Jeff Erickson

Curriculum Vitæ

Department of Computer Science
University of Illinois at Urbana-Champaign
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Research Interests

Algorithms, data structures, and lower bounds; computational and discrete geometry and topology; topological graph theory; combinatorial optimization; applications of geometry, topology, and optimization 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 (double major), May 1987

Employment

1998– Department of Computer Science, University of Illinois at Urbana-Champaign

- *2013–2016* Associate department head
- *2010–* Professor
- *2004–2010* Associate professor
- *1998–2004* Assistant professor

1996–1998 Postdoctoral 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

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 normal supèrieure, 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, Spring 2011, Fall 2012, Fall 2013, Fall 2014, Spring 2015*, Fall 2015, Spring 2016, Spring 2017*, Fall 2017, and Spring 2018*
List of Teachers Ranked as Excellent by Their Students, University of Illinois at Urbana-Champaign (*outstanding rating)

2017–2018 Education Innovation Fellow, College of Engineering, University of Illinois at Urbana-Champaign

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

— Research —

Publications

Almost all papers can be downloaded from http://jeffe.cs.illinois.edu/pubs/. Each paper is listed once, even if it has appeared in multiple versions. *Starred coauthors were students at the time of first submission. Unless indicated otherwise, each papers lists co-authors in alphabetical order, following standard practice in theoretical computer science. See also my publication profiles at ACM Digital Library, AMiner, DBLP, Google Scholar, Microsoft Academic Search, ORCID, and Scopus.

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. 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. 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. 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. 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. 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. 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. 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. 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. 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. With Erik D. Demaine, Danny Križanc, 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. 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. 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. 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. With Erin W. Chambers* and Amir Nayyeri*. *SIAM Journal on Computing* 41(6):1605–1634, 2012, special section of invited papers from the 41st Annual ACM Symposium on Theory of Computing. Extended abstract in *Proceedings of the 41st Annual ACM Symposium on Theory of Computing*, 273–282, 2009.

[18] Combinatorial optimization of cycles and bases. *Advances in Applied and Computational Topology*, Afra Zomorodian, editor. *Proceedings of Symposia in Applied Mathematics* 70, American Mathematical Society, 2012, pp. 195–228. Invited survey for an AMS Short Course at the 2011 Joint Mathematics Meetings.

[19] Tracing compressed curves in triangulated surfaces. With Amir Nayyeri*. *Discrete & Computational Geometry* 49(4):823–863, 2013, special issue of invited papers from the 28th Symposium on Computational Geometry. Extended abstract in *Proceedings of the 28th Symposium on Computational Geometry*, 131–140, 2012.

[20] Efficiently hex-meshing things with topology. *Discrete & Computational Geometry* 52(3):427–449, 2014, special issue of invited papers from the 29th Symposium on Computational Geometry. Extended abstract in *Proceedings of the 29th Annual Symposium on Computational Geometry*, 37–46, 2013.

[21] Recognizing weakly simple polygons. with Hugo Akitaya*, Greg Aloupis, and Csaba Tóth. *Discrete & Computational Geometry* 58(4):785–821, 2017, special issue of invited papers from the 32nd International Symposium on Computational Geometry. arXiv:1603.07401. Extended abstract in *Proceedings of the 32nd International Symposium on Computational Geometry*, 8:1–8:16, 2016.

[22] Untangling planar curves. With Hsien-Chih Chang*. *Discrete & Computational Geometry* 58(4):889–920, 2017, special issue of invited papers from the 32nd International Symposium on Computational Geometry. arXiv:1702.00146. Extended abstract in *Proceedings of the 32nd International Symposium on Computational Geometry*, 29:1–29:16, 2016. Winner of the SoCG 2016 Best Student Presentation Award.

Other Refereed Journal Papers

[23] Iterated nearest neighbors and finding minimal polytopes. 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.

[24] Better lower bounds on detecting affine and spherical degeneracies. 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.

[25] 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.

[26] 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.

[27] 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 [49].

[28] Flipturning polygons. 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.

[29] Algorithmic issues in modeling motion. With Pankaj K. Agarwal, Leonidas J. Guibas, and 18 others. *ACM Computing Surveys* 34(4):550–572, 2002.

[30] Preprocessing chains for dihedral rotations is hard or even impossible. With Michael A. Soss* and Mark Overmars. *Computational Geometry: Theory and Applications* 26(3):235–246, 2003.

[31] Kinetic collision detection for two simple polygons. 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.

[32] 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.

[33] Output-sensitive algorithms for computing nearest-neighbor decision boundaries. 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.

[34] Building space-time meshes over arbitrary spatial domains. 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.

[35] Capturing a convex object with three discs. 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.

[36] Centerpoint theorems for wedges. With Ferran Hurtado and Pat Morin. *Discrete Mathematics and Theoretical Computer Science* 11(1):45–54, 2009.

[37] Vietoris-Rips complexes of planar point sets. With Erin W. Chambers*, Vin de Silva, and Robert Ghrist. *Discrete & Computational Geometry* 44(1):75–90, 2010.

