# David M. Mount
# Curriculum Vitae

**Notarization.** I have read the following and certify that this curriculum vitae is a current and accurate statement of my professional record.

**Signature:** _(signature)_        **Date:** November 4, 2024

## I. Personal Information

### I.A. UID, Last Name, First Name, Middle Name, Contact Information

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   Department of Computer Science
   Brendan Iribe Center of CS and Engineering
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### I.B. Academic Appointments at UMD

Aug 1999–present: Full Professor

Aug 1990–Aug 1999: Associate Professor

Aug 1984–Aug 1990: Assistant Professor

### I.D. Other Employment

Jan–May 2024 Visiting Professor, Department of Computer Science and Engineering, Hong Kong University of Science and Technology. (While on leave.)

Feb–Jun 2009 Visiting Professor, Department of Computer Science and Engineering, Hong Kong University of Science and Technology. (While on sabbatical leave.)

Jul–Dec 2001 Visiting Professor, Department of Computer Science, Hong Kong University of Science and Technology. (While on sabbatical leave.)

Jun–Dec 1994 Visiting scientist, Max Planck Institute für Informatik, Saarbrücken, Germany. (While on sabbatical leave.)

Aug 1983–Aug 1984: Visiting Assistant Professor, Dept. of Computer Science, Purdue University, West Lafayette, Indiana

## I.E. Educational Background

B.S.: 1977, Purdue University, Computer Science (with highest distinction)

Ph.D.: 1983, Purdue University, Computer Science (Advisor: Christoph Hoffmann)

## II. Research, Scholarly, Creative and/or Professional Activities

### II.A. Books

II.A.1. Books Authored

[1] M. T. Goodrich, R. Tamassia, and D. M. Mount. *Data Structures and Algorithms in C++*. John Wiley & Sons, New York, 2nd edition, 2011. ISBN: 978-0-470-46044-3.

[2] M. T. Goodrich, R. Tamassia, and D. M. Mount. *Data Structures and Algorithms in C++*. John Wiley & Sons, New York, 2004. ISBN: 978-0-471-42924-1.

### II.B. Chapters

II.B.1. Books

[3] D. M. Mount. New directions in approximate nearest-neighbor searching. In *5th Annu. Internat. Conf. Alg. and Discr. Appl. Math. (CALDAM 2019)*, volume LNCS 11394 of *Lecture Notes Comput. Sci.*, pages 1–15. Springer-Verlag, 2019. `doi:10.1007/978-3-030-11509-8_1`.

[4] D. M. Mount. Geometric intersection. In J. E. Goodman, J. O'Rourke, and Csaba D. Tóth, editors, *The Handbook of Discrete and Computational Geometry, 3rd Edition*, pages 1113–1134. CRC Press LLC, Boca Raton, FL, 2017.

[5] D. M. Mount, N. S. Netanyahu, and S. Ratanasanya. New approaches to robust, point-based image registration. In J. LeMoigne, R. Eastman, and N. S. Netanyahu, editors, *Image Registration for Remote Sensing*, pages 179–199. Cambridge University Press, 2011.

[6] S. Arya and D. M. Mount. Computational geometry: Proximity and location. In D. Mehta and S. Sahni, editors, *The Handbook of Data Structures and Applications*, pages 63.1–63.22. CRC Press LLC, Boca Raton, Florida, 2005.

[7] D. M. Mount. Geometric intersection. In J. E. Goodman and J. O'Rourke, editors, *The Handbook of Discrete and Computational Geometry, 2nd Edition*, pages 857–876. CRC Press LLC, Boca Raton, FL, 2004.

[8] D. M. Mount, N. S. Netanyahu, and E. Zuck. Analyzing the number of samples required for an approximate monte-carlo LMS line estimator. In M. Hubert, G. Pison, A. Struyf, and S. Van Aelst, editors, *Theory and Applications of Recent Robust Methods*, Statistics for Industry and Technology, pages 207–219. Birkhauser, Basel, 2004.

[9] S. Maneewongvatana and D. M. Mount. Analysis of approximate nearest neighbor searching with clustered point sets. In M. H. Goldwasser, D. S. Johnson, and C. C. McGeoch, editors, *Data Structures, Near Neighbor Searches, and Methodology: Fifth and Sixth DIMACS Implementation Challenges*, volume 59 of *DIMACS Series in Discr. Math. and Theoret. Comp. Sci.*, pages 105–123. AMS, 2002.

[10] D. M. Mount and A. Rosenfeld. Computational geometry: A subject-classified bibliography of recent research. In R. Klette, A. Rosenfeld, and F. Sloboda, editors, *Advances in Digital and Computational Geometry*, pages 341–363. Springer, Singapore, 1998.

[11] D. M. Mount. Geometric intersection. In J. E. Goodman and J. O'Rourke, editors, *The Handbook of Discrete and Computational Geometry*. CRC Press LLC, Boca Raton, FL, 1997.

[12] P. J. Rousseeuw, N. Netanyahu, and D. M. Mount. New statistical and computational results on the repeated median regression estimator. In S. Morgenthaler, E. Ronchetti, and W. A. Stahel, editors, *New Directions in Statistical Data Analysis and Robustness*, pages 177–194. Birkhauser Verlag, Basel, 1993.

[13] D. M. Mount. The densest double-lattice packing of a convex polygon. In J. Goodman, R. Pollack, and W. Steiger, editors, *Discrete and Computational Geometry: Papers from the DIMACS Special Year*, volume 6 of *DIMACS Series in Discrete Mathematics and Theoretical Computer Science*, pages 245–262. Amer. Math. Soc., 1991.

[14] D. Mount and R. Silverman. Combinatorial and computational aspects of Minkowski decompositions. In R. A. Melter, A. Rosenfeld, and P. Bhattacharya, editors, *Contemporary Mathematics*, volume 119, pages 107–124. Amer. Math. Soc., 1991.

II.C. Refereed Journals

[15] S. Arya, G. D. da Fonseca, and D. M. Mount. Economical convex coverings and applications. *SIAM J. Comput.* (Accepted for publication).

[16] V. J. Wei, R. C.-W. Wong, C. Long, D. M. Mount, and H. Samet. On efficient shortest path computation on terrain surface: A direction-oriented approach. *IEEE Trans. Knowl. and Data Eng.*, 36(8):4129–4143, 2024. `doi:10.1109/TKDE.2024.3363147`.

[17] S. Arya and D. M. Mount. Optimal volume-sensitive bounds for polytope approximation. *Discrete Comput. Geom.* Accepted subject to revisions (Invited submission of best papers from SoCG 2023).

[18] V. J. Wei, R. C.-W. Wong, C. Long, D. M. Mount, and H. Samet. Proximity queries on terrain surface. *ACM Trans. Database Syst.*, 47(4):1–59, 2022. `doi:10.1145/3563773`.

[19] R. Arya, S. Arya, G. D. da Fonseca, and D. M. Mount. Optimal bound on the combinatorial complexity of approximating polytopes. *ACM Trans. Algorithms*, 18:1–29, 2022. `doi:10.1145/3559106`.

[20] A. Flores-Velazco and D. M. Mount. Guarantees on nearest-neighbor condensation heuristics. *Comput. Geom. Theory Appl.*, 2021. `doi:10.1016/j.comgeo.2020.101732`.

[21] F. Betul Atalay and D. M. Mount. Bounds on the cost of compatible refinement of simplex decomposition trees in arbitrary dimensions. *Comput. Geom. Theory Appl.*, 2019. `doi:10.1016/j.comgeo.2019.01.004`.

[22] P. Dasler and D. M. Mount. Modular circulation and applications to traffic management. *Algorithmica*, 2018. `doi:10.1007/s00453-018-0491-9`.

[23] S. Arya, G. D. da Fonseca, and D. M. Mount. Approximate polytope membership queries. *SIAM J. Comput.*, 47:1–51, 2018. `doi:10.1137/16M1061096`.

[24] S. Arya, G. D. da Fonseca, and D. M. Mount. On the combinatorial complexity of approximating polytopes. *Discrete Comput. Geom.*, 58:849–870, 2017. `doi:10.1007/s00454-016-9856-5`.

[25] S. Har-Peled, N. Kumar, D. M. Mount, and B. Raichel. Space exploration via proximity search. *Discrete Comput. Geom.*, 56:357–376, 2016. `doi:10.1007/s00454-016-9801-7`.

[26] D. M. Mount, N. S. Netanyahu, C. D. Piatko, R. Silverman, and A. Y. Yu. A practical approximation algorithm for the LTS estimator. *Computational Statistics & Data Analysis*, 99:148–170, 2016. `doi:10.1016/j.csda.2016.01.016`.

[27] S. A. Friedler and D. M. Mount. A sensor-based framework for kinetic data compression. *Comput. Geom. Theory Appl.*, 48:147–168, 2015. `doi:10.1016/j.comgeo.2014.09.002`.

[28] X. Wei, A. Joneja, and D. M. Mount. Optimal uniformly monotone partitioning of polygons with holes. *Computer Aided Design*, 44:1235–1252, 2012. `doi:10.1016/j.cad.2012.06.005`.

[29] S. Arya, D. M. Mount, and J. Xia. Tight lower bounds for halfspace range searching. *Discrete Comput. Geom.*, 47:711–730, 2012. `doi:10.1007/s00454-012-9412-x`.

