

David Eppstein

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Research Interests

Most of my research has been in the areas of computational geometry and graph algorithms, including finite element meshing, minimum spanning trees, shortest paths, dynamic graph data structures, graph coloring, graph drawing, geometric optimization, computational robust statistics, and geometric optimization.

Education

Stanford University, B.S. in Mathematics, with distinction, 1984.
Columbia University, Computer Science Dept., M.S. May 1985; Ph.D. May 1989.

Professional Employment

Post-doctoral researcher, Xerox Palo Alto Research Center, 1989–1990.
Department of Information and Computer Science, University of California, Irvine
Assistant professor, 1990–1994
Associate professor, 1994–1998
Full professor, 1998–2002
Computer Science Department, Donald Bren School of Information and Computer Sciences, UC Irvine
Full professor, 2003–present
Founding co-chair 2003–2005; vice chair for the Computing Division 2008–2010
Chancellor’s Professor, 2014–2020
Distinguished Professor, 2020–present

Awards and Honors

National Merit Scholarship, 1981–1984.
NSF Graduate Fellowship, 1984–1987.
NSF Young Investigator Award, 1992–1999.
Second Best Paper Award, 25th Conference of the European Association for Computer Graphics (Eurographics), 2004.
Best Paper Award, 16th ACM SIGSPATIAL International Conference on Advances in Geographic Information Systems, 2008.
Best Paper Award, Algorithms and Data Structures Symposium (WADS), 2009.
Dean’s Award for Research, Donald Bren School of Information and Computer Sciences, UC Irvine, 2011.
Fellow of the Association for Computing Machinery, 2012.
Best Paper Award, 20th International Symposium on Graph Drawing, 2012.
Fellow of the American Association for the Advancement of Science, 2017.
Best Paper Award, 14th International Symposium on Parameterized and Exact Computation, 2019.

Graduate Students

Jeff Erickson (M.S., 1992)
David Hart (Ph.D., 2002)
Joseph Wang (Ph.D., 2003)
Josiah Carlson (Ph.D., 2007)
Kevin Wortman (Ph.D., 2009)
Darren Strash (Ph.D., 2011, co-advised with Michael T. Goodrich)
Joe Simons (Ph.D., 2014, co-advised with Michael T. Goodrich)
Zhanpeng Cheng (M.S., 2014)
Michael J. Bannister (Ph.D., 2015)
William E. Devanny (Ph.D., 2017, co-advised with Michael T. Goodrich)
Sid Gupta (Ph.D., 2018, co-advised with Michael T. Goodrich)
Nil Mamano (current, co-advised with Michael T. Goodrich)
Elham Havvaei (current)

Postdoctoral Research Supervision

Maarten Löffler (2009–2011)
Martin Nöllenburg (2009–2010)

Journal editing

Editorial boards: J. Algorithms, 1994–2004; Chicago J. Theor. Comp. Sci., 1994–present; SIAM J. Comput., 1995–2004; J. Graph Algorithm. & Appl., 1995–2009. ACM Trans. Algorithm., 2004–2008.

Guest editor: J. Comp. Sys. Sci., special issue for 34th FOCS; Algorithmica, special issue on dynamic graph algorithms; J. Complexity, special issue for Zvi Galil; Discrete & Computational Geometry, special issue for SoCG 2001; J. Algorithms, special issue for SODA 2002; J. Graph Algorithm. & Appl., special issue for GD 2009.

Conference reviewing

ACM Symposium on Theory of Computing (STOC), program committee, 1994, 2000, 2003, 2006, 2009, and 2021.

ACM-SIAM Symposium on Discrete Algorithms, program committee, 1996, 2000, 2011, and 2017; program chair, 2002.

Algorithms and Data Structures Symposium (WADS, formerly Workshop on Algorithms and Data Structures), program committee, 1997 and 2007; steering committee, 2020–present.