[38] Computing the shortest essential cycle. With Pratik Worah*. *Discrete & Computational Geometry* 44(4):912–930, 2010.

[39] Tightening non-simple paths and cycles on surfaces. 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.

[40] Multiple-source shortest paths in surface-embedded graphs. With Sergio Cabello and Erin W. Chambers. *SIAM Journal on Computing* 42(4):1542–1571, 2013. Preliminary version (without my contributions) in *Proceedings of the 18th Annual ACM-SIAM Symposium on Discrete Algorithms*, 89–97, 2007.

[41] Necklaces, convolutions, and $X+Y$. With David Bremner, Timothy M. Chan, Erik D. Demaine, Ferran Hurtado, John Iacono, Stefan Langerman, Mihai Pătraşcu, and Perouz Taslakian*. *Algorithmica*

69(2):294–314, 2014. Extended abstract (without Pătraşcu) in *Proceedings of the 14th Annual European Symposium on Algorithms*, 160–171. *Lecture Notes in Computer Science* 4168, Springer-Verlag, 2006.

[42] Unfolding and dissection of multiple cubes. With Zachary Abel*, Brad Ballinger, Erik D. Demaine, Martin L. Demaine, Adam Hesterberg*, Hiro Ito, Irina Kostitsyna, Jayson Lynch*, and Ryuhei Uehara. *Journal of Information Processing* 25:610–615, 2017, special issue of discrete and computational geometry, graphs, and games. Extended abstract in *Abstracts of the 19th Japan Conference on Discrete and Computational Geometry, Graphs, and Games*, 42–43, 2016.

Refereed Book Chapters

[43] Sowing games. *Games of No Chance*, Richard J. Nowakowski, editor. *Mathematical Sciences Research Institute Publications* 29, Cambridge University Press, 1996, pp. 287–297.

[44] 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.

[45] Geometric range searching and its relatives. 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.

[46] Arbitrarily large neighborly families of congruent symmetric convex 3-polytopes. 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.

[47] Vertex-unfoldings of simplicial manifolds. 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

[48] 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://jeffe.cs.illinois.edu/pubs/relative.html⟩.

[49] 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 [27].

[50] Kinetic binary space partitions for intersecting segments and disjoint triangles. With Pankaj K. Agarwal and Leonidas J. Guibas. *Proceedings of the 9th Annual ACM-SIAM Symposium on Discrete Algorithms*, 107–116, 1998.

[51] Separation-sensitive collision detection for convex objects. With Leonidas J. Guibas, Jorge Stolfi, and Li Zhang*. *Proceedings of the 10th Annual ACM-SIAM Symposium on Discrete Algorithms*, 327–336, 1999.

[52] Finite-resolution hidden surface removal. *Proceedings of the 11th Annual ACM-SIAM Symposium on Discrete Algorithms*, 901-909, 2000.

[53] Flat-state connectivity of linkages under dihedral motions. 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.

[54] On the complexity of halfspace volume queries. With Erik D. Demaine and Stefan Langerman. *Proceedings of the 15th Canadian Conference on Computational Geometry*, 159–160, 2003.

[55] Spacetime meshing with adaptive refinement and coarsening. 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.

[56] Efficient tradeoff schemes in data structures for querying moving objects. 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.

[57] Automatic blocking scheme for structured meshing in 2d multiphase flow simulation. With Damrong Guoy. *Proceedings of the 13th Annual International Meshing Roundtable*, 121–132, 2004. ⟨http://www.andrew.cmu.edu/user/sowen/abstracts/Gu1003.html⟩

[58] Greedy optimal homotopy and homology generators. With Kim Whittlesey. *Proceedings of the 16th Annual ACM-SIAM Symposium on Discrete Algorithms*, 1038–1046, 2005.

[59] Lower bounds for external algebraic decision trees. *Proceedings of the 16th Annual ACM-SIAM Symposium on Discrete Algorithms*, 755–761, 2005.

[60] Minimum-cost coverage of point sets by disks. 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.

[61] Empty-ellipse graphs. With Olivier Devillers and Xavier Goaoc. *Proceedings of the 19th Annual ACM-SIAM Symposium on Discrete Algorithms*, 1249–1257, 2008.

[62] Testing contractibility in planar Rips complexes. With Erin W. Chambers* and Pratik Worah*. *Proceedings of the 24th Annual Symposium on Computational Geometry*, 251–259, 2008.

[63] Minimum cuts and shortest homologous cycles. With Erin W. Chambers* and Amir Nayyeri*. *Proceedings of the 25th Annual Symposium on Computational Geometry*, 377–385, 2009.

[64] Maximum flows and parametric shortest paths in planar graphs. *Proceedings of the 21st Annual ACM-SIAM Symposium on Discrete Algorithms*, 794–804, 2010.

[65] Shortest non-crossing walks in the plane. With Amir Nayyeri*. *Proceedings of the 22nd Annual ACM-SIAM Symposium on Discrete Algorithms*, 297–308, 2011.

[66] Minimum cuts and shortest non-separating cycles via homology covers. With Amir Nayyeri*. *Proceedings of the 22nd Annual ACM-SIAM Symposium on Discrete Algorithms*, 1166–1176, 2011.

