Nancy M. Amato

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Education

Ph.D. in Computer Science, University of Illinois at Urbana-Champaign, January 1995.
Ph.D. Thesis: *Parallel Algorithms for Convex Hulls and Proximity Problems*
Thesis advisor: Prof. Franco P. Preparata

M.S. in Computer Science, University of California at Berkeley, May 1988.
M.S. Thesis: *Reversing Trains: A Turn of the Century Sorting Problem*
Thesis advisor: Prof. Manuel Blum

B.S. in Mathematical Sciences, Stanford University, June 1986.

A.B. in Economics, Stanford University, June 1986.

Professional Experience

Assistant Professor, Department of Computer Science, Texas A&M University (1995 – Present)

Visiting Scientist, International Computer Science Institute, Berkeley, CA (Fall 1994)

Visiting Scientist, AT&T Bell Laboratories, Murray Hill, NJ (Summer 1994)

Research Assistant, U.S. Army Corps of Engineers CERL, Champaign, IL (1991-1993)

Research Assistant, University of Illinois at Urbana-Champaign (1990–1991)

Teaching Assistant, University of Illinois at Urbana-Champaign (1988–1989)

Member of Technical Staff, Bell Communications Research, Piscataway, NJ (1986–1988)

Research Interests

Computational geometry, robotics, computer-aided design, virtual reality.

Parallel algorithms, parallel and distributed computing.

Program checking, software fault tolerance.

Honors and Awards

TEES Select Young Faculty Award, College of Engineering, Texas A&M University, 1997-1998.

Montague Center for Teaching Excellence Scholar, Texas A&M University, 1997-98.

ACM Award for Teaching Excellence (voted by students), April 1997.

NSF Faculy Early Career Development (CAREER) Award, 1996–2000.

AT&T Bell Laboratories Ph.D. Scholar, 1993–1994.

Bellcore One-Year-On-Campus (OYOC) Graduate Study Program, 1987–1988.

Research Support

Research Grants

The National Science Foundation (CISE Postdocs in Experimental Computer Science), "Real-Time Multibody Dynamics for Virtual Reality Training Systems with Haptic User Interface" PI: N. Amato, co-PI: J. Trinkle, $87,120 ($21,120 cost sharing), June 1, 1998 – May 31, 2000. (Recommended for funding.)

Texas Higher Education Coordinating Board (ARP Program), "Real-Time Multibody Dynamics for Virtual Reality Training Systems with Haptic User Interface" (ARP-036327-017), PI: J. Trinkle, Texas A&M University, co-PI: N. Amato, $174,930, January 1, 1998 – December 31, 1999.

The National Science Foundation, "Planning Manipulation with Contact under Uncertainty" (IRI-9619850), PI: N. Amato, co-PI: J. Trinkle, Texas A&M University, $269,142, August 1, 1997 – July 31, 2000. (This project is a companion to one (same title) at Johns Hopkins University, PI: Jong-Shi Pang, Dept. of Mathematics, $130,429, August 1, 1997 – July 31, 2000.)

NATO Collaborative Research Grant Programme, "Bulk Synchronous Computational Geometry" (CRG-961243), PI: N. Amato, co-PIs: A. Pietracaprina, G. Pucci, Univ. Padova, Italy, 193,000 Belgian Francs ($9,120), January 1, 1997 – December 31, 1998.

The National Science Foundation (CAREER Program), "CAREER: Building and Searching Data Structures for Spatial Environments" (CCR-9624315), PI: N. Amato, $220,000, April 1, 1996 – March 31, 2000. ($10,000 in REU Supplements, 1997 and 1998.)

Equipment, Software, and Travel Grants

Hewlett-Packard Co., "Research Equipment Grant – 16 Processor V-class Shared Memory Multiprocessor Server," PI: L. Bhuyan, co-PIs: N. Amato, L. Rauchwerger, $1,200,000 ($140,000 cost sharing), 1998.

The National Science Foundation, Travel grant to bring three students from Texas A&M to the Grace Hopper Celebration of Women in Computing Conference, San Jose, CA, September 1997. ($3,370)

The National Science Foundation, "CISE Research Instrumentation: Distributed Computing and Real-Time Networking Research" (CDA-9529442), PI: N. Vaidya, co-PIs: J. Welch, W. Zhao, N. Amato,Texas A&M University, $108,360 ($36,120 cost sharing), January 1, 1996 – December 31, 1997.

The General Electric Company (GE Corporate R&D Center), Product Vision and motion planner (CAD software), 1996.

The National Science Foundation, Travel grants to attend CRA Workshops on Academic Careers for Women, May 1996 and May 1993.

Professional Service and Activities

NSF Panelist, 1997 (two panels).

Member (invited) of Computational Geometry Working Group at the ACM Workshop on Strategic Directions in Computing Research, MIT Laboratory for Computer Science, MA, June 1996.

Session Chair for a technical session at the *1996 IEEE International Conference on Robotics and Automation (ICRA'96)*, April 1996, Minneapolis, MN.

Referee for Funding Agencies and Scientific Journals including: *The National Science Foundation*, *Algorithmica*, *Computat. Geometry: Theory and Appl.*, *IEEE Trans. Computers*, *IEEE Trans. Parallel and Distributed Systems*, *IEEE Trans. Robotics and Automation*, *Information Processing Letters*, *Internat. J. Computat. Geometry & Appl.*, *Internat. J. Parallel*

Programming, *J. of Parallel and Distributed Computing*, *J. of Supercomputing*, *Mathematical Programming*, *Robotics and Autonomous Systems*, *SIAM J. Computing*, and *Theoretical Computer Science*.