[30] S. A. Friedler and D. M. Mount. Approximation algorithm for the kinetic robust $k$-center problem. *Comput. Geom. Theory Appl.*, 43:572–586, 2010. `doi:10.1016/j.comgeo.2010.01.001`.

[31] G. D. da Fonseca and D. M. Mount. Approximate range searching: The absolute model. *Comput. Geom. Theory Appl.*, 43:434–444, 2010. `doi:10.1016/j.comgeo.2008.09.009`.

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[35] M. Cho and D. M. Mount. Improved approximation bounds for planar point pattern matching. *Algorithmica*, 50:175–207, 2008. `doi:10.1007/s00453-007-9059-9`.

[36] S. Arya, T. Malamatos, and D. M. Mount. A simple entropy-based algorithm for planar point location. *ACM Trans. Algorithms*, 3, 2007. `doi:10.1145/1240233.1240240,Article17`.

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[38] N. Memarsadeghi, D. M. Mount, N. S. Netanyahu, and J. Le Moigne. A fast implementation of the ISODATA algorithm. *Internat. J. Comput. Geom. Appl.*, 17:71–103, 2007. `doi:10.1142/S0218195907002252`.

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[41] O. Daescu, J. Luo, and D. M. Mount. Proximity problems on line segments spanned by points. *Comput. Geom. Theory Appl.*, 33:115–129, 2006. `doi:10.1016/j.comgeo.2005.08.007`.

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[44] T. Kanungo, D. M. Mount, N. S. Netanyahu, C. Piatko, R. Silverman, and A. Y. Wu. An efficient $k$-means clustering algorithm: Analysis and implementation. *IEEE Trans. Pattern Anal. Mach. Intell.*, 24:881–892, 2002. `doi:10.1109/TPAMI.2002.1017616`.

[45] T. Kanungo, D. M. Mount, N. S. Netanyahu, C. Piatko, R. Silverman, and A. Y. Wu. Approximating large convolutions in digital images. *IEEE Trans. Image Proc.*, 10:1826–1835, 2001. `doi:10.1109/83.974567`.

[46] D. M. Mount and N. S. Netanyahu. Efficient randomized algorithms for robust estimation of circular arcs and aligned ellipses. *Comput. Geom. Theory Appl.*, 19:1–34, 2001. `doi:10.1016/S0925-7721(01)00009-8`.

[47] M. Murphy, D. M. Mount, and C. W. Gable. A point-placement strategy for conforming delaunay tetrahedralization. *Internat. J. Comput. Geom. Appl.*, pages 669–682, 2001. `doi:10.1142/S0218195901000699`.

[48] S. Arya and D. M. Mount. Approximate range searching. *Comput. Geom. Theory Appl.*, 17:135–163, 2000. `doi:10.1016/S0925-7721(00)00022-5`.

[49] S. Arya, S.-W. Cheng, and D. M. Mount. Approximation algorithm for multiple-tool milling. *Internat. J. Comput. Geom. Appl.*, 11, 2000. 339–372. `doi:10.1142/S0218195901000535`.

[50] D. M. Mount, N. S. Netanyahu, C. Piatko, R. Silverman, and A. Y. Wu. Quantile approximation for robust statistical estimation and $k$-enclosing problems. *Internat. J. Comput. Geom. Appl.*, 10:593–608, 2000. `doi:10.1142/S0218195900000334`.

[51] D. M. Mount, N. S. Netanyahu, R. Silverman, and A. Wu. Chromatic nearest neighbour searching: A query sensitive approach. *Comput. Geom. Theory Appl.*, 17:97–119, 2000. `doi:10.1016/S0925-7721(00)00021-3`.

[52] M. Keil, D. M. Mount, and S. K. Wismath. Visibility stabs and depth-first spiralling on line segments in output sensitive time. *Internat. J. Comput. Geom. Appl.*, 10:535–552, 2000. `doi:10.1142/S0218195900000309`.

[53] S. Arya, D. M. Mount, and M. Smid. Dynamic algorithms for geometric spanners of small diameter: Randomized solutions. *Comput. Geom. Theory Appl.*, 13:91–107, 1999.

[54] D. M. Mount, N. S. Netanyahu, and J. Le Moigne. Efficient algorithms for robust point pattern matching. *Pattern Recogn.*, 32:17–38, 1999.

[55] S. Arya, D. M. Mount, N. S. Netanyahu, R. Silverman, and A. Wu. An optimal algorithm for approximate nearest neighbor searching. *J. Assoc. Comput. Mach.*, 45:891–923, 1998. `doi:10.1145/293347.293348`.

[56] J. Matoušek, D. M. Mount, and N. S. Netanyahu. Efficient randomized algorithms for the repeated median line estimator. *Algorithmica*, 16:498–516, 1998.

[57] J. S. B. Mitchell, D. M. Mount, and S. Suri. Query-sensitive ray shooting. *Internat. J. Comput. Geom. Appl.*, 7:317–347, 1997.

[58] Y. Teng, D. Mount, E. Puppo, and L. Davis. Parallelizing an algorithm for visibility on polyhedral terrain. *Internat. J. Comput. Geom. Appl.*, 7:75–84, 1997.

[59] Esther M. Arkin, P. Belleville, Joseph S. B. Mitchell, D. M. Mount, K. Romanik, S. Salzberg, and D. Souvaine. Testing simple polygons. *Comput. Geom. Theory Appl.*, 8:97–114, 1997.

[60] S. Arya, D. M. Mount, and O. Narayan. Accounting for boundary effects in nearest-neighbor searching. *Discrete Comput. Geom.*, 16:155–176, 1996.

[61] D. M. Mount, R. Silverman, and A. Wu. On the area of overlap of translated polygons. *Computer Vision and Image Understanding*, 64:53–61, 1996.

[62] D. M. Mount and N. Netanyahu. Computationally efficient algorithms for high-dimensional robust estimators. *Graphical Models and Image Processing*, 56:289–303, 1994.

[63] R. Sharma, Y. Aloimonos, and D. M. Mount. Probabilistic analysis of some navigation strategies in a dynamic environment. *IEEE Trans. Syst. Man Cybern.*, 23:1465–1474, 1993.

[64] S. Chandran and D. M. Mount. A parallel algorithm for enclosed and enclosing triangles. *Internat. J. Comput. Geom. Appl.*, 2:191–214, 1992.

[65] S. Chandran, S. Kim, and D. M. Mount. Parallel computational geometry of rectangles. *Algorithmica*, 7:25–49, 1992.

[66] M. B. Dillencourt, D. M. Mount, and N. S. Netanyahu. A randomized algorithm for slope selection. *Internat. J. Comput. Geom. Appl.*, 2:1–27, 1992.

[67] S. Banerjee, D. M. Mount, and A. Rosenfeld. Pyramid computation of neighbor distance statistics in dot patterns. *Graphical Models Image Processing*, 53:373–381, 1991.

[68] S. K. Ghosh and D. M. Mount. An output-sensitive algorithm for computing visibility graphs. *SIAM J. Comput.*, 20:888–910, 1991.

[69] D. Mount and R. Silverman. Packing and covering the plane with translates of a convex polygon. *J. Algorithms*, 11:564–580, 1990.

[70] D. M. Mount. The number of shortest paths on the surface of a polyhedron. *SIAM J. Comput.*, 19:593–611, 1990.

[71] T. Y. Kong, D. M. Mount, and A. W. Roscoe. The decomposition of a rectangle into rectangles of minimal perimeter. *SIAM J. Comput.*, 17:1215–1231, 1988.

[72] Joseph S. B. Mitchell, D. M. Mount, and C. H. Papadimitriou. The discrete geodesic problem. *SIAM J. Comput.*, 16:647–668, 1987.

[73] D. M. Mount. Storing the subdivision of a polyhedral surface. *Discrete Comput. Geom.*, 2:153–174, 1987.

[74] T. Y. Kong, D. M. Mount, and M. Werman. The decomposition of a square into rectangles of minimal perimeter. *Discrete Appl. Math.*, 16:239–243, 1987.

## II.D. Published Conference Proceedings

II.D.1. Refereed Conference Proceedings

[75] A. Abdelkader and D. M. Mount. Smooth data structures for distance queries. In *Proc. 36th Annu. ACM-SIAM Sympos. Discrete Algorithms*, 2025. To appear.

[76] A. H. Gezalyan, S. H. Kim, C. Lopez, D. Skora, Z. Stefankovic, and D. M. Mount. Delaunay triangulations in the Hilbert metric. In *Proc. 19th Scand. Workshop Algorithm Theory*, pages 25:1–25:17, 2024. `doi:10.4230/LIPIcs.SWAT.2024.25`.

[77] A. Abdelkader and D. M. Mount. Convex approximation and the Hilbert geometry. In *Proc. SIAM Symp. Simplicity in Algorithms (SOSA24)*, pages 286–298, 2024. `doi:10.1137/1.9781611977936.26`.

[78] A. Abdelkader and D. M. Mount. Smooth distance approximation. In *Proc. 31st Annu. European Sympos. Algorithms*, pages 5:1–5:18, 2023. `doi:10.4230/LIPIcs.ESA.2023.5`.