Canadian Conference on Computational Geometry (CCCG), program committee, 2018, 2021.

Computational Geometry Young Researchers' Forum (CG:YRF), program committee, 2015.

Computing and Combinatorics (COCOON), program committee, 1999, 2012, and 2016.

European Symposium on Algorithms, steering committee, 2008–2012; program committee, 2014.

IEEE Symposia on Foundations of Computer Science (FOCS), program committee, 1993, 2001, and 2008.

International Colloquium on Automata, Languages and Programming (ICALP), program committee, 2005, 2008, and 2015.

International Conference on Fun with Algorithms (FUN), program committee, 2012, 2016, and 2018.

International Symposium on Algorithms and Computation (ISAAC), program committee, 1998.

International Symposium on Graph Drawing, program committee, 2006, 2008, 2010, 2012, 2014, 2016, and 2019; program co-chair, 2009; steering committee, 2008–2010.

International Symposium on Parameterized and Exact Computation (IPEC), program committee, 2020.

International Symposium on Theoretical Aspects of Computer Science (STACS), program committee, 2019.

International Symposium on Voronoi Diagrams (ISVD), program committee, 2013.
International Workshop on Enumeration Problems and Applications (WEPA), program committee, 2020.
International Workshop on Graph-Theoretic Concepts in Computer Science (WG), program committee, 2014.
Meeting on Algorithms & Experiments (ALENEX), program co-chair, 2015.
NSF Workshop on Computational Topology, co-chair, 1999.
Scandinavian Symposium and Workshops on Algorithm Theory (SWAT), program committee, 2012 and 2014; program chair, 2018.
SIAM Symposium on Simplicity in Algorithms, program committee, 2020
Symposium on Computational Geometry (SoCG), program committee, 1995, 1999, 2012, and 2020; video/multimedia program committee, 2010; program chair for theory track, 2001; steering committee, 2013–2016.

Other editorial service

Moderator for cs.DS (data structures and algorithms), arxiv.org electronic preprint repository, 2006–present; member of arXiv scientific advisory board, 2016–2019.
Administrator on English-language Wikipedia, 2007–present.

Patents

R. P. Tamstorf, M. T. Goodrich, and D. Eppstein. Attribute transfer between computer models including identifying isomorphic regions in polygonal meshes. US Patent 8,681,145, March 25, 2014.

Invited keynote lectures

“Dynamic geometric optimization.” 3rd MSI Works. Computational Geometry, Stony Brook, NY, 1993.
“Computational geometry and parametric matroid optimization.” 5th Int. Symp. Parametric Optimization, Chiba, Japan, 1997.
“Graphs for dynamic geometry.” Worksh. Dynamic Graph Algorithms, Victoria, Canada, 2000.
“Triangles and squares.” 1st European Conf. Combinatorics, Graph Theory, and Applications, Bellaterra, Spain, 2001.
“Topological issues in hexahedral meshing.” Conf. Algebraic Topology Methods in Computer Science, Stanford, CA, 2001.
“Depth and arrangements.” MSRI Introductory Worksh. Discrete & Computational Geometry, Berkeley, CA, 2003, and opening keynote, DIMACS Worksh. on Data Depth, New Brunswick, NJ, 2003.
“Hyperbolic geometry, Möbius transformations, and geometric optimization.” MSRI Introductory Worksh. Discrete & Computational Geometry, Berkeley, CA, 2003.
“Quasiconvex programming.” DIMACS Worksh. on Geometric Optimization, New Brunswick, NJ, 2003, and ALGO 2004, Bergen, Norway, 2004.
“Geometry of partial cubes.” 6th Slovenian International Conference on Graph Theory, Bled, Slovenia, 2007.
“Graph-theoretic solutions to computational geometry problems.” 35th International Workshop on Graph-Theoretic Methods in Computer Science, Montpellier, France, June 2009.
“Hyperconvexity and metric embedding”, 5th William Rowan Hamilton Geometry and Topology Workshop, Dublin, Ireland, September 2009.
“Hyperconvexity and metric embedding”, Workshop on Combinatorial Geometry, Institute for Pure and Applied Mathematics, Univ. of California, Los Angeles, October 2009.
“Regular labelings and geometric structures”, 22nd Canadian Conference on Computational Geometry, Winnipeg, Canada, August 2010.
“Listing all maximal cliques in sparse graphs in near-optimal time”, Workshop on Exact Algorithms for NP-Hard Problems, Dagstuhl, Germany, November 2010.
“Lombardi Drawings of Graphs”, 7th Dutch Computational Geometry Day, Eindhoven, The Netherlands, November 2010.