[67] Computing replacement paths in surface embedded graphs. With Amir Nayyeri*. *Proceedings of the 22nd Annual ACM-SIAM Symposium on Discrete Algorithms*, 1347–1354, 2011.

[68] Shortest non-trivial cycles in directed surface graphs. *Proceedings of the 27th Annual Symposium on Computational Geometry*, 236–243, 2011.

[69] Global minimum cuts in surface-embedded graphs. With Kyle Fox* and Amir Nayyeri*. *Proceedings of the 23rd Annual ACM-SIAM Symposium on Discrete Algorithms*, 1309–1318, 2012.

[70] Transforming curves on surfaces redux. With Kim Whittlesey. *Proceedings of the 24th Annual ACM-SIAM Symposium on Discrete Algorithms*, 1646–1655, 2013.

[71] A near-optimal approximation algorithm for asymmetric TSP on embedded graphs. With Anastasios Sidiropoulos. *Proceedings of the 30th Annual Symposium on Computational Geometry*, 130–135, 2014.

[72] Detecting weakly simple polygons. With Hsien-Chih Chang* and Chao Xu*. *Proceedings of the 26th Annual ACM-SIAM Symposium on Discrete Algorithms*, 1655–1670, 2015. Full version at arXiv:1407.3340.

[73] Tightening curves on surfaces via local moves. With Hsien-Chih Chang*, David Letscher, Arnaud de Mesmay, Saul Schleimer, Stephan Tillmann, Eric Sedgwick, and Dylan Thurston. *Proceedings of the 29th Annual ACM-SIAM Symposium on Discrete Algorithms*, 121–135, 2018.

[74] Holiest minimum-cost paths and flows in surface graphs. With Kyle Fox and Luvsandondov Lkhamsuren*. *Proceedings of the 50th Annual ACM Symposium on Theory of Computing*, 1319–1332, 2018. arXiv:1804.01045.

Current Submissions and Preprints

[75] Lower bounds for planar electrical reduction. With Hsien-Chih Chang*. Preprint, July 2017. arXiv:1707.04683.

[76] Four vertex-disjoint paths in planar graphs. With Yipu Wang*. Preprint, April 2018.

[77] Topologically trivial closed walks in directed surface graphs. With Yipu Wang*. Submitted to the 30th Annual ACM-SIAM Symposium on Discrete Algorithms (2019).

Course Materials

[78] *Algorithms, Etc.* Lecture notes (639 pages) and homework/exam/discussion problems (611 pages), most recently revised January 2015. ⟨http://jeffe.cs.illinois.edu/teaching/algorithms/⟩ or ⟨http://algorithms.fyi⟩ or ⟨http://algorithms.wtf⟩. Major revision underway, planned for release in 2018.

Other Publications and Manuscripts

[79] DrawPicture data format. With Keith Rollin. Apple II GS Technical Note #46, November 1988. ⟨http://www.umich.edu/~archive/apple2/technotes/tn/iigs/TN.IIGS.046⟩

[80] Font family numbers. With Rilla Reynolds. Apple II GS Technical Note #41, May 1988. Revised by Matt Deatherage and Keith Rollin, November 1990. ⟨http://www.umich.edu/~archive/apple2/technotes/tn/iigs/TN.IIGS.041⟩

[81] New algorithms for minimum measure simplices and one-dimensional weighted Voronoi diagrams. With David Eppstein. Technical Report 92-55, Department of Information and Computer Science, University of California, Irvine, June 1992.

[82] *Lower Bounds for Fundamental Geometric Problems*. Ph.D. dissertation, Computer Science Division, University of California, Berkeley, July 1996.

[83] Plücker coordinates. *Ray Tracing News* 10(3), 1997. ⟨http://www.realtimerendering.com/resources/RTNews/html/rtnv10n3.html⟩.

[84] Finding longest arithmetic progressions. Unpublished manuscript, 1999. ⟨http://jeffe.cs.illinois.edu/pubs/arith.html⟩.

[85] Distance-2 edge coloring is NP-complete. With David P. Bunde and Shripad Thite. Unpublished manuscript, 2005. arXiv:cs/0509100.

[86] 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.

[87] Special section on Foundations of Computer Science [Guest editors' foreword]. 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).

[88] Global minimum cuts in surface embedded graphs. With Erin W. Chambers, Kyle Fox, and Amir Nayyeri. Invited article in *Encyclopedia of Algorithms*, 2nd edition, Springer-Verlag, 2015.

[89] Electrical reduction, homotopy moves, and defect. With Hsien-Chih Chang*. Unpublished manuscript, October 2015. arXiv:1510.00571. Superseded by [22] and [75].

[90] Unwinding annular curves and electrically reducing planar networks. With Hsien-Chih Chang*. *Abstracts of the 2017 Computational Geometry: Young Researchers Forum*, 2017. Sketches results from [75] and [73].

[91] Embedded-width: A variant of treewidth for plane graphs. With Glencora Borradaile, Hung Le*, and Robbie Weber*. Preprint, March 2017. arXiv:1703.07532.