[79] A. H. Gezalyan and D. M. Mount. Voronoi diagrams in the Hilbert metric. In *Proc. 39th Internat. Sympos. Comput. Geom.*, pages 35:1–35:16, 2023. `doi:10.4230/LIPIcs.SoCG.2023.35`.

[80] S. Arya and D. M. Mount. Optimal volume-sensitive bounds for polytope approximation. In *Proc. 39th Internat. Sympos. Comput. Geom.*, pages 9:1–9:16, 2023. `doi:10.4230/LIPIcs.SoCG.2023.9`.

[81] S. Arya, G. D. da Fonseca, and D. M. Mount. Economical convex coverings and applications. In *Proc. 34th Annu. ACM-SIAM Sympos. Discrete Algorithms*, pages 1834–1861, 2023. `doi:10.1137/1.9781611977554.ch70`.

[82] A. Flores-Velazco and D. M. Mount. Boundary-sensitive approach for approximate nearest-neighbor classification. In *Proc. 29th Annu. European Sympos. Algorithms*, pages 44:1–44:15, 2021. `doi:10.4230/LIPIcs.ESA.2021.44`.

[83] A. Abdelkader and D. M. Mount. Approximate nearest-neighbor search for line segments. In *Proc. 37th Internat. Sympos. Comput. Geom.*, pages 4:1–4:15, 2021. `doi:10.4230/LIPIcs.SoCG.2021.4`.

[84] A. Flores-Velazco and D. M. Mount. Coresets for the nearest-neighbor rule. In *Proc. 28th Annu. European Sympos. Algorithms*, pages 47:1–47:19, 2020. `doi:10.4230/LIPIcs.ESA.2020.47`.

[85] R. Arya, S. Arya, G. D. da Fonseca, and D. M. Mount. Optimal bound on the combinatorial complexity of approximating polytopes. In *Proc. 31st Annu. ACM-SIAM Sympos. Discrete Algorithms*, pages 786–805, 2020. `doi:10.1137/1.9781611975994.48`.

[86] P. Dasler and D. M. Mount. Online algorithms for warehouse management. In *Proc. 30th Annu. Internat. Sympos. Algorithms Comput.*, pages 56:1–56:21, 2019. `doi:10.4230/LIPIcs.ISAAC.2019.56`.

[87] A. Abdelkader, S. Arya, G. D. da Fonseca, and D. M. Mount. Approximate nearest neighbor searching with non-Euclidean and weighted distances. In *Proc. 30th Annu. ACM-SIAM Sympos. Discrete Algorithms*, pages 355–372, 2019. `doi:10.1137/1.9781611975482.23`.

[88] R. P. Adkins, D. M. Mount, and A. A. Zhang. A game-theoretic approach for minimizing delays in autonomous intersections. In S. Hamdar, editor, *Traffic and Granular Flow '17 (TGF 2017)*. Springer, 2019. `doi:10.1007/978-3-030-11440-4_16`.

[89] A. Abdelkader and D. M. Mount. Economical delone sets for approximating convex bodies. In *Proc. 16th Scand. Workshop Algorithm Theory*, pages 4:1–4:12, 2018. `doi:10.4230/LIPIcs.SWAT.2018.4`.

[90] S. Arya, G. D. da Fonseca, and D. M. Mount. Approximate convex intersection detection with applications to width and Minkowski sums. In *Proc. 26th Annu. European Sympos. Algorithms*, pages 3:1–3:14, 2018. `doi:10.4230/LIPIcs.ESA.2018.3`.

[91] P. Dasler and D. M. Mount. Modular circulation and applications to traffic management. In *Proc. 15th Internat. Sympos. Algorithms Data Struct.*, volume 10389 of *Lecture Notes Comput. Sci.*, pages 277–288. Springer-Verlag, 2017. `doi:10.1007/978-3-319-62127-2_24`.

[92] V. J. Wei, R. C.-W. Wong, C. Long, and D. M. Mount. Distance oracle on terrain surface. In *Proc. 2017 ACM SIGMOD Internat. Conf. on Management of Data (SIGMOD '17)*, pages 1211–1226, 2017. `doi:10.1145/3035918.3064038`.

[93] S. Arya, G. D. da Fonseca, and D. M. Mount. Near-optimal $\varepsilon$-kernel construction and related problems. In *Proc. 33rd Internat. Sympos. Comput. Geom.*, pages 10:1–10:15, 2017. `doi:10.4230/LIPIcs.SoCG.2017.10`.

[94] S. Arya, G. D. da Fonseca, and D. M. Mount. Optimal approximate polytope membership. In *Proc. 28th Annu. ACM-SIAM Sympos. Discrete Algorithms*, pages 270–288, 2017. `doi:10.1137/1.9781611974782.18`.

[95] S. Arya, G. D. da Fonseca, and D. M. Mount. On the combinatorial complexity of approximating polytopes. In *Proc. 32nd Internat. Sympos. Comput. Geom.*, pages 11:1–11:15, 2016. `doi:10.4230/LIPIcs.SoCG.2016.11`.

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[97] P. Dasler and D. M. Mount. On the complexity of an unregulated traffic crossing. In *Proc. 14th Internat. Sympos. Algorithms Data Struct.*, volume 9214 of *Lecture Notes Comput. Sci.*, pages 224–235. Springer-Verlag, 2015. `doi:10.1007/978-3-319-21840-3_19`.

[98] S. Har-Peled, N. Kumar, D. M. Mount, and B. Raichel. Space exploration via proximity search. In *Proc. 31st Internat. Sympos. Comput. Geom.*, pages 374–389, 2015. `doi:10.4230/LIPIcs.SOCG.2015.374`.

[99] S. Arya, D. M. Mount, and E. Park. Approximate geometric MST range queries. In *Proc. 31st Internat. Sympos. Comput. Geom.*, pages 781–795, 2015. `doi:10.4230/LIPIcs.SOCG.2015.78`.

[100] E. Park and D. M. Mount. Output-sensitive well-separated pair decompositions for dynamic point sets. In *Proc. 21st Internat. Conf. on Advances in Geographic Information Systems*, pages 364–373, 2013. `doi:10.1145/2525314.2525364`.

[101] E. Park and D. M. Mount. A self-adjusting data structure for multidimensional point sets. In *Proc. 20th Annu. European Sympos. Algorithms*, volume 7501 of *Lecture Notes Comput. Sci.*, pages 778–789. Springer-Verlag, 2012. `doi:10.1007/978-3-642-33090-2_67`.

[102] S. Arya, G. D. da Fonseca, and D. M. Mount. Optimal area-sensitive bounds for polytope approximation. In *Proc. 28th Annu. Sympos. Comput. Geom.*, pages 363–372, 2012. `doi:10.1145/2261250.2261305`.

[103] S. Arya, G. D. da Fonseca, and D. M. Mount. Polytope approximation and the Mahler volume. In *Proc. 23rd Annu. ACM-SIAM Sympos. Discrete Algorithms*, pages 29–42, 2012. `doi:10.1137/1.9781611973099.3`.

[104] S. Arya, G. D. da Fonseca, and D. M. Mount. Approximate polytope membership queries. In *Proc. 43rd Annu. ACM Sympos. Theory Comput.*, pages 579–586, 2011. `doi:10.1145/1993636.1993713`.

[105] S. Arya, G. D. da Fonseca, and D. M. Mount. A unified approach to approximate proximity searching. In *Proc. 18th Annu. European Sympos. Algorithms*, volume LNCS 6346/2011 of *Lecture Notes Comput. Sci.*, pages 374–385. Springer-Verlag, 2010. `doi:10.1007/978-3-642-15775-2_32`.

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## II.E. Conferences, Workshops, and Talks

### II.E.1. Keynotes

[1] "Approximation Algorithms for Geometric Proximity Problems," 2017 European Symp. on Algorithms (ESA), Vienna, Austria, 2017.

[2] "On Approximate Range Searching, or Get in Shape; Round is a Good Choice," 18th Canadian Conf. on Computational Geometry (CCCG), Kingston, Ontario, 2006.

[3] "Keep Your Friends Close and Your Enemies Closer: The Art of Proximity Searching," 8th Workshop on Algorithm Engineering and Experiments (ALENEX'06), Miami, Florida, 2006.

[4] "The ABCs of AVDs: Geometric Retrieval Made Simple," International Symposium on Algorithms on Algorithms and Comptation (ISAAC) 2004, Hong Kong.

### II.E.2. Invited Talks

[1] "Economical Convex Coverings and Applications," Tel Aviv University (Dec 2022).

[2] Cornell, Maryland, Max Planck Pre-doctoral Research School (CMMRS), MPI Saarbrücken, Germany (Aug 2–7, 2021).

   (a) "Geometric Approximation - Basic Concepts,"

   (b) "Recent Developments in Approximate Proximity Searching,"

[3] Cornell, Maryland, Max Planck Pre-doctoral Research School (CMMRS), MPI Saarbrücken, Germany (Aug 2–7, 2021).

    (a) "Geometric Approximation - Basic Concepts,"

    (b) "Recent Developments in Approximate Proximity Searching,"

[4] "Innovations in Convex Approximation and Applications," Workshop on Computational Geometry, Schloss Dagstuhl, Wadern, Germany (Apr 2019).

[5] "Computing Approximate Euclidean Minimum Spanning Trees" ISI Kolkata, India (Feb 2019).

