *with an outstanding rating* (top 10% campuswide) based on my teaching evaluations for this course.

^o Lecture notes [65] and videos from these courses were used for web-based classes as part of the department’s Illinois Internet Computer Science program (<http://www.cs.uiuc.edu/join/i2cs.htm>).

• In Fall 2003, CS 373 (Combinatorial Algorithms) was split into separate graduate and undergraduate sections. In Fall 2004, all 300- and 400-level UIUC computer science course numbers increased by 100 as part of a campus-wide course catalog reorganization. In Fall 2008, the graduate algorithms course was renumbered to 573, formally splitting it from the undergraduate algorithms course. Also in Fall 2008, the department switched from paper to electronic student evaluations.

Research Funding

<i>2009–2010</i>	NSF EAGER: Adaptive spacetime discontinuous Galerkin methods in 3d×time. Co-principal investigator. With Robert Haber (PI). [\$200,000]
<i>2009–2012</i>	NSF AF: Small: Optimization in Surface-Embedded Graphs (CCF-0915519). Sole principal investigator. [\$500,000]
<i>2005–2008</i>	NSF MSPA/MCS: Fundamental Geodesic Problems in Computational Topology (DMS-0528086). Principal investigator. With Robert Ghrist (co-PI) and Steve LaValle (co-PI). [\$500,000] One of three grants chosen from over 100 proposals.
<i>2002–2005</i>	NSF ITR: Making 3D Visibility Practical (CCR-0219594). Co-principal investigator. With Frédo Durand, John Hart (co-PI), and Steve LaValle (PI). [\$500,000]
<i>2001–2006</i>	NSF ITR/AP: Multiscale Models for Microstructure Simulation and Process Design (DMR-0121695). With Jonathan A. Dantzig (co-PI), Michael Garland, Robert Haber (PI), Robert L. Jerrard, Duane D. Johnson (co-PI), Laxmikant Kale, John Sullivan, and Daniel A. Tortorelli. [\$4,000,000]
<i>2001–2006</i>	NSF CAREER: Realistically Efficient Geometric Algorithms (CCR-0093348). Sole principal investigator. [\$325,000]
<i>1999–2002</i>	Alfred P. Sloan Research Fellowship [\$36,000]
<i>1996–1998</i>	NSF Mathematical Sciences Postdoctoral Research Fellowship (DMS-9627683). [\$75,000]

Plenary Lectures and Invited Tutorials

- Jan. 2011* Short course on computational topology, AMS-MAA Joint Mathematics Meeting, New Orleans, LA [planned]
- Aug. 2007* “Finding Small Holes: A Brief Foray into Computational Topology”, 10th Workshop on Algorithms and Data Structures, Halifax, NS
- Sept. 2005* “Computing (with) Curves on Surfaces”, 6th Max-Planck Advanced Course on the Foundations of Computer Science, Saarbrücken, Germany
- Aug. 2005* “Computing Optimal Graphs on Surfaces”, 17th Canadian Conference on Computational Geometry, Windsor, ON
- Aug. 2000* “Kinetic Data Structures”, DIMACS Summer School on Foundations of Wireless Networks and Applications, Piscataway, NJ

Other Invited Lectures

- 2010* The Ohio State University [planned]
- 2009* California Institute of Technology
- 2008* University of California, Irvine; University of Illinois, Urbana-Champaign, Mathematics Department Colloquium; Toyota Technological Institute
- 2005* AT&T Labs, Florin Park, NJ; Courant Institute of Mathematical Sciences; École Normale Supérieure; Freie Universität Berlin (twice); Universitat Politècnica de Catalunya; University of Århus; University of Ljubljana; University of Waterloo
- 2004* École Normale Supérieure; Freie Universität Berlin; LORIA/INRIA Lorraine; Polytechnic University; Université Libre de Bruxelles
- 2002* Duke University; Sandia National Laboratory; Stanford University
- 2001* Los Alamos National Laboratory; McGill University; The Ohio State University; University of Waterloo
- 2000* Duke University; INRIA Sophia-Antipolis
- 1999* IBM Almaden Research Center
- 1998* Duke University (twice); The Johns Hopkins University; Massachusetts Institute of Technology; Middlebury College; University of Illinois at Urbana-Champaign (twice)
- 1997* 28th Computational Geometry Day, Courant Institute of Mathematical Sciences; The Johns Hopkins University; University of Maryland, College Park
- 1996* Duke University; Xerox Palo Alto Research Center
- 1994* Freie Universität Berlin; Max-Planck-Institut für Informatik, Saarbrücken (twice); Universiteit Utrecht
- 1993* NSF Regional Geometry Institute, Smith College