Funding

2017–2020 NSF SPX: Collaborative research: Asynchronous, parallel-adaptive solution of extreme multiscale problems in seismology (SPX-1725544). Co-principal investigator. With Reza Abedi (University of Tennessee, co-PI), Robert Haber (PI), Ahmed Elbanna (co-PI), and Volodymyr V. Kindratenko (co-PI). [$800,000]

2014–2018 NSF AF: Medium: Collaborative research: Fast and accurate optimization in planar graphs and beyond (CCF-1408763). Co-principal investigator. With Philip Klein (Brown University, PI). [$1,200,000]

2013–2014 NSF: Student travel support for SoCG 2013 (CCF-1342819). Sole principal investigator. [$20,000]

2009–2014 NSF AF: Small: Optimization in surface-embedded graphs (CCF-0915519). Sole principal investigator. [$500,000]

2009–2012 NSF EAGER: Adaptive spacetime discontinuous Galerkin methods in 3d×time (OCI-0948393). Co-principal investigator. With Robert Haber (PI). [$200,000]

2005–2008 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.

2002–2005 NSF ITR: Making 3d visibility practical (CCR-0219594). Co-principal investigator. With Frédo Durand (MIT), John Hart (co-PI), and Steve LaValle (PI). [$500,000]

2001–2006 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]

2001–2006 NSF CAREER: Realistically efficient geometric algorithms (CCR-0093348). Sole principal investigator. [$325,000]

1999–2002 Alfred P. Sloan Research Fellowship [$36,000]

1996–1998 NSF Mathematical Sciences Postdoctoral Research Fellowship (DMS-9627683). [$75,000]

Plenary Lectures and Invited Tutorials

June 2018 Research School on "Low-Dimensional Geometry and Topology: Discrete & Algorithmic Aspects", Institute Henri Poincaré, Paris, France [17][22][40][64][66][73]

May 2016 Untangling planar curves and planar graphs [22]. Topology, Geometry, and Data Analysis at OSU, The Ohio State University, Columbus, OH

July 2014 Computational topology of flows and cuts [17][63][66]. 9th International Colloquium on Graph Theory and Combinatorics, Grenoble, France

Oct. 2013 Cuts and flows in planar and surface graphs [17][63][64][66]. Dagstuhl Seminar on Algorithms for Optimization Problems in Planar Graphs, Schloß Dagstuhl, Wadern, Germany

July 2013 Basic algorithms for surface-embedded graphs. ACAT summer school on computational topology and topological data analysis, Ljubljana, Slovenia

June 2013 Theoretical advances in hexahedral mesh generation. Workshop on mesh generation, 29th Annual Symposium on Computational Geometry, Rio de Janiero, Brazil

Jan. 2011 Optimizing cycles and bases [18]. Short course on computational topology, AMS-MAA Joint Mathematics Meeting, New Orleans, LA

Oct 2010 Computational complexity of games: How playing checkers (but not Jenga) can make you a millionaire. 30th Annual Mathematics Symposium, Western Kentucky University, Bowling Green, KY

Aug. 2010 Computational topology: Shortest paths, flows, and cuts [17][40][66]. Workshop on Barriers in Computational Complexity, Princeton Center for Computational Intractability, Princeton, NJ

Aug. 2007 Finding small holes: A brief foray into computational topology [7][37][40][62]. 10th Workshop on Algorithms and Data Structures, Halifax, NS

Sept. 2005 Computing (with) curves on surfaces [7][58]. 6th Max-Planck Advanced Course on the Foundations of Computer Science, Saarbrücken, Germany

Aug. 2005 Computing optimal graphs on surfaces [7][58]. 17th Canadian Conference on Computational Geometry, Windsor, ON

Aug. 2000 Kinetic data structures [31][50][51]. DIMACS Summer School on Foundations of Wireless Networks and Applications, Piscataway, NJ

Other Invited Workshop Talks

Jun 2015 A brief (pre-)history of computational topology: Polygons and curves. 4th Annual Minisymposium on Computational Topology, workshop at the 31st International Symposium on Computational Geometry, Eindhoven, Netherlands

Jun 2014 Hex meshing things with topology [20]. Applied Topology: Methods, Computation, and Science (ATMCS), Vancouver, BC

Feb 2014 Hex meshing things with topology [20]. IMSE Hot TIME Symposium, University of Illinois at Urbana-Champaign;

Aug 2013 Hex meshing things with topology [20]. Mathematical Congress of the Americas, Guanajuato, Mexico

Jan 2013 Transforming curves on surfaces redux [70]. AMS-MAA Joint Mathematics Meeting, San Diego, CA

Mar 2009 Homology flows, cohomology cuts [17]. Dagstuhl Seminar on Computational Geometry, Schloß Dagstuhl, Wadern, Germany

Jul 2005 Local polyhedra and geometric graphs [9]. Carleton–Eindhoven Workshop on Computational Geometry, Gatineau Park, Québec, Canada

May 2003 Well-spaced samples of generic surfaces have sparse Delaunay triangulations. DIMACS Workshop on Surface Reconstruction, Piscataway, NJ