[6] "New Directions in Approximate Nearest-Neighbor Searching" Invited talk at CALDAM 2019, Kharagpur, India, (Feb 2019).

[7] "Multi-Dimensional Geometric Approximation: Algorithms and Data Structures" Hamilton Mathematics Institute, Trinity College, Dublin Ireland (Jun 2018).

[8] "Approximating Convex Bodies and Applications," Ohio State TGDA Workshop (May 2018).

[9] SCGP Spring School on Discrete and Computational Geometry, Stonybrook University (Apr 17-21, 2017).

    (a) "Computing Approximate Euclidean Minimum Spanning Trees"

    (b) "Approximate Nearest Neighbor Searching and Polytope Approximation"

    (c) "Convex Approximation: Macbeath Regions and Delone Sets"

[10] "A Fast and Simple Algorithm for Computing Approximate Euclidean Minimum Spanning Trees," Highlights of Algorithms, Paris (Jun 2016).

[11] "Range Queries Involving Geometric Structures," University of Pennsylvania, (Nov 2015).

[12] "Extracting Local Structures from Geometric Networks," University of California Irvine, (Mar 2015).

[13] Winter School in Computational Geometry, Amirkabir University, Tehran, Iran (Feb 26–Mar 2, 2015):

    (a) "Point Location: Entropy and Expected-case Efficiency"

    (b) "Well-Separated Pair Decompositions and Applications"

    (c) "Approximation Algorithms for Euclidean Minimum Spanning Trees"

    (d) "Data Structures for Approximate Nearest Neighbor Searching"

    (e) "Approximate Nearest Neighbor Searching and Polytope Approximation"

[14] "A New Algorithm for Approximating the Euclidean Minimum Spanning Tree," Shiraz University, Shiraz, Iran (Feb 2015).

[15] "A New Algorithm for Approximating the Euclidean Minimum Spanning Tree," University of Maryland, Theory Day (Oct 2015).

[16] "Output-Sensitive Well-Separated Pair Decompositions for Dynamic Point Sets," Workshop on Computational Geometry, Schloss Dagstuhl, Wadern, Germany (Mar 2013).

[17] "How to Rotate Trees in Space," Bryn Mawr College (Mar 2013).

[18] "Approximate Nearest Neighbor Searching and Polytope Approximation," University of Maryland, Theory Day (Oct 2012).

[19] "Approximate Nearest Neighbor Searching and Polytope Approximation," George Mason University (Sep 2012).

[20] "Proximity Searching and the Quest for the Holy Grail," Computational Geometry: Applications, Practice, and Theory, (Jun 2012).

[21] "Proximity Searching in Euclidean and Other Metric Spaces," NASA Goddard Space Flight Center, Beltsville, Maryland (Nov 2009).

[22] "On Proximity Searching in Euclidean and Metric Spaces," Federal University of Rio de Janeiro (UFRJ), Rio de Janeiro, Brazil (Oct 2008).

[23] "Embedding and Similarity Search for Point Sets under Translation," National Institute of Pure and Applied Mathematics (IMPA), Rio de Janeiro, Brazil (Oct 2008).

[24] "Embedding and Similarity Search for Point Sets under Translation," Hong Kong University of Science and Technology (Aug 2008).

[25] "Fat is Good: The Skinny on Approximate Range Searching," University of Texas, Dallas (Feb 2007).

[26] "Keep Your Friends Close and Your Enemies Closer: The Art of Proximity Searching," George Mason University (Sep 2006).

[27] "Keep Your Friends Close and Your Enemies Closer: The Art of Proximity Searching," University of Buffalo (Apr 2006).

[28] "Two Heads are Better Than One: Combining Two Heuristics to Produce One Approximation Algorithm", Georgetown University (Oct 2005).

[29] "On the Least Median Square Problem," Invited talk at Interface 2004 (May 2004).

[30] "Data Structures for Approximate Proximity and Range Searching," CSCAMM Workshop on the Fast Multipole Method, University of Maryland (Apr 2004).

[31] "Maintaining Geometric Structures under Incremental Motion," Hong Kong University of Science and Technology (Jan 2004).

[32] "Maintaining Geometric Structures under Incremental Motion," Workshop on Robot Navigation (Dec 2003).

[33] "Approximate Voronoi Diagrams," Mathematical Sciences Research Institute (MSRI), Berkeley (Oct 2003).

[34] "Approximation Algorithms for Clustering," University of Alabama (Sep 2003).

[35] "Approximate Voronoi Diagrams," University of Illinois at Urbana-Champaign (Jul 2003).

[36] "Analyzing The Number of Samples Required for an Approximate Monte-Carlo LMS Line Estimator," DIMACS Workshop on Data Depth, (May 2003).

[37] "Incremental Motion and $k$-Means Clustering," DIMACS Workshop on Motion (Nov 2002).

[38] "$k$-Means Clustering and Applications," University of Notre Dame (Apr 2002).

[39] "$k$-Means Clustering and Applications in Image Processing," 11th Workshop on Theoretical Foundations of Computer Vision, Schloss Dagstuhl, Wadern, Germany (Apr 2002).

[40] "Analysis of a Local-Search Approximation Algorithm for k-Means Clustering", Hong Kong University of Science and Technology (Nov 2001).

[41] "Two Heads are Better Than One: Combining Two Heuristics to Produce One Approximation Algorithm", Hong Kong University of Science and Technology (Oct 2001).

[42] "Pseudo-kinetic Algorithms for Data Clustering", University of Pisa (Sep 1999).

[43] "Nearest Neighbor Searching: New Issues, New Questions", Invited Talk at IWOSS'99 (International Workshop on Similarity Search), (Sep 1999).

[44] "Hierarchical Algorithms for Geometric Optimization", Hong Kong University of Science and Technology (Jun 1999).

[45] "Computational Geometry for Solid Modeling", (tutorial presented at the 1999 ACM Solid Modeling Symposium), (Jun 1999).

[46] "Pseudo-kinetic Algorithms for Data Clustering", Los Alamos National Laboratory, Los Alamos, New Mexico (Mar 1999).

[47] "Improved Algorithms for Robust Point Matching and Applications to Image Registration", University of Tokyo, Tokyo, Japan (Nov 1998).

[48] "Robust Line Estimators (fitting good lines to bad data)", Georgetown University (Oct 1997).

[49] "Practical Approaches to Nearest Neighbor Searching in Moderate Dimensions", University of Tokyo, Tokyo, Japan (Jul 1997).

[50] "Robust Line Estimators", University of Genova, Genova, Italy (Jun 1997)

[51] "A Practical Algorithm for the LMS Line Estimator", Schloss Dagstuhl, Wadern, Germany (Feb 1997).

[52] "Robust Line Estimators", Hong Kong University of Science and Technology (Jan 1997)

[53] "Routing and Clustering in Graphs", Census Bureau, Suitland, Maryland (Oct 1996).

[54] "Tree Decomposition of Spanners", Max-Planck Institute for Computer Science, Saarbrücken, Germany (Nov 1994).

[55] "Spanners Constructed from Well-Separated Pair Decompositions", Max-Planck Institute for Computer Science, Saarbrücken, Germany (Nov 1994).

[56] "Nearest Neighbor Searching and Related Problems", Freiburg University, Freiburg, Germany (Sep 1994).

[57] "Geometric Structures", A series of 3 lectures presented at Bilkent University, Ankara, Turkey (Aug 1994).

[58] "Nearest Neighbor Searching", Johns Hopkins University, (May 1993).

[59] "Nearest Neighbor Searching", University of New Hampshire, (Mar 1993).

[60] "Minimum enclosures with specified angles", SPIE OE/Technology '92, Boston (Nov 1992).

[61] "Approximate Nearest Neighbor Searching", University of Virginia (Sep 1992).

[62] "Intersection Detection and Polygon Separators", SUNY at Stony Brook (Aug 1992).

[63] "Geometric Packing and Covering", Department of Mathematics, University of Maryland (Feb 1992).

[64] "Confronting Exponential Blow-up in Nearest Neighbor Searching", UMIACS Applied Computational Geometry Day, University of Maryland (Feb 1992).

[65] "Intersection Detection and Polygon Separators", Invited talk at the MSI Workshop on Computational Geometry, SUNY at Stony Brook (Oct 1991).

[66] "Computational Geometry and Mesh Generation," NASA Langley (Sep 1991).

[67] "Geometric Packing and Covering," Cornell University (Apr 1991).

[68] "Intersection Detection and Polygon Separators", Cornell University (Apr 1991).

[69] "Geometric Packing and Covering," 1990 ORSA/TIMS Conference (Oct 1990).

[70] "Slope Selection," National Institute of Standards and Technology, Gaithersburg, Maryland (Dec 1989).

[71] "Object Detection in Images by Probing," AMS Special Session on Mathematics in Computer Vision, Hoboken, New Jersey (Oct 1989).

[72] "Geometric Packing and Covering," DIMACS Workshop on Geometric Complexity, Princeton University (Oct 1989).

[73] "Geometric Packing and Covering," Cornell University (Nov 1988).

[74] "Geometric Algorithms and Data Structures," Virginia Tech, (Feb 1988).

[75] "An Output Sensitive Algorithm for Constructing Visibility Graphs," New York University (Nov 1987).

[76] "On the Number of Shortest Paths on Convex Polyhedra," New York University, Computational Geometry Day (Jan 1987).