- “Graph-theoretic solutions to computational geometry problems”, Computer Science Colloquium, KAIST, Daejeon, Korea, December 2010.
- “Regular labelings and geometric structures”, 21st International Symposium on Algorithms and Computation, Jeju, Korea, December 2010.
- “Möbius transformations, power diagrams, Lombardi drawings, and soap bubbles”, EuroGIGA Midterm Conference, Prague, Czech Republic, July 2012.
- “Circle packings, hyperbolic Voronoi diagrams, Lombardi drawings, and soap bubbles”, International Workshop on Combinatorial Image Analysis, Austin, Texas, November 2012.
- “A brief history of curves in graph drawing”, Workshop on Drawing Graphs and Maps with Curves, Dagstuhl, Germany, April 2013.
- “Windows into relational events: Data structures for contiguous subsequences of edges”, University of Arizona, February 2014.
- “Structures in solution spaces: three lessons from Jean-Claude”, Conference on Meaningfulness and Learning Spaces (A Tribute to the Work of Jean-Claude Falmagne), Irvine, California, February 2014.
- “Regular labelings and geometric structures”, Oregon State University, March 2014.
- “Curves in graph drawing”, EuroGIGA Ph.D. school “CCC” 2014, Recent Trends in Graph Drawing – Curves, Crossings, and Constraints, University of Würzburg, Germany, September 2014.
- “Realizing graphs as polyhedra”, Workshop on Recent Trends in Graph Drawing: Curves, Graphs, and Intersections, California State University Northridge, September 2015
- “Treetopes and their graphs”, Southern California Theory Day, University of Southern California, November 2015
- “Forbidden configurations in discrete geometry”, Paul Erdős Memorial Lecture, Canadian Conference on Computational Geometry, Ottawa, Canada, July 2017.
- “Forbidden configurations in discrete geometry”, 20th Japan Conf. Discrete & Computational Geometry, Graphs, and Games, Tokyo, Japan, August 2017.
- “Forbidden configurations in discrete geometry”, 5th International Conf. Combinatorics, Melbourne, Australia, December 2017.
- “Stable-matching Voronoi diagrams”, 21st Japan Conf. Discrete & Computational Geometry, Graphs, and Games, Manila, Philippines, September 2018.
- “Graphs in nature”, 17th Eurographics Symposium on Geometry Processing, Milan, Italy, July 2019.
- “Graphs in nature”, 16th Algorithms and Data Structures Symposium, Edmonton, Canada, August 2019.

Books

- B1. D. Eppstein, J.-Cl. Falmagne, and S. Ovchinnikov. *Media Theory*. Springer-Verlag, 2008.
- B2. D. Eppstein. *Forbidden Configurations in Discrete Geometry*. Cambridge University Press, 2018.