Conference and Workshop Presentations

- 2010* 21st ACM-SIAM Symposium on Discrete Algorithms, San Francisco, CA [57]
Dagstuhl Seminar on Data Structures, Schloß Dagstuhl, Wadern, Germany (planned)
SIAM Conference on Discrete Mathematics, minisymposium on topological graph theory, Austin, TX [planned]
- 2009* Dagstuhl Seminar on Computational Geometry, Schloß Dagstuhl, Wadern, Germany [55]
- 2008* 19th ACM-SIAM Symposium on Discrete Algorithms, San Francisco, CA (twice) [53] [15]
24th Annual ACM Symposium on Computational Geometry, College Park, MD [14]
- 2007* 18th ACM-SIAM Symposium on Discrete Algorithms, New Orleans, LA (substitute speaker)
- 2005* 16th ACM-SIAM Symposium on Discrete Algorithms, Vancouver, BC (twice) [48] [49]
Carleton-Eindhoven Workshop on Computational Geometry, Gatineau Park, Québec [9]
8th US National Congress on Computational Mechanics, Austin, TX [45]
- 2004* 20th Annual ACM Symposium on Computational Geometry, Brooklyn, NY [11]

- 2003 19th Annual ACM Symposium on Computational Geometry, San Diego, CA [9]
 DIMACS Workshop on Surface Reconstruction, Piscataway, NJ [7] [25]
 International Workshop on 3D Object Recognition, Taormina, Sicily
 4th Symposium on Trends in Unstructured Mesh Generation, Albuquerque, NM [27]
- 2002 DIMACS Workshop on Algorithmic Issues in Modeling Motion, Piscataway, NJ [6]
 11th International Meshing Roundtable, Ithaca, NY [27]
 18th Annual ACM Symposium on Computational Geometry, Barcelona, Spain [8]
 13th Annual ACM-SIAM Symposium on Discrete Algorithms, San Francisco, CA [25]
- 2001 Dagstuhl Seminar on Computational Geometry, Schloß Dagstuhl, Wadern, Germany [7]
 11th Fall Workshop on Computational Geometry, Brooklyn, NY [25]
 17th ACM Symposium on Computational Geometry, Boston, MA [7]
- 2000 19th ACM Symposium on Principles of Database Systems, Dallas, TX [6]
 11th ACM-SIAM Symposium on Discrete Algorithms, San Francisco, CA [42]
- 1999 10th ACM-SIAM Symposium on Discrete Algorithms, Baltimore, MD [41]
- 1998 3rd CGC Workshop on Computational Geometry, Providence, RI [41]
 14th ACM Symposium on Computational Geometry, Minneapolis, MN [2]
 17th ACM Symposium on Principles of Database Systems, Seattle, WA [3]
 9th ACM-SIAM Symposium on Discrete Algorithms, San Francisco, CA [40]
- 1997 Dagstuhl Seminar on Computational Geometry, Schloß Dagstuhl, Wadern, Germany [2]
 13th ACM Symposium on Computational Geometry, Nice, France [20]
- 1996 37th IEEE Symposium on Foundations of Computer Science, Burlington, VT [39]
 1st CGC Workshop on Computational Geometry, Baltimore, MD [39]
 12th ACM Symposium on Computational Geometry, Philadelphia, PA [18]
- 1995 5th MSI/SUNYSB Workshop on Computational Geometry, Stony Brook, NY [18]
 7th Canadian Conference on Computational Geometry, Québec City, QC [38]
 11th ACM Symposium on Computational Geometry, Vancouver, BC [1]
 6th ACM-SIAM Symposium on Discrete Algorithms, San Francisco, CA [19]
- 1994 Combinatorial Games Workshop, Mathematical Sciences Research Institute, Berkeley, CA [34]
- 1993 34th IEEE Symposium on Foundations of Computer Science, Palo Alto, CA [17]
 4th ACM-SIAM Symposium on Discrete Algorithms, Austin, TX [16]

