

Jeff Erickson

Curriculum Vitæ

Department of Computer Science
University of Illinois at Urbana-Champaign
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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, 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

- 2010–present Professor, Department of Computer Science, University of Illinois at Urbana-Champaign
- 2004–2010 Associate professor (with tenure), Department of Computer Science, University of Illinois at Urbana-Champaign
- 1998–2004 Assistant professor, Department of Computer Science, University of Illinois at Urbana-Champaign
- 1996–1998 Research associate (postdoc), 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
- 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

Visiting Positions

- Oct 2011, Mar 2012 Visiting professor, École normale supérieure, Paris, France
- Aug 2011–Jun 2012 Institute of Science and Technology, Austria
- Mar–Jun 2005 Fachbereich Informatik, Freie Universität Berlin, Germany
- Nov 2004–Feb 2005 Computer Science Department, Polytechnic University, Brooklyn, New York
- Aug–Nov 2004 Research associate, Laboratoire lorrain de recherche en informatique et ses applications (LORIA), Nancy, France
- Aug–Dec 1994 Research assistant, Fachbereich Informatik, Universität des Saarlandes, and (unofficially) Max-Planck-Institut für Informatik, Saarbrücken, Germany

Awards and Honors

National

- 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, Spring 2008, Spring 2010, Fall 2010, and Spring 2011

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

- April 2010 Xerox Award for (Senior) Faculty Research, College of Engineering, University of Illinois at Urbana-Champaign
 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.illinois.edu/~jeffe/pubs/>.

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

*Marked coauthors were students at the time of submission.

Invited Refereed Papers

- [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 Symposium on Computational Geometry. Extended abstract in *Proceedings of the 11th Annual 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 Symposium on Computational Geometry. Extended abstract in *Proceedings of the 14th Annual 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 Symposium on Computational Geometry. Extended abstract in *Proceedings of the 17th Annual Symposium on Computational Geometry*, 96–105, 2001.
- [8] Optimally cutting a surface into a disk. Written with Sariel Har-Peled. *Discrete & Computational Geometry* 31(1):37–59, 2004, special issue of invited papers from the 18th Annual Symposium on Computational Geometry. Extended abstract in *Proceedings of the 18th Annual 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 Symposium on Computational Geometry. Extended abstract in *Proceedings of the 19th Annual 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 Symposium on Computational Geometry. Extended abstract in *Proceedings of the 20th Annual Symposium on Computational Geometry*, 10–16, 2004.
- [11] 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. Invited paper for special issue on adaptive analysis.
- [12] On the least median square problem. Written with Sariel Har-Peled and David Mount. *Discrete & Computational Geometry*, 36(4):593–607, 2006, special issue of invited papers from the 20th Annual Symposium on Computational Geometry. Extended abstract in *Proceedings of the 20th Annual Symposium on Computational Geometry*, 273–279, 2004.
- [13] 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.
- [14] 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 Symposium on Computational Geometry*, 421–429, 2006.
- [15] 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* 43(3):295–311, 2010, special issue of invited papers from the 24th Annual Symposium on Computational Geometry. Extended abstract in *Proceedings of the 24th Annual Symposium on Computational Geometry*, 101–109, 2008.
- [16] Finding one tight cycle. Written with Sergio Cabello, Matt de Vos, and Bojan Mohar. *ACM Transactions on Algorithms* 6(4):article 61, 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.

- [17] Homology flows, cohomology cuts. Written with Erin W. Chambers* and Amir Nayyeri*. To appear in *SIAM Journal on Computing*, 2011, special issue of invited papers from the 41st Annual ACM Symposium on Theory of Computing. *Proceedings of the 41st Annual ACM Symposium on Theory of Computing*, 273–282, 2009.
- [18] Combinatorial optimization of cycles and bases. To appear in *Computational Topology*, Afra Zomorodian, editor. *Proceedings of Symposia in Applied Mathematics*, American Mathematical Society, 2012. Invited survey for an AMS Short Course at the 2011 Joint Mathematics Meetings. (<http://www.cs.illinois.edu/~jeffe/pubs/optcycles.html>).