Edited Volumes

- V1. D. Eppstein and D. Halperin. *Proceedings of the 17th Annual ACM Symposium on Computational Geometry. Medford, MA, USA, June 3–5, 2001*. ACM Press, 2001.
- V2. D. Eppstein. *Proceedings of the 13th Annual ACM–SIAM Symposium on Discrete Algorithms. San Francisco, CA, USA; January 6–8, 2002*. ACM Press, 2002.
- V3. D. Eppstein and E. Gansner. *Proceedings of the 17th International Symposium on Graph Drawing, GD 2009, Chicago, IL, USA, September 22–25, 2009*. Lecture Notes in Computer Science 5849, Springer-Verlag, 2010.
- V4. J.-Cl. Falmagne, D. Albert, C. Doble, D. Eppstein, and X. Hu. *Knowledge Spaces: Applications in Education*. Springer-Verlag, 2013.
- V5. U. Brandes and D. Eppstein. *Proceedings of the 17th Workshop on Algorithm Engineering and Experiments (ALENEX), San Diego, CA, USA, January 5, 2015*. Society for Industrial and Applied Mathematics, 2015, doi:10.1137/1.9781611973754.
- V6. D. Eppstein. *Proceedings of the 16th Scandinavian Symposium and Workshops on Algorithm Theory (SWAT 2018), Malmö, Sweden, June 18–20, 2018*. Leibniz International Proceedings in Informatics (LIPIcs) 101, Dagstuhl Publishing, 2018, <http://www.dagstuhl.de/dagpub/978-3-95977-068-2>.