Mar 2001 Nice point sets can have nasty Delaunay triangulations [7]. Dagstuhl Seminar on Computational Geometry, Schloß Dagstuhl, Wadern, Germany

Dec 1997 Raising roofs, crashing cycles, and playing pool [2]. 29th Computational Geometry Day, Courant Institute of Mathematical Sciences

Mar 1997 Raising roofs, crashing cycles, and playing pool [2]. Dagstuhl Seminar on Computational Geometry, Schloß Dagstuhl, Wadern, Germany

Invited Talks at Institutions

2018 CIMAT, Guanajuato, México *[three talks planned]*

2016 Duke University, St. Louis University

2015 Princeton University

2014 Oregon State University

2012 Brown University; École Normale Supérieure (twice); Institute of Science and Technology Austria (twice)

2011 Århus Universitet/MADALGO; École Normale Supérieure; Institute of Science and Technology Austria; Universität des Saarlandes

2010 The Ohio State University

2009 California Institute of Technology

2008 Mathematics Department Colloquium, University of Illinois at Urbana-Champaign; Toyota Technological Institute; University of California, Irvine

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 Ljubljiana

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 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

— Education —

Course Development

CS 374: Algorithms and Models of Computation

A new junior-level course in theoretical computer science now required for all computer science and computer engineering majors. Developed and piloted with Lenny Pitt in Spring 2014. Currently offered every semester, with a steady-state enrollment of 400–600 students per semester.

CS 473: Algorithms

An elective advanced algorithms course designed for advanced undergraduates and graduate students in computer science and related fields. Developed and piloted in Spring 2015. Currently offered every semester, with an average enrollment of 80 students per offering.

Instruction

Numbers in the right margin are student evaluations of instructor/course quality (maximum 5.0/5.0). *Stars indicate listings in the university's "List of Teachers Ranked as Excellent by Their Students" based on these evaluations; **double stars indicate an outstanding rating (top 10% campus-wide). °Circles indicate courses offered both on-campus and online through my department's online master's program. This list spans several major course and curriculum revisions, including a 2005 university-wide renumbering of all courses.

1998–2019	**Average student evaluations (weighted by class size)**	**(4.63/4.32)**
2018–2019	— On sabbatical —	
Spring 2018	CS 374: Algorithms and Models of Computation	(4.7/4.4)*
Fall 2017	CS 598: Special Topics: One-Dimensional Computational Topology	(4.9/4.7)*
Spring 2017	CS 473: Algorithms	(5.0/4.9)**
Fall 2016	CS 374: Algorithms and Models of Computation (with Alexandra Kolla)	(4.4/3.9)
Spring 2016	CS 473: Algorithms	(4.9/4.7)*
Fall 2015	CS 598: Special Topics: Advanced Data Structures	(4.7/4.7)*
Spring 2015	CS 473: Algorithms *Pilot for revised senior- and graduate-level elective course*	(5.0/4.9)**
Fall 2014	CS 374: Algorithms and Models of Computation	(4.7/4.6)*
Spring 2014	CS 374: Algorithms and Models of Computation (with Lenny Pitt) *Pilot for new required junior-level course for computer science and computer engineering majors*	(4.7/4.3)

Fall 2013	CS 473: Undergraduate Algorithms	(4.9/4.7)*
Spring 2013	CS 598: Special Topics: Computational Topology	(no evaluations)
Fall 2012	CS 473: Undergraduate Algorithms	(4.8/4.4)*
2011–2012	— On sabbatical —	
Spring 2011	CS 598: Special Topics: Advanced Data Structures	(4.9/4.8)*
Fall 2010	CS 573: Graduate Algorithms	(4.9/4.7)*
Spring 2010	CS 473: Undergraduate Algorithms	(4.73/4.46)*
Fall 2009	CS 598: Special Topics: Computational Topology	(4.56/4.44)
Spring 2009	CS 473: Undergraduate Algorithms	(4.76/4.15)
Fall 2008	CS 573: Graduate Algorithms	(4.65/4.33)
Spring 2008	CS 598: Special Topics: Computational Geometry	(4.6/4.5)*
Fall 2007	CS 173: Discrete Mathematical Structures (with Cinda Heeren)	(3.8/3.6)
Spring 2007	CS 473G: Graduate Algorithms	(4.7/4.6)*
Fall 2006	CS 473U: Undergraduate Algorithms	(4.8/4.4)*
Spring 2006	CS 573: Topics in Analysis of Algorithms: Advanced Data Structures	(4.7/4.3)
Fall 2005	CS 473G: Graduate Algorithms°	(4.6/4.6)*
2004–2005	— On sabbatical —	
Spring 2004	CS 373U: Undergraduate Algorithms	(4.5/3.8)
Fall 2003	CS 473: Topics in Analysis of Algorithms: Algorithms for Massive Data	(no evaluations)
Spring 2003	CS 497: Special Topics: Concrete Models of Computation	(4.6/4.4)
Fall 2002	CS 373: Combinatorial Algorithms° *Enrollment: 180 undergraduates, 120 graduate students, and 20 online students*	(4.5/4.1)
Spring 2002	CS 497: Special Topics: Computational Geometry	(4.8/4.4)
Fall 2001	CS 473: Topics in Analysis of Algorithms: Online Algorithms	(5.0/4.8)*
Spring 2001	CS 373: Combinatorial Algorithms°	(4.9/4.7)**
Fall 2000	CS 373: Combinatorial Algorithms	(4.8/4.6)*
Spring 2000	CS 497: Special Topics: Computational Geometry	(4.6/4.5)
Fall 1999	CS 173: Discrete Mathematical Structures	(4.4/4.1)
Spring 1999	CS 373: Combinatorial Algorithms°	(4.8/4.6)*
Fall 1998	CS 497: Special Topics: Geometric Data Structures	(4.3/4.3)