Departmental and University Service

Theses supervised

- Aparna Sundar, M.S. 2009. *More Homology Flows*.
- Tracy Grauman, M.S. 2008. *Making Sense of Making Change*. Currently at athenahealth.
- **Erin Wolf Chambers, Ph.D. 2008.** *Finding Interesting Topological Features*. Currently an assistant professor of mathematics and computer science at St. Louis University, St. Louis, Missouri.
- Pratik Worah, M.S. 2008 (Applied Mathematics). *Finding Nontrivial Cycles in Topological Spaces*. Currently at Google.
- Kevin Milans, M.S. 2006. *The Complexity of Graph Pebbling*. Currently a PhD student in mathematics at UIUC (PhD expected 2010).
- **David Bunde, Ph.D. 2006.** *Scheduling and Admission Control*. Currently an assistant professor of computer science at Knox College, Galesburg, Illinois.
- **Shripad Thite, Ph.D. 2005.** *Spacetime Meshing for Discontinuous Galerkin Methods*. Currently at Google.
- Dan Cranston, M.S. 2003. *Coloring for Efficient Computation of Jacobians*. Currently a postdoc at DIMACS/Bell Labs. Becoming an assistant professor of mathematics and computer science at Virginia Commonwealth University in Fall 2009.
- Amit K. Patel, M.S. 2003. *Line Transversals in \mathbb{R}^3* . Currently a PhD student at Duke University and the Institute of Science and Technology, Austria (PhD expected 2011).
- David Bunde, M.S. 2002. *Approximating Total Flow Time*. See above.

- Matthew Hayward, M.S. 2002. *Lower Query Bounds in the Quantum Oracle Model*.
- Luigi Marini, B.S. 2002. *Edge-Coloring Graphs*. Currently a research programmer at NCSA.
- **Alper Üngör, Ph.D. 2002** (co-advised with Shang-Hua Teng). *Parallel Delaunay Refinement and Space-Time Meshing*. Currently an assistant professor of computer science at the University of Florida, Gainesville.
 - David J. Kuck Outstanding Ph.D. Thesis Award, UIUC Computer Science Department, 2003.
 - National Science Foundation CAREER award, 2009–2014.

Current Ph.D. students

- Kyle Fox
- Amir Nayyeri

Other dissertation committees (*de jure advisor)

- Current students: Doug King, Nitish Korula
- Ph.D. 2009: Bill Cochran, Evan VanderZee (Mathematics), Michael Wolf, Feida Zhu
- Ph.D. 2008: Hamid Chitsaz, Gio Kao, Stephen Kloder, Anna Yershova
- Ph.D. 2007: Ke Chen, Dan Cranston*, Shen Dong, Xinlai Ni, Jason O’Kane
- Ph.D. 2006: Svetlana Lazebnik, Bardia Sadri
- Ph.D. 2005: Peng Cheng, Sung-Il Pae, Eric Shaffer
- Ph.D. 2004: Fred Rothganger
- Ph.D. 2002: Derek Armstrong (Industrial Engineering), Tanya Berger-Wolf, Ho-Lun (Alan) Cheng*,
- Ph.D. 2001: Damrong Guoy*, Peter Leven (Electrical and Computer Engineering), Ali Pinar, Radhika Ramamurthi (Mathematics), Afra Zomorodian*
- Ph.D. 2000: Xiangyang Li
- Ph.D. 1999: André Kündgen (Mathematics)

Departmental committees

- Advisory, 2000–2001, 2001–2003 (elected by the faculty, two-year terms)
- Building, 2000–2001
- Courses and curricula, 2000–2001
- Faculty recruiting, 2000–2004, 2006–2009
- Fellowships, assistantships, and admissions, 1999–2000, 2002–2004
- Teaching evaluation and improvement, 2001–2002, 2005–2006, *Chair* 2006–2007

Other departmental service

- Area chair, algorithms and theoretical computer science, since Fall 2005
- Graduate advisor since 2000
- Mathematics department liaison, 2005–2007
- Undergraduate advisor since 2001

Other university service

- Applied Mathematics Program steering committee, Department of Mathematics, 2005–2006
- Committee on mathematics and its applications, Department of Mathematics, 2002–2003
- Computer science department head search committee, College of Engineering, 2007–2009
- Engineering-Mathematics Liason committee, College of Engineering, since 2007
- Senate of the Urbana-Champaign Campus, 2005–2007, 2009–2011 (elected by the computer science faculty)
 - General University Policy committee, 2009–2011

Professional Service

Editorial service

- Member of the editorial board of *SIAM Journal on Computing* since January 2010
- Member of the editorial board of *Journal on Computational Geometry* since inception in June 2009

- Guest associate editor (with Scott Aaronson, Mohammad Mahdian, R. Ravi, and Emanuele Viola), *SIAM Journal on Computing*, special issue of invited papers from the 49th IEEE Symposium on Foundations of Computer Science, to appear in 2010
- Guest editor, *Discrete & Computational Geometry* 42(1), 2009, special issue of invited papers from the 23rd Annual ACM Symposium on Computational Geometry [64]
- Member of the editorial board of *Discrete & Computational Geometry* since January 2007
- CoRR/ArXiv moderator for Computational Geometry (CS/CG) and Discrete Mathematics (CS/DM) since January 2007; see (<http://arxiv.org/corr/home>)