Refereed Journal Articles

- J1. D. Eppstein. Sequence comparison with mixed convex and concave costs. *J. Algorithms* 11(1):85–101, March 1990, doi:10.1016/0196-6774(90)90031-9, MR1041168.
- J2. D. Eppstein. Reset sequences for monotonic automata. *SIAM J. Computing* 19(3):500–510, June 1990, doi:10.1137/0219033, MR1041543.
- J3. M. W. Bern, D. Eppstein, and F. F. Yao. The expected extremes in a Delaunay triangulation. *Int. J. Computational Geometry & Applications* 1(1):79–92, March 1991, doi:10.1142/S0218195991000074, MR1099499.
- J4. M. Chrobak and D. Eppstein. Planar orientations with low out-degree and compaction of adjacency matrices. *Theoretical Computer Science* 86(2):243–266, September 1991, doi:10.1016/0304-3975(91)90020-3, MR1122790.
- J5. D. Eppstein, J. Feigenbaum, and C.-L. Li. Equipartitions of graphs. *Discrete Mathematics* 91(3):239–248, 1991, doi:10.1016/0012-365X(90)90233-8, MR1129988.
- J6. D. Eppstein, M. Overmars, G. Rote, and G. J. Woeginger. Finding minimum area k -gons. *Discrete & Computational Geometry* 7(1):45–58, 1992, doi:10.1007/BF02187823, MR1134451.
- J7. D. Eppstein, L. A. Hemachandra, J. Tisdall, and B. Yener. Simultaneous strong separations of probabilistic and unambiguous complexity classes. *Mathematical Systems Theory* 25(1):23–36, 1992, doi:10.1007/BF01368782, MR1139093.
- J8. D. Eppstein, G. F. Italiano, R. Tamassia, R. E. Tarjan, J. R. Westbrook, and M. Yung. Maintenance of a minimum spanning forest in a dynamic plane graph. *J. Algorithms* 13(1):33–54, March 1992, doi:10.1016/0196-6774(92)90004-V, MR1146331. Special issue for 1st SODA.
- J9. D. Eppstein. The farthest point Delaunay triangulation minimizes angles. *Computational Geometry Theory & Applications* 1(3):143–148, March 1992, doi:10.1016/S0925-7721(98)00031-5, MR1154641.
- J10. D. Eppstein. Parallel recognition of series parallel graphs. *Information & Computation* 98(1):41–55, May 1992, doi:10.1016/0890-5401(92)90041-D, MR1161075.
- J11. D. Eppstein. Finding the k smallest spanning trees. *BIT* 32(2):237–248, 1992, doi:10.1007/BF01994879, MR1172188. Special issue for 2nd SWAT.
- J12. D. Eppstein, Z. Galil, R. Giancarlo, and G. F. Italiano. Sparse dynamic programming I: linear cost functions. *J. ACM* 39(3):519–545, July 1992, doi:10.1145/146637.146650, MR1177953.
- J13. D. Eppstein, Z. Galil, R. Giancarlo, and G. F. Italiano. Sparse dynamic programming II: convex and concave cost functions. *J. ACM* 39(3):546–567, July 1992, doi:10.1145/146637.146656, MR1177954.
- J14. M. W. Bern and D. Eppstein. Polynomial-size non-obtuse triangulation of polygons. *Int. J. Computational Geometry & Applications* 2(3):241–255, September 1992, doi:10.1142/S0218195992000159, MR1194449. Special issue for 7th SCG.
- J15. D. Eppstein. Dynamic three-dimensional linear programming. *INFORMS Journal on Computing* 4(4):360–368, Fall 1992, doi:10.1287/ijoc.4.4.360, MR1189074. Special issue on computational geometry.
- J16. D. Eppstein. Improved bounds for intersecting triangles and halving planes. *J. Combinatorial Theory, Series A* 62:176–182, 1993, doi:10.1016/0097-3165(93)90082-J, MR1198391.
- J17. D. Eppstein. Connectivity, graph minors, and subgraph multiplicity. *J. Graph Theory* 17:409–416, 1993, doi:10.1002/jgt.3190170314, MR1221000.
- J18. M. W. Bern, H. Edelsbrunner, D. Eppstein, S. A. Mitchell, and T.-S. Tan. Edge insertion for optimal triangulation. *Discrete & Computational Geometry* 10(1):47–65, 1993, doi:10.1007/BF02573962, MR1215322.
- J19. D. Eppstein. Approximating the minimum weight Steiner triangulation. *Discrete & Computational Geometry* 11(2):163–191, 1994, doi:10.1007/BF02574002, MR1254088.
- J20. M. W. Bern, D. P. Dobkin, D. Eppstein, and R. L. Grossman. Visibility with a moving point of view. *Algorithmica* 11(4):360–378, April 1994, doi:10.1007/BF01187019, MR1264269.
- J21. D. Eppstein and J. G. Erickson. Iterated nearest neighbors and finding minimal polytopes. *Discrete & Computational Geometry* 11(3):321–350, April 1994, doi:10.1007/BF02574012, MR1271639.
- J22. M. W. Bern, D. Eppstein, and J. R. Gilbert. Provably good mesh generation. *J. Computer & Systems Sciences* 48(3):384–409, June 1994, doi:10.1016/S0022-0000(05)80059-5, MR1279408. Special issue for 31st FOCS.
- J23. D. Eppstein. Tree-weighted neighbors and geometric k smallest spanning trees. *Int. J. Computational Geometry & Applications* 4(2):229–238, June 1994, doi:10.1142/S0218195994000136, MR1288661.
- J24. B. Aronov, M. W. Bern, and D. Eppstein. On the number of minimal 1-Steiner trees. *Discrete & Computational Geometry* 12(1):29–34, July 1994, doi:10.1007/BF02574363, MR1280574.
- J25. D. Eppstein. Arboricity and bipartite subgraph listing algorithms. *Information Processing Letters* 51(4):207–211, August 1994, doi:10.1016/0020-0190(94)90121-X, MR1294315.
- J26. D. Eppstein. Offline algorithms for dynamic minimum spanning tree problems. *J. Algorithms* 17(2):237–250, September 1994, doi:10.1006/jagm.1994.1033, MR1291541.
- J27. D. Eppstein. Dynamic Euclidean minimum spanning trees and extrema of binary functions. *Discrete & Computational Geometry* 13(1):111–122, January 1995, doi:10.1007/BF02574030, MR1300511.
- J28. D. Eppstein, G. L. Miller, and S.-H. Teng. A deterministic linear time algorithm for geometric separators and its applications. *Fundamenta Informaticae* 22(4):309–331, April 1995, MR1360950. Special issue on computational geometry.
- J29. D. Eppstein. Ten algorithms for Egyptian fractions. *Mathematica in Education and Research* 4(2):5–15, 1995.