Other Refereed Journal Papers

- [19] 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.
- [20] 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.
- [21] 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 Symposium on Computational Geometry*, 1–9, 1996.
- [22] 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.
- [23] Space-time tradeoffs for emptiness queries. *SIAM Journal on Computing* 29(6):1968–1996, 2000. Extended abstract in *Proceedings of the 13th Annual Symposium on Computational Geometry*, 304–313, 1997. Includes results from [42].
- [24] Flipturning 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.
- [25] Algorithmic issues in modeling motion. Written with Pankaj K. Agarwal, Leonidas J. Guibas, and 18 others. *ACM Computing Surveys* 34(4):550–572, 2002.
- [26] 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.
- [27] 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.
- [28] 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.
- [29] 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.
- [30] 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.

- [31] 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.
- [32] Centerpoint theorems for wedges. Written with Ferran Hurtado and Pat Morin. *Discrete Mathematics and Theoretical Computer Science* 11(1):45–54, 2009.
- [33] Vietoris-Rips complexes of planar point sets. Written with Erin W. Chambers*, Vin de Silva, and Robert Ghrist. *Discrete & Computational Geometry* 44(1):75–90, 2010.
- [34] Computing the shortest essential cycle. Written with Pratik Worah*. *Discrete & Computational Geometry* 44(4):912–930, 2010.
- [35] Tightening non-simple paths and cycles on surfaces. Written with Éric Colin de Verdière. *SIAM Journal on Computing* 39(8):3784–3813, 2010. Extended abstract in *Proceedings of the 17th Annual ACM-SIAM Symposium on Discrete Algorithms*, 192–201, 2006.

Refereed Book Chapters

- [36] Sowing games. *Games of No Chance*, Richard J. Nowakowski, editor. *Mathematical Sciences Research Institute Publications* 29, Cambridge University Press, 1996, pp. 287–297.
- [37] 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.
- [38] 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.
- [39] 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.
- [40] 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 Symposium on Computational Geometry*, 237–243, 2002.

Conference Papers with no Journal Version

- [41] 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.illinois.edu/~jeffe/pubs/relative.html>).
- [42] 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 [23].
- [43] 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.
- [44] 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.
- [45] Finite-resolution hidden surface removal. *Proceedings of the 11th Annual ACM-SIAM Symposium on Discrete Algorithms*, 901–909, 2000.
- [46] 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.
- [47] 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.

- [48] 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 Symposium on Computational Geometry*, 300–309, 2004.
- [49] 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.
- [50] 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>)
- [51] Greedy optimal homotopy and homology generators. Written with Kim Whittlesey. *Proceedings of the 16th Annual ACM-SIAM Symposium on Discrete Algorithms*, 1038–1046, 2005.
- [52] Lower bounds for external algebraic decision trees. *Proceedings of the 16th Annual ACM-SIAM Symposium on Discrete Algorithms*, 755–761, 2005.
- [53] 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 Symposium on Computational Geometry*, 449–458, 2006.
- [54] Necklaces, convolutions, and $X + Y$. Written with David Bremner, Timothy M. Chan, Erik D. Demaine, Ferran Hurtado, John Iacono, Stefan Langerman, and Perouz Taslakian*. *Proceedings of the 14th Annual European Symposium on Algorithms*, 160–171. *Lecture Notes in Computer Science* 4168, Springer-Verlag, 2006.
- [55] Empty-ellipse graphs. Written with Olivier Devillers and Xavier Goaoc. *Proceedings of the 19th Annual ACM-SIAM Symposium on Discrete Algorithms*, 1249–1257, 2008.
- [56] Testing contractibility in planar Rips complexes. Written with Erin W. Chambers* and Pratik Worah*. *Proceedings of the 24th Annual Symposium on Computational Geometry*, 251–259, 2008.
- [57] Minimum cuts and shortest homologous cycles. Written with Erin W. Chambers* and Amir Nayyeri*. *Proceedings of the 25th Annual Symposium on Computational Geometry*, 377–385, 2009.
- [58] Maximum flows and parametric shortest paths in planar graphs. *Proceedings of the 21st Annual ACM-SIAM Symposium on Discrete Algorithms*, 794–804, 2010.
- [59] Shortest non-crossing walks in the plane. Written with Amir Nayyeri*. *Proceedings of the 22nd Annual ACM-SIAM Symposium on Discrete Algorithms*, 297–308, 2011.
- [60] Minimum cuts and shortest non-separating cycles via homology covers. Written with Amir Nayyeri*. *Proceedings of the 22nd Annual ACM-SIAM Symposium on Discrete Algorithms*, 1166–1176, 2011.
- [61] Computing replacement paths in surface embedded graphs. Written with Amir Nayyeri*. *Proceedings of the 22nd Annual ACM-SIAM Symposium on Discrete Algorithms*, 1347–1354, 2011.
- [62] Shortest non-trivial cycles in directed surface graphs. *Proceedings of the 27th Annual Symposium on Computational Geometry*, 236–243, 2011.
- [63] Global minimum cuts in surface-embedded graphs. Written with Kyle Fox* and Amir Nayyeri*. *Proceedings of the 23rd Annual ACM-SIAM Symposium on Discrete Algorithms*, 1309–1318, 2012.