[77] "Packing Flexible Objects," Johns Hopkins University (Apr 1986) and UMIACS Colloquium Series (Apr 1986).


## II.G. Book Reviews, Notes, and Other Contributions

- D. M. Mount, "ANN Programming Manual," (unpublished software manual), 1998 (available from `www.cs.umd.edu/~mount/ANN`).


## II.J. Sponsored Research – Administered by the Office of Research Administration (ORA)

### II.J.1. Grants

[1] 08/16–08/20, NSF Grant CCF-1618866, "New Challenges in Geometric Search and Retrieval," $407,537 PI.

[2] 09/11–09/16, NSF Grant CCF-1117259, "New Challenges in Geometric Search and Retrieval," $345,349, PI.

[3] 05/08–04/14, ONR MURI Grant 20082040, "Scalable Methods for the Analysis of Network-Based Data," $462,642, co-I. (This is my part of a $5,381,300 grant involving multiple PIs from U.C. Irvine, U. Washington, and Penn State.)

[4] 10/06–09/10, NSF Grant CCF-0635099, "Approximation Algorithms for Geometric Retrieval," $307,386, PI.

[5] 08/01–08/06, NSF Grant CCR-0098151, "Structure-Sensitive Geometric Algorithms and Data Structures," $255,000, PI.

[6] 09/97–08/01, NSF Grant CCR-9712379, "Geometric Tools and Applications", $208,789, PI.

[7] 08/93–01/96, NSF Grant CCR-9310705, "Geometric Tools and Applications", $65,584, PI.

[8] 08/93–01/96, NSF ROA Supplement to CCR-9310705, $13,116.

[9] 02/91–03/93, Bureau of the Census JSA 91-5 "Interviewer Assignment and Routing", $21,000, PI.

[10] 10/89–09/90, Bureau of the Census Grant JSA 89-32, "Efficient Joint Triangulation for Mapping", $25,000, PI.

[11] 07/89–12/91 NSF Grant CCR-89-08901, "Geometric Packing, Covering and Path Planning", $32,901, PI.

II.P. Research Fellowships, Prizes and Awards

[1] Symposium on Computational Geometry Test of Time Award, 2021 (for the paper "The analysis of a simple $k$-means clustering algorithm," by T. Kanungo, D. M. Mount, N. S. Netanyahu, C. D. Piatko, R. Silverman, and A. Y. Wu., SoCG, 2000, 100–109)

## III. Teaching, Extension, Mentoring, and Advising

III.A. Courses Taught

| | | |
|---|---|---|
| Spring 2023 | CMSC 420 | Advanced Data Structures (145 students) |
| Fall 2022 | CMSC 420 | Advanced Data Structures (141 students) |
| Spring 2022 | CMSC 420 | Advanced Data Structures (149 students) |
| Fall 2021 | CMSC 754 | Computational Geometry (47 students) |
| Spring 2021 | CMSC 420 | Advanced Data Structures (190 students - Online) |
| Fall 2020 | CMSC 420 | Advanced Data Structures (170 students - Online) |
| Spring 2020 | CMSC 754 | Computational Geometry (45 students) |
| Fall 2019 | CMSC 420 | Advanced Data Structures (140 students) |
| Fall 2018 | CMSC 425 | Game Programming (80 students) |
| Spring 2018 | CMSC 425 | Game Programming (50 students) |
| Fall 2017 | CMSC 451 | Design and Analysis of Algorithms (85 students) |
| Spring 2017 | CMSC 425 | Game Programming (50 students) |
| Fall 2016 | CMSC 754 | Computational Geometry (33 students) |
| Spring 2016 | CMSC 425 | Game Programming (52 students) |
| Fall 2015 | CMSC 451 | Design and Analysis of Algorithms (70 students) |
| Spring 2014 | CMSC 425 | Game Programming (50 students) |

| | | |
|---|---|---|
| Fall 2013 | CMSC 451 | Design and Analysis of Algorithms (50 students) |
| | CMSC 427 | Computer Graphics (40 students) |
| Spring 2013 | CMSC 425 | Game Programming (51 students) |
| Fall 2012 | CMSC 451 | Design and Analysis of Algorithms (45 students) |
| Spring 2012 | CMSC 754 | Computer Graphics (48 students) |
| Fall 2011 | CMSC 427 | Computer Graphics (42 students) |
| Spring 2011 | CMSC 498M | Game Programming (17 students) |
| Fall 2010 | CMSC 427 | Computer Graphics (26 students) |
| Spring 2010 | CMSC 754 | Computational Geometry (31 students) |
| Fall 2009 | CMSC 427 | Computer Graphics (30 students) |
| Spring 2008 | CMSC 451 | Design and Analysis of Algorithms (28 students) |
| Fall 2007 | CMSC 498M | Game Programming (14 students) |
| Spring 2007 | CMSC 754 | Computational Geometry (29 students) |
| Fall 2006 | CMSC 498M | Game Programming (18 students) |
| Spring 2006 | CMSC 427 | Computer Graphics (24 students) |
| Fall 2005 | CMSC 754 | Computational Geometry (30 students) |
| Fall 2004 | CMSC 131 | Object-Oriented Programming I (180 students) |
| Spring 2004 | CMSC 427 | Computer Graphics (53 students) |
| Fall 2003 | CMSC 451 | Design and Analysis of Algorithms (50 students) |
| Spring 2003 | CMSC 427 | Computer Graphics (65 students) |
| Fall 2002 | CMSC 754 | Computational Geometry (48 students) |
| Spring 2001 | CMSC 420 | Data Structures (55 students) |
| Fall 2000 | CMSC 427 | Computer Graphics (42 students) |
| Spring 2000 | CMSC 754 | Computational Geometry (38 students) |
| | CMSC 858K | Data Struct. and Algorithms. for Inf. Retrieval (7 students) |
| Fall 1999 | CMSC 451 | Design and Analysis of Algorithms (58 students) |
| Spring 1998 | CMSC 251 | Algorithms (85 students) |
| Fall 1997 | CMSC 754 | Computational Geometry (50 students) |
| Spring 1997 | CMSC 427/828M | Computer Graphics (80 students) |
| Fall 1996 | CMSC 451 | Design and Analysis of Algorithms (60 students) |
| Spring 1996 | CMSC 451 | Design and Analysis of Algorithms (60 students) |
| Fall 1995 | CMSC 498M/828M | Computer Graphics (70 students) |
| Spring 1994 | CMSC 651 | Analysis of Algorithms (40 students) |
| Fall 1993 | CMSC 420 | Data Structure (55 students) |
| Spring 1993 | CMSC 420 | Data Structure (60 students) |
| | CMSC 498C/828C | Computer Graphics (55 students) |
| Fall 1992 | CMSC 451 | Design and Analysis of Algorithms (55 students) |
| Spring 1992 | CMSC 420 | Data Structure (50 students) |
| Fall 1991 | CMSC 451 | Design and Analysis of Algorithms (70 students) |
| Spring 1991 | CMSC 451 | Design and Analysis of Algorithms (60 students) |
| Fall 1990 | CMSC 251 | Algorithms (135 students) |
| Spring 1990 | CMSC 498C/828C | Computer Graphics (35 students) |
| Fall 1989 | CMSC 451 | Design and Analysis of Algorithms (50 students) |
| Spring 1989 | CMSC 451 | Design and Analysis of Algorithms (50 students) |
| Fall 1988 | CMSC 498C/828C | Computer Graphics (30 students) |

| | | |
|---|---|---|
| Spring 1988 | CMSC 651 | Analysis of Algorithms (40 students) |
| Fall 1987 | CMSC 452 | Elementary Theory of Computation (55 students) |
| Spring 1987 | CMSC 451 | Design and Analysis of Algorithms (55 students) |
| Fall 1986 | CMSC 451 | Design and Analysis of Algorithms (50 students) |
| Spring 1986 | CMSC 651 | Analysis of Algorithms (12 students) |
| Fall 1985 | CMSC 451 | Design and Analysis of Algorithms (45 students) |
| Spring 1985 | CMSC 651 | Analysis of Algorithms (12 students) |

### III.B. Teaching Innovations

#### III.B.8. Other

- Unpublished class lecture notes:

  [1] CMSC 451: Algorithm Design, 2017, `cs.umd.edu/class/fall2017/cmsc451-0101/`

  [2] CMSC 425: Game Programming, 2018, `cs.umd.edu/class/fall2018/cmsc425/`

  [3] CMSC 754: Computational Geometry, 2016, `cs.umd.edu/class/fall2016/cmsc754/`

  [4] CMSC 427: Computer Graphics, 2013, `cs.umd.edu/class/fall2013/cmsc427/`

  [5] CMSC 420: Advanced Data Structures, 2019, `cs.umd.edu/class/fall2019/cmsc420-0201/`

  [6] CMSC 251: Algorithms, 1998, `cs.umd.edu/~mount/251`

### III.C. Advising: Research or Clinical

#### III.C.1. Undergraduate

[1] Davin Park, *Classes of Graphs with Fast Isomorphism Tests: An Overview*, 2021-22

[2] Nathan Hayes, *Classes of Graphs with Fast Isomorphism Tests: An Overview*, 2021-22

[3] Austin Antonacci, *Image Registration through Partial Matching and Knee Detection*, 2020-21