- J30. D. Eppstein. Asymptotic speed-ups in constructive solid geometry. *Algorithmica* 13(5):462–471, May 1995, doi:10.1007/BF01190849, MR1323901.
- J31. M. W. Bern, D. P. Dobkin, and D. Eppstein. Triangulating polygons without large angles. *Int. J. Computational Geometry & Applications* 5(1–2):171–192, March–June 1995, doi:10.1142/S0218195995000106, MR1331181. Special issue for 8th SCG.
- J32. M. T. Dickerson and D. Eppstein. Algorithms for proximity problems in higher dimensions. *Computational Geometry Theory & Applications* 5(5):277–291, January 1996, doi:10.1016/0925-7721(95)00009-7, MR1368264.
- J33. D. Eppstein, Z. Galil, G. F. Italiano, and T. H. Spencer. Separator based sparsification I: planarity testing and minimum spanning trees. *J. Computer & Systems Sciences* 52(1):3–27, February 1996, doi:10.1006/jcss.1996.0002, MR1375801. Special issue for 25th STOC.
- J34. D. Eppstein. Average case analysis of dynamic geometric optimization. *Computational Geometry Theory & Applications* 6(1):45–68, April 1996, doi:10.1016/0925-7721(95)00018-6, MR1387673.
- J35. K. L. Clarkson, D. Eppstein, G. L. Miller, C. Sturivant, and S.-H. Teng. Approximating center points with iterated Radon points. *Int. J. Computational Geometry & Applications* 6(3):357–377, September 1996, doi:10.1142/S021819599600023X, MR1409651. Special issue for 9th SCG.
- J36. D. P. Dobkin, D. Eppstein, and D. P. Mitchell. Computing the discrepancy with applications to supersampling patterns. *ACM Trans. Graphics* 15(4):354–376, October 1996, doi:10.1145/234535.234536.
- J37. D. Fernández-Baca, G. Slutzki, and D. Eppstein. Using sparsification for parametric minimum spanning tree problems. *Nordic J. Computing* 3(4):352–366, Winter 1996, MR1436019. Special issue for 5th SWAT.
- J38. D. Eppstein. Zonohedra and zonotopes. *Mathematica in Education and Research* 5(4):15–21, 1996.
- J39. D. Eppstein, M. S. Paterson, and F. F. Yao. On nearest neighbor graphs. *Discrete & Computational Geometry* 17(3):263–282, April 1997, doi:10.1007/PL00009293, MR1432064.
- J40. D. Eppstein. Minimum range balanced cuts via dynamic subset sums. *J. Algorithms* 23(2):375–385, May 1997, doi:10.1006/jagm.1996.0841, MR1441974.
- J41. D. Eppstein. Dynamic connectivity in digital images. *Information Processing Letters* 62(3):121–126, May 1997, doi:10.1016/S0020-0190(97)00056-2, MR1453694.
- J42. D. Eppstein and D. S. Hirschberg. Choosing subsets with maximum weighted average. *J. Algorithms* 24(1):177–193, July 1997, doi:10.1006/jagm.1996.0849, MR1453956.
- J43. D. Eppstein, Z. Galil, G. F. Italiano, and A. Nissenzweig. Sparsification — A technique for speeding up dynamic graph algorithms. *J. ACM* 44(5):669–696, September 1997, doi:10.1145/265910.265914, MR1492341.
- J44. D. Eppstein. Faster circle packing with application to nonobtuse triangulation. *Int. J. Computational Geometry & Applications* 7(5):485–491, October 1997, doi:10.1142/S0218195997000296, MR1471881.
- J45. D. Eppstein. Faster geometric k -point MST approximation. *Computational Geometry Theory & Applications* 8:231–240, October 1997, doi:10.1016/S0925-7721(96)00021-1, MR1472336.
- J46. A. B. Amenta, M. W. Bern, and D. Eppstein. The crust and the β -skeleton: combinatorial curve reconstruction. *Graphical Models & Image Processing* 60/2(2):125–135, March 1998, doi:10.1006/gmip.1998.0465.
- J47. G. Barequet, M. T. Dickerson, and D. Eppstein. On triangulating three-dimensional polygons. *Computational Geometry Theory & Applications* 10(3):155–170, June 1998, doi:10.1016/S0925-7721(98)00005-4, MR1625512.
- J48. D. Eppstein. Geometric lower bounds for parametric matroid optimization. *Discrete & Computational Geometry* 20:463–476, 1998, doi:10.1007/PL00009396, MR1651908.
- J49. D. Eppstein. Finding the k shortest paths. *SIAM J. Computing* 28(2):652–673, 1998, doi:10.1137/S0097539795290477, MR1634364.
- J50. D. Eppstein, Z. Galil, G. F. Italiano, and T. H. Spencer. Separator based sparsification II: edge and vertex connectivity. *SIAM J. Computing* 28(1):341–381, 1999, doi:10.1137/S0097539794269072, MR1630489.
- J51. D. Eppstein. Subgraph isomorphism in planar graphs and related problems. *J. Graph Algorithms & Applications* 3(3):1–27, 1999, doi:10.7155/jgaa.00014, arXiv:cs.DS/9911003, MR1750082.
- J52. A. B. Amenta, M. W. Bern, and D. Eppstein. Optimal point placement for mesh smoothing. *J. Algorithms* 30(2):302–322, February 1999, doi:10.1006/jagm.1998.0984, arXiv:cs.CG/9809081, MR1671836. Special issue for 8th SODA.
- J53. D. Eppstein. Linear complexity hexahedral mesh generation. *Computational Geometry Theory & Applications* 12:3–16, 1999, doi:10.1016/S0925-7721(98)00032-7, arXiv:cs.CG/9809109, MR1677595. Special issue for 12th Symp. Comp. Geom.
- J54. D. Eppstein and J. G. Erickson. Raising roofs, crashing cycles, and playing pool: applications of a data structure for finding pairwise interactions. *Discrete & Computational Geometry* 22(4):569–592, 1999, doi:10.1007/PL00009479, MR1721026. Special issue for SCG 1998.
- J55. M. W. Bern, D. Eppstein, and S.-H. Teng. Parallel construction of quadtrees and quality triangulations. *Int. J. Computational Geometry & Applications* 9(6):517–532, December 1999, doi:10.1142/S0218195999000303, MR1727394.
- J56. A. B. Amenta, M. W. Bern, D. Eppstein, and S.-H. Teng. Regression depth and center points. *Discrete & Computational Geometry* 23(3):305–323, 2000, doi:10.1007/PL00009502, arXiv:cs.CG/9809037, MR1744506.
- J57. D. Eppstein. Diameter and treewidth in minor-closed graph families. *Algorithmica* 27:275–291, 2000, doi:10.1007/s004530010020, arXiv:math.CO/9907126, MR1759751. Special issue on treewidth, graph minors, and algorithms.