Current Submissions, Preprints, and Works in Progress

- [64] Tracing compressed curves in triangulated surfaces. Work in progress with Amir Nayyeri*. Submitted to the 28th Symposium on Computational Geometry (2012).
- [65] Multiple-source shortest paths in surface-embedded 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.
- [66] Topological hexahedral meshing of multiply-connected domains. Work in progress.
- [67] *Aspects of Computational Topology*. Book in progress, publication expected in 2013.

Other Publications

- [68] New algorithms for minimum measure simplices and one-dimensional weighted Voronoi diagrams. Written with David Eppstein. Technical Report 92-55, Department of Information and Computer Science, University of California, Irvine, June 1992.
- [69] *Lower Bounds for Fundamental Geometric Problems*. Ph.D. dissertation, Computer Science Division, University of California, Berkeley, July 1996.
- [70] Plücker coordinates. *Ray Tracing News* 10(3), 1997. (<http://www.acm.org/tog/resources/RTNews/html/rtnv10n3.html>).
- [71] Finding longest arithmetic progressions. Unpublished manuscript, 1999. (<http://www.cs.illinois.edu/~jeffe/pubs/arith.html>).
- [72] 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.
- [73] Special section on foundations of computer science [guest editors' foreword]. Written with Scott Aaronson, Mohammad Mahdian, R. Ravi, and Emanuele Viola. *SIAM Journal on Computing* 40(3):770, 2011, special section of invited papers from the 49th IEEE Symposium on Foundations of Computer Science (2008).
- [74] Algorithms Course Materials. Lecture notes (374 pages) and homework/exam problems (440 pages), most recently revised January 2011. (<http://www.cs.illinois.edu/~jeffe/teaching/algorithms/>).

Teaching (all at the University of Illinois)

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

<i>Fall 2010</i>	CS 473: Undergraduate Algorithms [tentative]	
<i>2011–2012</i>	— On sabbatical —	
<i>Spring 2011</i>	CS 598: Special Topics: Advanced Data Structures*	(4.9/4.8)
<i>Fall 2010</i>	CS 573: Graduate Algorithms*	(4.9/4.7)
<i>Spring 2010</i>	CS 473: Undergraduate Algorithms*	(4.73/4.46)
<i>Fall 2009</i>	CS 598: Special Topics: 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: Special Topics: 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: Undergraduate Algorithms	(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: Special Topics: 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: Special Topics: 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: Special Topics: 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: Special Topics: Geometric Data Structures	(4.3/4.3)

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

° Lecture notes [74] and videos from these courses were used for web-based classes as part of the department's Illinois Internet Computer Science program (<http://i2cs.cs.illinois.edu>).

Funding

<i>2009–2011</i>	NSF EAGER: Adaptive spacetime discontinuous Galerkin methods in 3d×time (OCI-0948393). 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

<i>Jan. 2011</i>	<i>Optimizing cycles and bases.</i> Short course on computational topology. AMS-MAA Joint Mathematics Meeting, New Orleans, LA [18]
<i>Aug. 2010</i>	<i>Computational topology: Shortest paths, flows, and cuts.</i> Workshop on Barriers in Computational Complexity, Princeton Center for Computational Intractability, Princeton, NJ
<i>Aug. 2007</i>	<i>Finding small holes: A brief foray into computational topology.</i> 10th Workshop on Algorithms and Data Structures, Halifax, NS
<i>Sept. 2005</i>	<i>Computing (with) curves on surfaces.</i> 6th Max-Planck Advanced Course on the Foundations of Computer Science, Saarbrücken, Germany
<i>Aug. 2005</i>	<i>Computing optimal graphs on surfaces.</i> 17th Canadian Conference on Computational Geometry, Windsor, ON
<i>Aug. 2000</i>	<i>Kinetic data structures.</i> DIMACS Summer School on Foundations of Wireless Networks and Applications, Piscataway, NJ