[4] Mary Monroe, *Efficient Approximation Algorithms for Multiple-Tour TSP*, 2020-21

[5] Aranya Bannerjee, *Robust Geometric Set Cover*, 2019–20

[6] Dhruv Mehta, *Empirical Analysis of Convex Hull Algorithms*, 2019–20

[7] Robert Adkins, *Algorithmic Game Theory for Traffic Problems*, 2015–17

[8] Phong Dinh, *Comparison of Euclidean Minimum Spanning Tree Algorithms*, 2015–17

[9] Joseph Brosinham, *Hierarchical Meshes for Level-of-Detail in Graphics*, 2015

[10] Taylor Moore, *The Held-Karp Lower Bound for Euclidean TSP*, 2015

[11] Chaojun Li, *Euclidean Minimum Spanning Trees Based on Well Separated Pair Decompositions*, 2014

[12] Aharon Turpie, *Water Simulation*, 2014

[13] Jeremy Ulrich, *Rigid Body Simulation*, 2013

[14] John Ingraham, *Visualizing Hulls, Upper Envelopes, Voronoi Diagrams, and Delaunay Triangulations*, 2013

[15] Michael Auerbach, *Procedural Grass Animation*, 2013

[16] Ciara Belle, *Particle Systems: Theory and Practice*, 2012

[17] Dustin Biser, *Rigid2D: Library for 2D physics and collision*, 2012

[18] Michail Denchev, *Rigid2D: Library for 2D physics and collision*, 2012

[19] Steven Dobek, *Fluid Dynamics and the Navier-Stokes Equation*, 2012

[20] Alisa Chen, *Rendering Crystal Glass Caustics*, 2011

[21] David Yoo, *Reflection Mapping with Shaders*, 2008

[22] William Mennell, *Circular Trapezoidal Decomposition*, 2007

[23] Chihiro Hirai, *High Dynamic Range Images on Low Dynamic Range Displays through Tone Mapping*, 2005

[24] Jordan Richardson, *Object Oriented Programming in Macromedia Flash MX*, 2005

[25] Steven Helfand (Honors), *Advanced Methods in Texture Mapping*, 2004

[26] Yulia Eyman, *A Survey of Current Fire Models and Applications to 3D Studio Max*, 2004

[27] Tzu-Hsiu (Kevin) Chiou, *Roadmap-Based Methods for Flocking Motion with Obstacles*, 2004

[28] Istvan Lazslo (Honors), *Moons of Mars Explorer*, 2004

[29] In-Joon Chu, *Data Structures for Approximate Voronoi Diagrams*, 2003

[30] Carina Hassan (Honors), *On the Effective Use of a Web Page Design*, 2001

[31] Ransom Winder (Honors, CMPS Outstanding Graduating Seniors), *Kinetic PR Quadtree*, 2001

[32] Aleksey Martynov (Honors), *Ray trace spheres*, 2000

[33] Amy Yuan (Honors), *Image Flaw Removal by Airbrushing*, 1999

[34] Maria Jump, *Design and Implementation of an Interactive Ray Tracer*, 1998

[35] James Starz, *An Implementation of Arora's TSP Approximation Algorithm*, 1997

[36] Gregory Seidman, *VRML Extension Package*, 1996

[37] Shu Cheah, *A Recursive Ray Tracer that Renders Caustic Lighting Effects*, 1996

[38] Connie Peng, *Graphics Applets*, 1996

[39] Ed Craft, *A Sampling of Applets*, 1996

[40] Salim Chwaro, *Topology Trees*, 1994

[41] Daniel Bounds, *Graphical Motion Simulator*, 1993

III.C.2. Master's

[1] Jerry Qian (Nonthesis option), 2021

[2] Xue Li (Nonthesis option), 2016

[3] William Goh (Nonthesis option), 2013

[4] Cengiz Celik (Nonthesis option), 2000

[5] Shu Cheah (Nonthesis option), 1997

[6] Connie Peng (Nonthesis option), 1997

[7] Yi Qiu (Nonthesis option), 1997

[8] Steven Han (Nonthesis option), 1997

[9] Tobin Hill (Nonthesis option), 1996

[10] ZhaoYu Liu (Nonthesis option), 1994

[11] Shuo-Jen Wu (Nonthesis option), 1993

[12] Salil Joshi (Nonthesis option), 1992

[13] TianXiong Xue (Nonthesis option), 1992

[14] Kuodung Shih (Nonthesis option), 1992

[15] Adrienne Paiewonsky (Thesis title: Continuous Rotating Calipers: Application, Design and Implementation), 1989

[16] Pauline Hwang (Nonthesis option), 1987

III.C.3. Doctoral

Current advisees: Alejandro Flores, Aditya Acharya, Shuhao Tan

[1] Alejandro Flores-Velazco, *Algorithms and Data Structures for Faster Nearest-Neighbor Classification*, 2022 (Role: Advisor, Placement: Google)

[2] Ahmed Abdelkader, *Adaptive Sampling for Geometric Approximation*, 2020 (Role: Advisor, Placement: University of Texas, Austin (Postdoc)).

[3] Phillip Dasler, *Efficient Algorithms for Coordinated Motion in Shared Spaces*, 2020 (Role: Advisor).

[4] Eunhui Park, *Dynamic Data Strucutures for Geometric Search and Retrieval*, 2013 (Role: Advisor, Placement: Goldman Sachs, New York).

[5] Sorelle A. Friedler, *Geometric Algorithms for Objects in Motion*, 2010 (Role: Advisor, Placement: Haverford College, Philadelphia).

[6] Minkyoung Cho, *Approximation Algorithms for Point Pattern Matching and Searching*, 2010 (Role: Advisor, Placement: MyongJi University, South Korea).

[7] Guilherme Dias da Fonseca, *Approximate Range Searching in the Absolute Error Model*, 2007 (Role: Advisor, Placement: Aix-Marseille University, France).

[8] Nargess Memarsadeghi, *Efficient Algorithms for Clustering and Interpolation of Large Spatial Data Sets*, 2007 (Role: Advisor, Placement: NASA Goddard Space Flight Center).

[9] Cengiz Celik, *New Approaches to Similarity Searching in Metric Spaces*, 2006 (Role: Advisor, Placement: Bilkent University, Turkey).

[10] F. Betul Atalay, *Spatial Decompositions for Geometric Interpolation and Efficient Rendering*, 2004 (Role: Advisor, Placement: St. Joseph's University, Philadelphia).

[11] Michael Murphy, *Delaunay Triangulations and Control-Volume Mesh Generation*, 2002 (Role: Advisor).

[12] Songrit Maneewongvatana, *Multi-Dimensional Nearest Neighbor Searching with Low Dimensional Data*, 2001 (Role: Advisor, Placement: King Mongkutt University, Thailand).

[13] Fan-Tao Pu, *Data Structures for Global Illumination Computation and Visibility Queries in 3-Space*, 1998 (Role: Advisor).

[14] Sunil Arya, *Nearest Neighbor Searching and Applications*, 1993 (Role: Advisor, Placement: Hong Kong University of Science and Technology).

[15] Thomas Kao, *Efficient/Practical Algorithms for Geometric Structures: Convex Hulls, Delaunay Triangulations and Voronoi Diagrams*, 1992 (Role: Advisor).

[16] Nathan Netanyahu, *Computationally Efficient Algorithms for Robust Estimators.*, 1991 (Role: Co-Advisor with Azriel Rosenfeld, Placement: Bar-Ilan University, Israel).

[17] Sharat Chandran, *Merging in Parallel Computational Geometry*, 1989 (Role: Co-Advisor with Larry Davis, Placement: IIT Mumbay).

III.C.5. Other Research Directions (e.g., K-12 Interactions)

[1] Alice Zhang, Montgomery Blair High School, 2016–2018 (Regeneron Talent Search Finalist, 2018).

[2] Sachin Pandey, Montgomery Blair High School, 2014–2015.

[3] Prayaag Ventkat, Mt. Hebron High School, 2013–2014.

[4] Walter Tan, Montgomery Blair High School, 2012–2013.

[5] Qinlan Shen, Poolesville High, 2010–2011.

[6] Ryan Cooper, Eleanor Roosevelt High School, 1996–1997.

III.D. Mentorship

III.D.1. Junior Faculty

[1] Prof. Marine Carpuat, 2022–present.

[2] Prof. Max Leiserson, 2018–2019.

[3] Prof. Elaine Shi, 2014–2015.

[1] University of Maryland, Dept. of Computer Science, Award for Teaching Excellence, 2020.

[2] University of Maryland, Dept. of Computer Science, Award for Teaching Excellence, 2013.

[3] University of Maryland, School of CMPS, Dean's Award for Excellence in Teaching, 2005.

[4] Hong Kong University of Science and Technology, School of Engineering, Award for Teaching Excellence Appreciation, 2001.

[5] University of Maryland, School of CMPS, Honorable Mention Citation for Excellence in Teaching, 2000.

[6] University of Maryland, Dept. of Computer Science, Award for Teaching Excellence, 1999.

[7] University of Maryland, School of CMPS, Dean's Award for Excellence in Teaching, 1997.

[8] National Technological University, List of Outstanding Instructors, 1994.

[9] University of Maryland, Dept. of Computer Science, Award for Teaching Excellence, 1993.