Mentorship

Current students

- Christian Howard, M.S. expected 2019
- Patrick Lin, Ph.D. expected 2020
- Yipu Wang, Ph.D expected 2020

Former Ph.D. students and postdocs

- Hsien-Chih Chang, Ph.D. 2018. *Tightening Curves and Graphs on Surfaces*.
  - Best Student Presentation award, SoCG 2016
  - Postdoctoral associate, Duke University, starting August 2018
- Kyle Fox, Ph.D. 2013. *Fast Algorithms for Surface Embedded Graphs via Homology*.
  - C. W. Gear Outstanding Graduate Student award, Illinois Computer Science Department, 2013

  - Assistant professor (since 2017), Department of Computer Science, University of Texas at Dallas.
- Anastasios Sidiropoulos (Ph.D. 2008 MIT), postdoc 2012–2013, co-hosted with Sariel Har-Peled
  - Assistant professor, Department of Computer Science, University of Illinois, Chicago
- Amir Nayyeri, Ph.D. 2012. *Combinatorial Optimization of Embedded Curves*.
  - Assistant professor (since 2014), Department of Electrical Engineering and Computer Science, Oregon State University, Corvallis.
  - **Former graduate students:**
    - Farzad Zafarani, M.S. 2016. PhD student at Purdue University
- Erin Wolf Chambers, Ph.D. 2008. *Finding Interesting Topological Features*.
  - Professor (since 2018), Department of Computer Science, St. Louis University, St. Louis, Missouri
  - National Science Foundation CAREER award, 2011–2016
  - **Former PhD students:**
    - Kyle Sykes, Ph.D. 2016. Senior Data Scientist at Allscripts, Glen Carbon, Illinois
- David Bunde, Ph.D. 2006. *Scheduling and Admission Control*.
  - Associate professor (since 2012) and former department chair, Department of Computer Science, Knox College, Galesburg, Illinois
- Shripad Thite, Ph.D. 2005. *Spacetime Meshing for Discontinuous Galerkin Methods*.
  - Software engineer, Uber, San Francisco, California
- Alper Üngör, Ph.D. 2002, co-advised with Shang-Hua Teng. *Parallel Delaunay Refinement and Space-Time Meshing*.
  - Associate professor (since 2010), Department of Computer & Information Science & Engineering, University of Florida, Gainesville
  - David J. Kuck Oustanding Ph.D. Thesis Award, Illinois Computer Science Department, 2003
  - National Science Foundation CAREER award, 2009–2014
  - **Former PhD students**:
    - Hale Erten, Ph.D. 2009. Software engineer at Intel, Portland, Oregon
    - Paul Accisano, Ph.D. 2014. Software engineer at Microsoft, Redmond, Washington
    - Anubhav Singh, Ph.D. 2014. Software Engineer II at Microsoft, Redmond, Washington

Former M.S. and B.S. students

- Alexander Steiger, M.S. 2017. *Single-Face Non-Crossing Shortest Paths in Planar Graphs*. Ph.D. student at Duke University since August 2017.
- Luvsandondov Lkhamsuren, B.S. 2016. *Multiple-Source Shortest Paths in Unweighted Embedded Graphs*. Software engineer at AirBnB since May 2016.
- Robert Weber, B.S. 2015. *Embedded-width of Planar Graphs*. Ph.D. student in computer science at University of Washington since August 2015.
- Alexander Mont, M.S. 2011. *Adaptive Unstructured Spacetime Meshing for Four-Dimensional Spacetime Discontinuous Galerkin Finite Element Methods*. Common Networks, San Francisco, CA.
- Daniel Larkin-York (né Larkin), B.S. 2011. *An Experimental Comparison of Heaps*. Ph.D. student in computer science at Princeton, Ph.D. 2015. Freelance developer with ArangDB, West Lafayette, Indiana.
- Kyle Fox, M.S. 2010. *Online Scheduling on Identical Machines using SRPT*. See above.
- Aparna Sundar, M.S. 2009. *More Homology Flows*. General Motors, Austin, Texas.
- Tracy Russell (née Grauman), M.S. 2008. *Making Sense of Making Change*. athenahealth, Watertown, Massachusetts.