Other Invited Lectures

<i>2012</i>	Univerzita Komenského v Bratislave (planned); École Normale Supérieure (planned); Institute of Science and Technology Austria
<i>2011</i>	Århus Universitet/MADALGO; École Normale Supérieure; Institute of Science and Technology Austria; Universität des Saarlandes

- 2010 The Ohio State University; Western Kentucky University
- 2009 California Institute of Technology
- 2008 University of California, Irvine; University of Illinois, Urbana-Champaign, Mathematics Department Colloquium; Toyota Technological Institute
- 2005 Århus Universitet; AT&T Labs, Florin Park, NJ; Courant Institute of Mathematical Sciences; École Normale Supérieure; Freie Universität Berlin (twice); Universitat Politècnica de Catalunya; University of Waterloo; Univerza v Ljubljana
- 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

Departmental and University Service

Current students

- [Kyle Fox](#), Ph.D. expected 2014
- [Amir Nayyeri](#), Ph.D. expected 2012

Former Ph.D. students

- [Erin Wolf Chambers](#), Ph.D. 2008. *Finding Interesting Topological Features*.
 - Assistant professor of mathematics and computer science at St. Louis University, St. Louis, Missouri.
 - National Science Foundation CAREER award, 2011–2016.
- [David Bunde](#), Ph.D. 2006. *Scheduling and Admission Control*.
 - Assistant professor of computer science at Knox College, Galesburg, Illinois
 - Junior Scientist of the Year, Quad City Engineering and Science Council, 2011
- [Shripad Thite](#), Ph.D. 2005. *Spacetime Meshing for Discontinuous Galerkin Methods*.
 - Software engineer at Google, Mountain View, California
- [Alper Üngör](#), Ph.D. 2002 (co-advised with Shang-Hua Teng). *Parallel Delaunay Refinement and Space-Time Meshing*.
 - Associate 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
 - Awarded tenure in 2010

Former M.S. and B.S. students

- [Alexander Mont](#), M.S. 2011. *Adaptive Unstructured Spacetime Meshing for Four-Dimensional Spacetime Discontinuous Galerkin Finite Element Methods*. Numerica Corporation, Loveland, Colorado.
- Dan Larkin, B.S. 2011. *An Experimental Comparison of Heaps*. Ph.D. student in computer science at Princeton.

- Kyle Fox, M.S. 2010. *Online Scheduling on Identical Machines using SRPT*. Ph.D. student in computer science at UIUC, advised by me.
- Aparna Sundar, M.S. 2009. *More Homology Flows*.
- Tracy Grauman, M.S. 2008. *Making Sense of Making Change*. Developer at athenahealth, Watertown, MA.
- Pratik Worah, M.S. 2008 (Applied Mathematics). *Finding Nontrivial Cycles in Topological Spaces*. Ph.D. student in computer science at the University of Chicago.
- Kevin Milans, M.S. 2006. *The Complexity of Graph Pebbling*. Ph.D. 2010 in Mathematics, advised by Doug West. Visiting assistant professor of mathematics at the University of South Carolina.
- Dan Cranston, M.S. 2003. *Coloring for Efficient Computation of Jacobians*. Ph.D. 2007, advised by Doug West. Assistant professor of mathematics and computer science at Virginia Commonwealth University.
- Amit K. Patel, M.S. 2003. *Line Transversals in \mathbb{R}^3* . Ph.D. 2010, Duke University, advised by Herbert Edelsbrunner. Postdoc at INRIA-Saclay. Postdoctoral associate in mathematics at Rutgers University.
- 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*. Research programmer at NCSA.