- J58. D. Eppstein. Clustering for faster network simplex pivots. *Networks* 35(3):173–180, 2000, doi:10.1002/(SICI)1097-0037(200005)35:3<173::AID-NET1>3.0.CO;2-W, MR1764876.
- J59. D. Eppstein. Fast hierarchical clustering and other applications of dynamic closest pairs. *J. Experimental Algorithmics* 5(1):1–23, June 2000, doi:10.1145/351827.351829, arXiv:cs.DS/9912014, MR1794936.
- J60. M. W. Bern and D. Eppstein. Quadrilateral meshing by circle packing. *Int. J. Computational Geometry & Applications* 10(4):347–360, August 2000, doi:10.1142/S0218195900000206, arXiv:cs.CG/9908016, MR1791192.
- J61. M. B. Dillencourt, D. Eppstein, and D. S. Hirschberg. Geometric thickness of complete graphs. *J. Graph Algorithms & Applications* 4(3):5–17, 2000, doi:10.7155/jgaa.00023, arXiv:math.CO/9910185, MR1787458. Special issue for Graph Drawing '98.
- J62. D. Eppstein. Incremental and decremental maintenance of planar width. *J. Algorithms* 37(2):570–577, November 2000, doi:10.1006/jagm.2000.1107, arXiv:cs.CG/9809038, MR1788850.
- J63. D. Eppstein. Tangent spheres and triangle centers. *American Mathematical Monthly* 108(1):63–66, January 2001, doi:10.2307/2695679, arXiv:math.MG/9909152, MR1857072.
- J64. X. Ge, D. Eppstein, and P. Smyth. The distribution of loop lengths in graphical models for turbo decoding. *IEEE Trans. Information Theory* 47(6):2549–2553, September 2001, doi:10.1109/18.945266, MR1873940.
- J65. M. W. Bern, D. Eppstein, and B. Hutchings. Algorithms for coloring quadrees. *Algorithmica* 32(1):87–94, January 2002, doi:10.1007/s00453-001-0054-2, arXiv:cs.CG/9907030, MR1867026.
- J66. D. Eppstein. Beta-skeletons have unbounded dilation. *Computational Geometry Theory & Applications* 23(1):43–52, July 2002, doi:10.1016/S0925-7721(01)00055-4, arXiv:cs.CG/9907031, MR1902878.
- J67. M. W. Bern and D. Eppstein. Multivariate regression depth. *Discrete & Computational Geometry* 28(1):1–17, July 2002, doi:10.1007/s00454-001-0092-1, arXiv:cs.CG/9912013, MR1904006.
- J68. M. W. Bern, D. Eppstein, and J. G. Erickson. Flipping cubical meshes. *Engineering with Computers* 18(3):173–187, October 2002, doi:10.1007/s003660200016, arXiv:cs.CG/0108020.
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- P3. D. Eppstein. *Efficient algorithms for sequence analysis with concave and convex gap costs*. Ph.D. thesis, Columbia Univ., Computer Science Dept., New York, NY, 10027, USA, 1989, <https://www.ics.uci.edu/~eppstein/pubs/Epp-PhD-89.pdf>.
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Grants and Contracts