[10] University of Maryland, Dept. of Computer Science, Award for Teaching Excellence, 1991.

[11] University of Maryland, Dept. of Computer Science, Award for Teaching Excellence, 1987.

[12] University of Maryland, Dept. of Computer Science, Award for Teaching Excellence (Honorable mention), 1986.

[13] Purdue University, School of Science List of Outstanding Teachers in Science, 1984.


## IV. Service and Outreach

IV.A. Editorships, Editorial Boards, and Reviewing Activities

IV.A.2. Editorial Boards

[1] *TheoretiCS*, Editorial board member (2021–present)

[2] *Computational Geometry: Theory and Applications*, Associate Editor (2012–present)

[3] *International J. Computational Geometry and Applications*, Associate Editor (2008–present)

[4] *ACM Trans. Spatial Algorithms and Systems*, Senior Associate Editor (2013–2020)

[5] *ACM Trans. Mathematical Software*, Associate Editor (2006–2018)

[6] *Pattern Recognition.* Editorial board member (1999–2006)

[7] *Computational Geometry: Theory and Applications.* Guest editor for the special issue on papers from the "19th Annual Symposium on Computational Geometry, 2003," Vol 31, 2005

IV.A.4. Reviewing Activities for Agencies and Foundations

[1] NSF CAREER Program Review Panel (Algorithmic Foundations), 2016

[2] NSF CCF Proposal Review Panel (Algorithmic Foundations), 2014

[3] NSF CCF Proposal Review Panel (Algorithmic Foundations), 2012

[4] NSF CAREER Program Review Panel (Theoretical Foundations), 2010

[5] NSF CAREER Proposal Review Panel (Theoretical Foundations), 2006

[6] NSF ITR Proposal Review Panel (Numerical and Symbolic Computation), 2001

[7] NSF CCR Proposal Review Panel (Numerical and Symbolic Computation), 1997

[8] NSF CAREER Program Panel Review (Numerical and Symbolic Computation), 1996

IV.A.5. Reviewing Activities for Conferences

[1] Program Committee, 40th International Symposium on Computational Geometry (SoCG), 2024

[2] Program Committee, 18th Algorithms and Data Structures Symposium (WADS), 2023

[3] Program Committee, 18th Algorithms and Data Structures Symposium (WADS), 2023

[4] Program Committee, 63rd Annual Symposium on Foundations of Computer Science (FOCS), 2022

[5] Program Committee, 30th European Symposium on Algorithms (ESA-B), 2022

[6] Program Committee, 33th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA), 2021

[7] Program Committee, Member 12th International Conference on Similarity Search and Applications (SISAP), 2019

[8] Program Committee, 34th International Symposium on Computational Geometry (SoCG), 2018

[9] Program Committee, Workshop on Algorithms and Computation (WALCOM), 2017

[10] Program Committee, 8th International Conference on Similarity Search and Applications (SISAP), 2015

[11] Program Committee, 26th Annual ACM-SIAM Symposium on Discrete Algorithms (SODA), 2014

[12] Program Committee, Computational Geometry: Young Researchers Forum (CG:YRF), 2013 (workshop of the 29th Symposium on Computational Geometry)

[13] Program Committee, Workshop on Algorithms and Computation (WALCOM), 2013

[14] Program/Organizing Committee, Algorithmic and Statistical Approaches for Large Social Network Data Sets (workshop of NIPS), 2012

[15] Program Committee, Computational Geom.: Applications, Practice, and Theory (CG:APT), 2012 (workshop of the 28th Symposium on Computational Geometry)

[16] Program Committee, 26th Annual Symposium on Computational Geometry (SoCG), 2011

[17] Program Committee, XXIV SIBGRAPI Conference on Graphics, Patterns and Images, 2011

[18] Program Committee, Workshop on Algorithm Engineering and Experiments (ALENEX), 2011

[19] Program Committee, 21st Internat. Symposium on Algorithms and Computation (ISAAC), 2010

[20] Program Committee, 18th Internat. Symposium on Algorithms and Computation (ISAAC), 2007

[21] Program Committee, 12th Annual International Computing and Combinatorics Conference (COCOON'06), 2006

[22] Program Committee, 10th European Symposium on Algorithms (ESA), 2002

[23] Program Committee, SPIE's OE/Technology '98 (Vision Geometry VI), 1998

[24] Program Committee, 13th ACM Symposium on Computational Geometry (SoCG), 1997

[25] Program Committee, NASA Image Registration Workshop, 1997

[26] Program Committee, SPIE's OE/Technology '97 (Vision Geometry V), 1997

[27] Program Committee, SPIE's OE/Technology '96 (Vision Geometry IV), 1996

[28] Program Committee, SPIE's OE/Technology '95 (Vision Geometry III), 1995

[29] Program Committee, SPIE's OE/Technology '94 (Vision Geometry II), 1993

[30] Program Committee, SPIE's OE/Technology '93 (Vision Geometry I), 1992


## IV.B. Committees, Professional & Campus Service

IV.B.1. Campus Service - Department

2022–23:
- Associate Chair of Undergraduate Studies
- Chair, Study-Abroad Program
- Chair, Undergraduate TA Training
- Member, Diversity and Inclusion Committee

- Library/Technical Reports Coordinator
- Judge and Contributor, High School Programming Contest
- Faculty Advisor for the Game Developer's Club

2021–22:
- Associate Chair of Undergraduate Studies
- Chair, Study-Abroad Program
- Chair, Undergraduate TA Training
- Member, Department Council
- Member, Diversity and Inclusion Committee
- Library/Technical Reports Coordinator
- Faculty Advisor for the Game Developer's Club

2020–21:
- Associate Chair of Undergraduate Studies
- Chair, Study-Abroad Program
- Chair, Undergraduate TA Training
- Member, Iribe Building Committee
- Member, Diversity and Inclusion Committee
- Member, Teaching Awards Committee
- Library/Technical Reports Coordinator
- Faculty Advisor for the Game Developer's Club

2019–20:
- Associate Chair of Undergraduate Studies
- Chair, Study-Abroad Program
- Chair, Undergraduate TA Training
- Chair, Teaching Evaluation Committee
- Member, Iribe Building Committee
- Member, Diversity and Inclusion Committee
- Library/Technical Reports Coordinator
- Faculty Advisor for the Game Developer's Club

2018–19:
- Associate Chair of Undergraduate Studies
- Chair, Study-Abroad Program
- Chair, Undergraduate TA Training
- Member, Iribe Building Committee
- Member, Department Council
- Member, Diversity and Inclusion Committee
- Member, Teaching Evaluation Committee
- Library/Technical Reports Coordinator
- Faculty Advisor for the Game Developer's Club

2017–18:
- Chair, Theory Field Committee
- Member, Iribe Chair Advisory Committee
- Member, Department Council
- Member, Department Recruiting for Diversity Committee

- Member, Teaching Evaluation Committee
- Library/Technical Reports Coordinator
- Judge and Contributor, High School Programming Contest
- Faculty Advisor for the Game Developer's Club

2016–17:
- Member, Iribe Chair Advisory Committee
- Member, Department Council
- Member, Department Recruiting for Diversity Committee
- Member, Larry Davis Dissertation Award Committee
- Library/Technical Reports Coordinator
- Judge and Contributor, High School Programming Contest

2015–16:
- Member, Professorial Faculty Merit Committee
- Member, Iribe Chair Search Committee
- Member, Department Council
- Member, Department Recruiting for Diversity Committee
- Member, Nomination committee for IBM Graduate Fellowship
- Member, Alumnus Award Committee
- Library/Technical Reports Coordinator
- Judge and Contributor, High School Programming Contest

2014–15:
- Chair, Professorial Faculty Merit Committee
- Chair, CMSC Teaching Awards Committee
- Member, Department Council
- Member, Department Recruiting for Diversity Committee
- Library/Technical Reports Coordinator
- Member, Graduate Admissions Committee
- Judge and Contributor, High School Programming Contest

2013–14:
- Chair, APT Committee
- Chair, CMSC Teaching Awards Committee
- Member, Search Committee for the CMSC Dir. of Finance, Operations and Personnel
- Member, Department Council
- Member, Department Review Self-Study Committee
- Library/Technical Reports Coordinator
- Member, Graduate Admissions Committee
- Judge and Contributor, High School Programming Contest

2012–13:
- Chair, APT Committee
- Library/Technical Reports Coordinator
- Judge and Contributor, High School Programming Contest

2011–12:
- Chair, APT Committee
- Chair, Professorial Faculty Merit Committee

- Library/Technical Reports Coordinator
- Member, Graduate Admissions Committee
- Judge and Contributor, High School Programming Contest

2010–11:
- Chair, APT Committee
- Library/Technical Reports Coordinator
- Member, Graduate Admissions Committee
- Judge and Contributor, High School Programming Contest

2009–10:
- Library Coordinator
- Member, Graduate Admissions Committee

2007–08:
- Chair, APT Committee
- Member, Teaching Evaluation Committee
- Library Coordinator
- Member, Graduate Admissions Committee
- Judge and Contributor, High School Programming Contest

2006–07:
- Chair, APT Committee
- Member, Teaching Evaluation Committee
- Member, Department Council
- Member, Graduate Admissions Committee
- Member, Committee to Revise CMSC Plan of Organization
- Library Coordinator
- Judge and Contributor, High School Programming Contest