Other dissertation committees (*de jure advisor)

- Current students: Sungjin Im, Doug King
- Ph.D. 2010: 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)

Major departmental committees

- Advisory, 2000–2001, 2001–2003 (elected by the faculty, two-year terms)
- Building, 2000–2001
- Faculty recruiting, 2000–2004, 2006–present
- Fellowships, assistantships, and admissions, 1999–2000, 2002–2004
- Promotions and tenure, 2010–present
- Teaching evaluation and improvement, 2001–2002, 2005–2006, *Chair* 2006–2007

Other departmental service

- Algorithms and theoretical computer science area chair, 2005–2011
- Graduate advisor, 2000–present
- Mathematics department liaison, 2005–2007
- Undergraduate advisor, 2001–present

Other university service

- Senate of the Urbana-Champaign Campus, 2005–2007, 2009–2011 (elected by Computer Science faculty)
 - General University Policy committee, 2009–2011

- College of Engineering committees
 - Department of Computer Science head search, 2007–2009
 - Engineering-Mathematics liaison, 2007–2011
 - Teaching evaluation and improvement, 2009–2011
- Department of Mathematics committees
 - Applied Mathematics Program steering committee, 2005–2006
 - Mathematics and its applications, 2002–2003

Professional Service

Editorial service

- Guest editor (with Scott Aaronson, Mohammad Mahdian, R. Ravi, and Emanuele Viola), *SIAM Journal on Computing* 40(3), 2011, special section of invited papers from the 49th IEEE Symposium on Foundations of Computer Science (2008) [73]
- Member of the editorial board of *SIAM Journal on Computing* since January 2010
- Guest editor, *Discrete & Computational Geometry* 42(1), 2009, special issue of invited papers from the 23rd Annual Symposium on Computational Geometry (2007) [72]
- Member of the **founding** editorial board of *Journal on Computational Geometry* since June 2009
- 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 (<http://arxiv.org/corr/home>)

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

- Program committee, 24th Canadian Conference on Computational Geometry (2012)* [tentative]
- Organizing committee, Computational Geometry: Young Researchers Forum (2012)*
- Program committee, 3rd Symposium on Innovations in Theoretical Computer Science (2012)
- 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**, Symposium on Computational Geometry, 2006–2009 (elected by the SOCG community)
- **Program committee chair**, 23rd Annual 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**, Symposium on Computational Geometry, 2001–2003 (elected by the SOCG community)
- Program committee, 11th Annual International Symposium on Algorithms and Computation (2000)*
- Program committee, theory track, 16th Annual Symposium on Computational Geometry (2000)*
- **Video Review committee chair**, 15th Annual Symposium on Computational Geometry (1999)
- Organizing committee, 7th Annual Fall Workshop on Computational Geometry (1997)

External dissertation committees

- Shay Mozes, Ph.D. expected 2012, Brown University
- Hayim Shaul, Ph.D. 2012, Tel Aviv University
- Kostas Tsakalidis, Ph.D. 2011, Århus Universitet

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

Reviewing and refereeing

- **Book reviewer** for Princeton University Press
- **Proposal panelist/reviewer** for the National Science Foundation (DMS, CCF, and GFRP), 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*; *Journal on Computational Geometry*; *Proceedings of Symposia in Applied Mathematics (AMS)*; *SIAM Journal on Computing*; and *Software: Practice & Experience*
- **External reviewer** for ACM-SIAM Symposium on Discrete Algorithms [SODA] (1998, 1999, 2002, 2004, 2005, 2006, 2008, 2009, 2010, 2011, 2012); ACM Symposium on Solid Modeling and Applications (1999); ACM Symposium on Theory of Computing [STOC] (1999, 2001, 2004, 2005, 2006, 2011, 2012); Algorithms and Data Structures Symposium [WADS] (2007, 2011); Eurographics (2002); European Symposium on Algorithms [ESA] (2002, 2004, 2005, 2011); Fall Workshop on Computational Geometry (1996); IEEE Symposium on Foundations of Computer Science [FOCS] (1994, 1996, 1998, 1999, 2002, 2004, 2007, 2011); IEEE Conference on Automation Science and Engineering [CASE] (2008); International Colloquium on Automata, Languages, and Programming [ICALP] (2008, 2010); International Meshing Roundtable [IMR] (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); SIGGRAPH (2001, 2002, 2003, 2005, 2007); and Symposium on Computational Geometry [SOCG] (1995, 1996, 2001, 2002, 2003, 2004, 2005, 2006, 2009, 2010, 2011, 2012)