- Pratik Worah, M.S. 2008 (Applied Mathematics). *Finding Nontrivial Cycles in Topological Spaces*. Ph.D. 2013, University of Chicago, advised by Janos Simon. Google, New York.
- Kevin Milans, M.S. 2006. *The Complexity of Graph Pebbling*. Ph.D. 2010 in Mathematics, advised by Doug West. Associate professor (since 2018) of mathematics at West Virginia University.
- Dan Cranston, M.S. 2003. *Coloring for Efficient Computation of Jacobians*. Ph.D. 2007, advised by Doug West. Associate professor (since 2015) 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. Assistant professor of mathematics, Colorado State 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*. Technical Program Manager at Google, San Francisco, California.
- Luigi Marini, B.S. 2002. *Edge-Coloring Graphs*. Research programmer at National Center for Supercomputing Applications, Urbana, Illinois.

Other thesis committees (Ph.D. in Computer Science from Illinois unless otherwise indicated)

- Current students: Tim Ophelders (Technische Universiteit Eindhoven), Kent Quanrud
- 2018: Chao Xu
- 2015: Kaushik Kalyanaraman, Daniel Larkin (Princeton University), Yahav Nussbaum (Tel Aviv University), Benjamin Raichel
- 2014: Lawrence Erickson, Nirman Kumar, Arnaud de Mesmay (École normale supèrieure), Steve Oudot (Habilitation, Université Paris-Sud)
- 2012: Hayim Shaul (Tel Aviv University), Shay Mozes (Brown University), Sungjin Im
- 2011: Kostas Tsakalidis (Århus Universitet)
- 2010: Nitish Korula
- 2009: Bill Cochran, Evan VanderZee (Mathematics), Michael Wolf, Feida Zhu
- 2008: Hamidreza Chitsaz, Gio Kao, Stephen Kloder, Anna Yershova
- 2007: Ke Chen, Dan Cranston, Shen Dong, Xinlai Ni, Jason O'Kane
- 2006: Svetlana Lazebnik, Bardia Sadri
- 2005: Masud Hasan (University of Waterloo), Peng Cheng, Sung-Il Pae, Eric Shaffer
- 2004: Fred Rothganger, Xavier Goaoc (Université de Nancy 2)
- 2002: Derek Armstrong (Industrial Engineering), Tanya Berger-Wolf, Ho-Lun (Alan) Cheng
- 2001: Damrong Guoy, Peter Leven (Electrical and Computer Engineering), Ali Pınar, Radhika Ramamurthi (Mathematics), Afra Zomorodian
- 2000: Xiang-Yang Li
- 1999: André Kündgen (Mathematics)

— Service —

Department and University

Departmental service

- ***Associate department head*** 2013–2016, primarily responsible for tenure-track faculty recruiting.
  - Eleven tenure-track faculty hired during my term, including two endowed full professors.
- Major departmental committees
  - Advisory: 2000–2003, 2012–2014, 2016–2018, ***chair*** 2017–2018 (committee elected by the faculty, chair elected by the committee)

  - Graduate admissions: 1999–2000, 2002–2004, 2012–2013
  - Teaching faculty recruiting: 2015–2016
  - Promotions and tenure: 2010–2018 (elected by the faculty starting in 2017)
  - Tenure-track faculty recruiting: 2000–2004, 2005–2011, 2012–2017, ***chair*** 2013–2016
  - Undergraduate curriculum revision: 2011–2015
- Other departmental service
  - Algorithms and theoretical computer science area chair, 2005–2011, 2016–2017

Other university service

- Senate of the Urbana-Champaign Campus, 2005–2007, 2009–2011 (elected by CS department faculty)
  - General University Policy committee, 2009–2011
- College of Engineering service
  - Department of Computer Science head search committee, 2007–2009
  - Department of Computer Science head search committee, 2017–2018
  - Education Innovation Fellow, 2017–2018
  - Engineering-Mathematics liaison, 2007–2011, 2015–2018
  - Equal Employment Opportunity Officer, 2015–2018
- Service in other departments
  - Applied Mathematics Program steering committee, Department of Mathematics, 2005–2006
  - Mathematics and its applications committee, Department of Mathematics, 2002–2003

Professional

Professional society service

- ACM SIGACT Committee for the Advancement of Theoretical Computer Science, 2013–2015

Editorial service

- *Journal of Applied and Computational Topology*, 2016– (***founding*** editorial board)
- CoRR/ArXiv moderator for Computational Geometry (cs.CG) and Discrete Mathematics (cs.DM), 2007–
- *Discrete & Computational Geometry*, 2007–
- Guest editor, *Discrete & Computational Geometry* 42(1), 2009, special issue of invited papers from the 23rd Annual Symposium on Computational Geometry (2007) [86]
- *Journal on Computational Geometry*, 2009–2015 (***founding*** editorial board)
- *SIAM Journal on Computing*, 2010–2012
- 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) [87].