- PI, “Algorithms for Molecular Biology, Optimal Triangulation, Minimum Spanning Trees, and Geometric Optimization,” \$200,000, NSF Young Investigator Award CCR-9258355, 1992–1999.
- PI, “Workshop on Computational Topology, Miami, FL, June 10–11, 1999”, \$22,500, NSF Grant CCR-9908620, 1999–2000.
- PI, “Geometric Algorithms in Statistics, Meshing, and Parametric Optimization,” \$222,047, NSF Grant CCR-9912338, 2000–2004.
- Co-PI, “Collaborative Research: Algorithms for Graphs on Surfaces,” \$400,000, NSF Grant CCR-0830403, 2008–2011.
- Co-investigator, “Scalable Methods for the Analysis of Network-Based Data,” \$529,152, Office of Naval Research: Multidisciplinary University Research Initiative (MURI) Award, number N00014-08-1-1015, 2008–2015.
- PI, “Geometric Graph Algorithms,” \$388,861, NSF Grant CCF-1217322, 2012–2015.
- Co-PI, “Collaborative Research: Efficient Algorithms for Cycles on Surfaces,” \$159,987, NSF Grant CCF-1618301, 2016–2019.
- PI, “Sparse Geometric Graph Algorithms,” \$415,894, NSF Grant CCF-1616248, 2016–2019.