2005–06:
- Chair, APT Committee
- Chair, Teaching Evaluation Committee
- Member, Department Council
- Member, Graduate Admissions Committee
- Member, Search Committee for the CMSC Departmental Information Specialist
- Library Coordinator
- Judge and Contributor, High School Programming Contest

2004–05:
- Chair, Teaching Evaluation Committee
- Chair, Department Merit Pay Committee
- Member, Department Council
- Member, Graduate Admissions Committee
- Member, Introductory Course Committee
- Library Coordinator
- Judge and Contributor, High School Programming Contest

2003–04:
- Chair, APT Committee
- Member, Department Council

- Library Coordinator
- Judge and Contributor, High School Programming Contest

2002–03:

- Chair, Teaching Evaluation Committee
- Chair, Committee to Redesign Lower Division Courses
- Member, Department External Evaluation Committee
- Library Coordinator
- Judge and Contributor, High School Programming Contest

2000–01:
- Library Coordinator
- Member, Department Council
- Member, Faculty Recruiting Committee
- Member, Space Utilization Committee
- Member, Teaching Evaluation Committee
- Judge and Contributor, High School Programming Contest

1999–00:
- Library Coordinator
- Chair, Search Committee for the CMSC Director of Administration
- Member, Graduate Admissions Committee
- Member, Teaching Evaluation Committee
- Member, Department Council
- Member, Merit Pay Committee
- Member, Academic Evaluation Committee
- Member, Space Committee
- Judge and Contributor, High School Programming Contest

1998–99:
- Library Coordinator
- Member, Teaching Evaluation Committee
- Member, Department Council
- Member, Graduate Admissions Committee
- Judge and Contributor, High School Programming Contest
- Member, Teaching Evaluation Committee

1997–98:
- Library Coordinator
- Member, Graduate Admissions Committee
- Judge and Contributor, High School Programming Contest
- Member, Teaching Evaluation Committee

1996–97:
- Judge and Contributor, High School Programming Contest
- Member, Teaching Evaluation Committee

1995–96:
- Member, Department Council
- Member, Teaching Evaluation Committee

- Teaching Assistant Orientation and Training

1993–94:
- Member, Teaching Evaluation Committee
- Teaching Assistant Orientation and Training

1992–93:
- ITV Liaison
- Faculty Editor, Annual Report

1991–92:
- Member, Department Council
- Member, Teaching Evaluation Committee
- ITV Liaison
- Chair, Theory Field Committee
- Member, Comprehensive Examination Committee
- Member, Graduate Admissions Committee

1990–91:
- Member, Department Council
- Teaching Assistant Orientation and Training
- ITV Liaison
- Member, Comprehensive Exam Revision Committee
- Member, Undergraduate Studies Committee

1989–90:
- Teaching Assistant Orientation and Training
- Member, Laboratory Facilities Committee

1988–89:
- Faculty Editor, Annual Report

1987–88:
- Faculty Advisor for Student ACM Chapter

1986–87:
- Member, Graduate Admissions Committee
- Member, Department Council

1985–86:
- Member, Graduate Admissions Committee

IV.B.2. Campus Service - College

2022–23:
- Member, UMIACS APT Committee

2021–22:
- Member, UMIACS APT Committee
- Member, UMIACS Steering Committee

2019–21:
- Member, UMIACS APT Committee

2016–18:

- Member, UMIACS APT Committee

2015–16:
- Member, UMIACS APT Committee
- Member, UMIACS Salary Committee

2014–15:
- Member, UMIACS APT Committee

2012–13:
- Member, UMIACS APT Committee

2009–10:
- Member, UMIACS APT Committee

2007–08:
- Member, UMIACS Salary Committee

2006–07:
- Member, UMIACS APT Committee
- Member, CMPS Dorfman Prize Selection Committee

2005–06:
- Member, UMIACS APT Committee

2004–05:
- Member, UMIACS APT Committee
- Member, UMIACS Salary Committee

2003–04:
- Member, UMIACS Steering Committee

2002–03:
- Member, UMIACS APT Committee

2000–01:
- Member, UMIACS Steering Committee
- Member, CMPS Library Advisory Committee

1999–00:
- Member, UMIACS APT Committee
- Member, UMIACS APT Salary Committee
- Member, Search Committee for the CMSC Department Chair
- Member, CMPS Graduate Education Task Force
- Member, CMPS Library Advisory Committee

1998–99:
- Member, UMIACS APT Committee
- Member, UMIACS Steering Committee
- Member, UMIACS Graduate Fellowship Committee
- Member, Chen Scholarship Selection Committee

1997–98:
- Member, UMIACS Graduate Fellowship Committee

1996–97:
- Chair, UMIACS Graduate Fellowship Committee

1995–96:

- Chair, UMIACS Graduate Fellowship Committee

1993–94:
- Member, CMPS Dean's Committee on Teaching Enhancement
- Member, UMIACS director search committee

1992–93:
- Member, UMIACS APT Committee

1990–91:
- CMPS Calculus Reform Committee

1989–90:
- Member, UMIACS APT Committee


IV.B.3. Campus Service - University

2021-23:
- Member, University Undergraduate Studies PCC Committee
- Member, University Individual Studies Program Committee

2020–21:
- Member, University Medal Selection Committee
- Member, University Undergraduate Studies PCC Committee
- Member, University Individual Studies Program Committee

2011–20:
- Member, University Undergraduate Studies PCC Committee
- Member, University Individual Studies Program Committee

2010–11:
- Member, University APT Appeals Committee
- Member, University Undergraduate Studies PCC Committee
- Member, University Individual Studies Program Committee

2009–10:
- Member, University APT Appeals Committee
- Member, University Undergraduate Studies PCC Committee
- Member, University Individual Studies Program Committee

2007–08:
- Member, University Undergraduate Studies PCC Committee
- Member, University Individual Studies Program Committee

2006–07:
- Member, University Undergraduate Studies PCC Committee
- Member, University Individual Studies Program Committee

2005–06:
- Member, University Undergraduate Studies PCC Committee
- Member, University Individual Studies Program Committee
- Member, University Medal Selection Committee

2004–05:
- Member, University Undergraduate Studies PCC Committee

- Member, University Individual Studies Program Committee

2003–04:
- Member, University Undergraduate Studies PCC Committee
- Member, University Individual Studies Program Committee

2000–01:
- Member, Computer Engineering Curriculum Committee.
- Member, Graduate School Fellowship Committee

1999–00:
- Member, Graduate School Fellowship Committee
- Member, Computer Engineering Curriculum Committee

1996–97:
- Panel member for Student Honor Council Hearings
- Panel Moderator for Career Center's Career Week

1992–93:
- Member, Provost's Library Advisory Committee
- Chair, Campus Senate Adjunct Committee on Instructional Resources

1991–92:
- Departmental Representative to Campus Senate
- Member, Campus Senate Committee to Study MLS and Ph.D. programs in CLIS

[1] Chair, Workshops Committee, Computational Geometry Week (CGWeek), Berlin, Germany, 2022.

[2] Member, Computational Geometry Steering Committee Member, 2016–2018

[3] Workshop Co-Chair, Workshop on Multi-Dimensional Proximity Problems, College Park, Maryland, 2016

[4] Workshop Chair, 22nd Annual Fall Workshop on Computational Geometry (FWCG), College Park, Maryland, 2012

[5] Conference Co-Chair, 41st ACM Symposium on Theory of Computing (STOC), Bethesda, Maryland, May 31–June 2, 2009

[6] Conference Chair, 24th Symposium on Computational Geometry (SoCG), University of Maryland, College Park, June 9–11, 2008

[7] ALENEX Steering Committee member (Workshop on Algorithm Engineering and Experiments) 2003–2007

[8] Program Committee Co-Chair, IS&T/SPIE Electronic Imaging Science and Technology (Vision Geometry), 1999–2006

[9] Program Committee Co-Chair, 19th ACM Symposium on Computational Geom. (SoCG), 2003

[10] Program Committee Co-Chair, 4th Workshop on Algorithm Engineering and Experiments (ALENEX'02), 2002

## IV.C. External Service and Consulting

IV.C.5. Consultancies (to local, state and federal agencies; companies; organizations)

[1] Automatic Target Recognition Project, Army Center for Night Vision and Electro-Optics, Ft. Belvoir, Virginia (algorithms for the identification of targets in laser radar data), 1988–1989.

[2] Aging Services Project, Dept. of Sociology and Anthropology, Purdue University, Lafayette, Indiana (design and implementation of graph theoretic algorithms for social network analysis), 1984.

[3] Wintek Corp. Lafayette, Indiana (design and implementation of a C-language compiler for microprocessor), 1979.

## IV.D. Non-Research Presentations

IV.D.1. Outreach Presentations

[1] Speaker at Prince George's Community College Science and Engineering Day, 1999

[2] Speaker at Prince George's Community College Science and Engineering Day, 1996

## IV.G. Service Awards and Honors

[1] ACM Fellow ("For contributions to algorithms and data structures for geometric data analysis and retrieval"), 2023–present.

[2] ACM Recognition of Service Award for serving as the Conference Treasurer for the 41st ACM Symposium on Theory of Computing, 2009.

[3] ACM Recognition of Service Award for serving as the Conference Chair of the 24th Annual Symposium on Computational Geometry, 2008.