Conference and workshop committees (*Submissions not accepted from committee members)

- Program committee, 21st Canadian Conference on Computational Geometry (2009)
- Program committee, 49th IEEE Symposium on Foundations of Computer Science (2008)*
- International program committee, 13th ACM Symposium on Solid and Physical Modeling (2008)
- Program committee, 19th Canadian Conference on Computational Geometry (2007)
- **Steering committee**, Annual ACM Symposium on Computational Geometry, 2006–2009 (elected by the research community)
- **Program committee chair**, 23rd Annual ACM Symposium on Computational Geometry (2007)*
- Program committee, 18th Annual ACM-SIAM Symposium on Discrete Algorithms (2007)*
- Program committee, 47th IEEE Symposium on Foundations of Computer Science (2006)*
- Program committee, 10th Scandinavian Workshop on Algorithm Theory (2006)*
- Program committee, 15th Annual Fall Workshop on Computational Geometry and Visualization (2005)
- Minisymposium organizer, SIAM Conference on Discrete Mathematics (2004)
- Program committee, 14th Annual ACM-SIAM Symposium on Discrete Algorithms (2003)*
- **Steering committee**, Annual ACM Symposium on Computational Geometry, 2001–2003 (elected by the research community)
- Program committee, 11th Annual International Symposium on Algorithms and Computation (2000)*
- Program committee, theory track, 16th Annual ACM Symposium on Computational Geometry (2000)*
- **Video Review committee chair**, 15th Annual ACM Symposium on Computational Geometry (1999)
- Organizing committee, 7th Annual Fall Workshop on Computational Geometry (1997)

External dissertation committees

- Masud Hasan, Ph.D. 2005, University of Waterloo
- Xavier Goaoc, Ph.D. 2004, Université de Nancy 2

Reviewing and refereeing

- **Proposal reviewer/panelist** for the National Science Foundation (DMS and CCR), the Army Research Office, the Department of Defense (EPSCoR), the Israeli Science Foundation, and the Netherlands Organisation for Scientific Research (NWO)
- **Referee** for *ACM Transactions on Algorithms*; *ACM Transactions on Database Systems*; *Algorithmica*; *Computational Geometry: Theory and Applications*; *Computational Statistics and Data Analysis*; *Discrete & Computational Geometry*; *Discrete Mathematics*; *Engineering with Computers*; *Graphical Models and Image Processing*; *IEEE Transactions on Dependable and Secure Computing*; *IEEE Transactions on Pattern Recognition and Machine Intelligence*; *IEEE Transactions on Robotics and Automation*; *Information Processing Letters*; *International Journal of Computational Geometry and Applications*; *International Journal of Robotics Research*; *Journal of the ACM*; *SIAM Journal on Computing*; and *Software: Practice & Experience*
- **Book reviewer** for Princeton University Press
- **External reviewer** for ACM-SIAM Symposium on Discrete Algorithms [SODA] (1998, 1999, 2002, 2004, 2005, 2006, 2008, 2009, 2010); ACM Symposium on Computational Geometry [SOCG] (1995, 1996, 2001, 2002, 2003, 2004, 2005, 2006, 2009, 2010); ACM Symposium on Solid Modeling and Applications (1999); ACM Symposium on Theory of Computing [STOC] (1999, 2001, 2004, 2005, 2006); Conference on Algorithms and Data Structures [WADS] (2007); Eurographics (2002); European Symposium on Algorithms

[ESA] (2002, 2004, 2005); Fall Workshop on Computational Geometry (1996); IEEE Symposium on Foundations of Computer Science [FOCS] (1994, 1996, 1998, 1999, 2002, 2004, 2007); IEEE Conference on Automation Science and Engineering [CASE] (2008); International Colloquium on Automata, Languages, and Programming [ICALP] (2008); International Meshing Roundtable (2000, 2002, 2003, 2004, 2008); International Symposium on Experimental Algorithms [SEA] (2009); International Symposium on Theoretical Aspects of Computer Science [STACS] (2000); Pacific Conference on Computer Graphics and Applications [PG] (2009); Robotics: Science and Systems Conference [RSS] (2009); SIAM Workshop on Algorithms and Experiments [ALENEX] (2008); and SIGGRAPH (2001, 2002, 2003, 2005, 2007)