Conference committee chairing (*Submissions not accepted from committee members)

- Workshop committee chair, 30th Annual Symposium on Computational Geometry (2014)
- ***Steering committee chair***, Symposium on Computational Geometry, 2013–2016 (committee members elected by the SoCG community, officers elected by the committee)
  - Oversaw the 2014 community vote ending SoCG's 30-year affiliation with ACM. For details, see http://makingSoCG.wordpress.com.
  - STOC/STOC 2016 colocation committee (*ex officio*)

- Program committee chair, 23rd Annual Symposium on Computational Geometry (2007)*
- Video Review committee chair, 15th Annual Symposium on Computational Geometry (1999)

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

- 2019 Symposium on Simplicity in Algorithms
- 34th International Symposium on Computational Geometry (2018)*
- 28th Annual ACM-SIAM Symposium on Discrete Algorithms (2017)*
- 8th International Conference on Fun with Algorithms (2016)
- ***Steering committee***, Symposium on Computational Geometry, 2013–2016 (elected by the SoCG community)
- 45th Annual ACM Symposium on Theory of Computing (2013)*
- 24th Canadian Conference on Computational Geometry (2012)*
- 3rd Symposium on Innovations in Theoretical Computer Science (2012)
- 21st Canadian Conference on Computational Geometry (2009)*
- 49th IEEE Symposium on Foundations of Computer Science (2008)*
- 13th ACM Symposium on Solid and Physical Modeling (2008)
- 19th Canadian Conference on Computational Geometry (2007)
- ***Steering committee***, Symposium on Computational Geometry, 2006–2009 (elected by the SoCG community)
- 18th Annual ACM-SIAM Symposium on Discrete Algorithms (2007)*
- 47th IEEE Symposium on Foundations of Computer Science (2006)*
- 10th Scandinavian Workshop on Algorithm Theory (2006)*
- 14th Annual ACM-SIAM Symposium on Discrete Algorithms (2003)*
- ***Steering committee***, Symposium on Computational Geometry, 2001–2003 (elected by the SoCG community)
- 11th Annual International Symposium on Algorithms and Computation (2000)*
- 16th Annual Symposium on Computational Geometry, theory track (2000)*

Workshop organization and other committees

- Organizing committee, Dagstuhl Seminar on Computational Geometry (2019)
- Organizing committee, 60th birthday workshop for Herbert Edelsbrunner, Raimund Seidel, and Emo Welzl, 34th International Symposium on Computational Geometry (2018)
- Organizing committee, Dagstuhl Seminar on Computational Geometry (2017)
- Organizing committee, Dagstuhl Seminar on Optimization in Planar Graphs (2016)
- Organizing committee, Oberwolfach Seminar on Computational Geometric and Algebraic Topology (2015)
- Organizing committee, Dagstuhl Seminar on Computational Geometry (2015)
- Program committee, 6th Workshop on Massive Data Algorithmics (2014)
- Workshop committee, 29th Annual Symposium on Computational Geometry (2013)
- Young Researchers Forum committee, 28th Annual Symposium on Computational Geometry (2012)
- Organizing committee, 15th Annual Fall Workshop on Computational Geometry and Visualization (2005)
- Organizer, minisymposium on computational geometry, SIAM Conference on Discrete Mathematics (2004)
- Organizing committee, 7th Annual Fall Workshop on Computational Geometry (1997)

Reviewing and refereeing

- **Book reviewer** for American Mathematical Society and Princeton University Press
- **Proposal panelist/reviewer** for the National Science Foundation (CCF, DMS, CAREER, and GFRP), the Army Research Office, the Department of Defense (EPSCoR), the European Research Council, the Israeli Science Foundation, and the Netherlands Organisation for Scientific Research (NWO)
- **Referee** for *ACM Journal of Experimental Algorithmics*; *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*; *Israeli Journal of Mathematics*; *Journal of Applied and Computational Topology*; *Journal of the ACM*; *Journal on Computational Geometry*; *Journal of Computer and System Sciences*; *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, 2004–2006, 2008–2016, 2019); ACM Symposium on Solid Modeling and Applications (1999); ACM Symposium on Theory of Computing [STOC] (1999, 2001, 2004–2006, 2011, 2012, 2014, 2016); Algorithms and Data Structures Symposium [WADS] (2007, 2011); Eurographics (2002); European Symposium on Algorithms [ESA] (2002, 2004, 2005, 2011, 2015, 2017); Fall Workshop on Computational Geometry (1996); IEEE Conference on Automation Science and Engineering [CASE] (2008); IEEE Conference on Computational Complexity [CCC] (2013); IEEE Symposium on Foundations of Computer Science [FOCS] (1994, 1996, 1998, 1999, 2002, 2004, 2007, 2011, 2013, 2015, 2016, 2018); International Colloquium on Automata, Languages, and Programming [ICALP] (2008, 2010); International Meshing Roundtable [IMR] (2000, 2002–2004, 2008); International Symposium on Experimental Algorithms [SEA] (2009); International Symposium on Theoretical Aspects of Computer Science [STACS] (2000, 2013); Pacific Conference on Computer Graphics and Applications [PG] (2009); Robotics: Science and Systems Conference [RSS] (2009); Scandinavian Symposium and Workshops on Algorithm Theory [SWAT] (2014); SIAM Meeting on Algorithm Engineering and Experimentation [ALENEX] (2008, 2014); SIGGRAPH (2001–2003, 2005, 2007, 2012, 2013); and Symposium on Computational Geometry [SoCG] (1995, 1996, 2001–2006, 2009–2015, 2017)