Outside Reviewer for Scientific Conferences including: ACM Symposium on Computational Geometry (1995, 1996), ACM Symposium on Parallel Algorithms and Architectures (1995, 1996), ACM-SIAM Symposium on Discrete Algorithms (1994, 1995), International IEEE Symposium on Fault-Tolerant Computing (1994), International Parallel Processing Symposium (1997, 1998), IEEE Symposium on Parallel and Distributed Processing (1996), IEEE International Conference on Robotics and Automation (1997, 1998).

Member of ACM, IEEE, SIAM, and Sigma Xi.

Significant University Service and Activities

Vision2020 Committee Member: university-level committee formed to create a strategic plan for Texas A&M for the year 2020, 1997-1998.

Frontiers of Engineering Conference Organizing Committee Member: college of Engineering committee formed to plan a conference to encourage interdisciplinary research in engineering, spring 1998–present.

Adminstrator of Undergraduate Mentoring Program in the Department of Computer Science, fall 1997–present. (Program details can be found at `http://www.cs.tamu.edu/mentoring/`.)

Founder and Faculty Sponsor for AWICS (Aggie Women in Computer Science), Fall 1996 – present. (Details regarding AWICS can be found at `http://www.cs.tamu.edu/student-org/awics/`.)

Undergraduate Curriculum Committee, member of subcommitte charged with restructuring the first two courses for CS majors, 1996–present.

Student Research Supervision

5 Current Doctoral Students: (3 women, 1 Hispanic male)
4 Current Masters Students: (2 women, 1 an African American)
2 Current Undergradute Research Projects: (1 African American woman)
3 Graduated Masters Students: (2 women)
2 Previous Undergradute Research Projects: (1 Hispanic male)

Recent Invited Presentations

"An Obstacle-Based Probabilistic Roadmap Method for Motion Planning"
Department of Mathematics, Univerisity of Padova, Italy, July 1997
Max Planck Institute, Saarbrucken, Germany, July 1997

"Hot Topics in Computational Geometry "
GE Corporate R&D Center, Schenectady, NY, June 1996

"A Randomized Method for Motion Planning"
Department of Computer Science, University of Houston, November 1995

"Parallel Geometric Partitioning: Convex Hulls and Other Applications"
Department of Electrical Engineering, Purdue University, April 1995
Supercomputing Research Center, Bowie, MD, March 1995
Department of Computer Sciences, University of Texas at Austin, March 1995

"Parallel Algorithms for Higher-Dimensional Geometric Problems"
International Computer Science Institute, Berkeley, CA, November 1994
Department of EECS, Northwestern University, September 1994
AT&T Bell Laboratories, Murray Hill, NJ, August 1994

Publications

Book Chapters

[1] Nancy M. Amato, Section 9.7 on "Computational Techniques" in Chapter 9 on Discrete Geometry, *The CRC Handbook of Discrete and Combinatorial Mathematics*, to appear.

Journal Papers

[2] R. Tamassia (editor and working group chair), P. K. Agarwal, N. M. Amato, D. Z. Chen, D. Dobkin, R. L. S. Drysdale, S. Fortune, M. T. Goodrich, J. Hershberger, J. O'Rourke, F. P. Preparata, J.-R. Sack, S. Suri, I. G. Tollis, J. S. Vitter, and S. Whitesides, "Strategic Directions in Computational Geometry," *ACM Computing Surveys*, **28**(4), pp. 591–606, 1996.

[3] Nancy M. Amato, "Equipping CAD/CAM Systems with Geometric Intelligence," *ACM Computing Surveys*, **28**(4es), December 1996, Article 17.
http://www.acm.org/pubs/citations/journals/surveys/1996-28-4es/a17-amato/

[4] Lawrence Rauchwerger, Nancy M. Amato, and David A. Padua, "A Scalable Method for Run-Time Loop Parallelization," *International Journal of Parallel Programming*, **23**(6), pp. 537–576, 1995.

[5] Nancy M. Amato, "Finding a Closest Visible Vertex Pair Between Two Polygons," *Algorithmica*, **14**, pp. 183–201, 1995.

[6] Nancy M. Amato and Franco P. Preparata, "A Time-Optimal Parallel Algorithm for Three-Dimensional Convex Hulls," *Algorithmica*, **14**, pp. 169–182, 1995.

[7] Nancy M. Amato, "Determining the Separation of Simple Polygons," *International Journal of Computational Geometry & Applications*, **4**(4), pp. 457–474, 1994.

[8] Nancy M. Amato, "Improved Processor Bounds for Parallel Algorithms for Weighted Digraphs," *Information Processing Letters*, **45**, pp. 147–152, 1993.

[9] Nancy M. Amato and Franco P. Preparata, "The Parallel 3D Convex-Hull Problem Revisited," *International Journal of Computational Geometry & Applications*, **2**(2), pp. 163–174, 1992.

[10] Nancy Amato, Manuel Blum, Sandra Irani, and Ronitt Rubinfeld, "Reversing Trains: A Turn of the Century Sorting Problem," *Journal of Algorithms*, **10**, pp. 413–428, 1989.

Refereed Conference Papers

[11] Nancy M. Amato, O. Burchan Bayazit, Lucia K. Dale, Christopher Jones, Daniel Vallejo, "Choosing good distance metrics and local planners for probabilistic roadmap methods," to appear in *Proceedings of the International Conference on Robotics and Automation (ICRA'98)*, May 1998.

[12] Nancy M. Amato, O. Burchan Bayazit, Lucia K. Dale, Christopher Jones, Daniel Vallejo, "OBPRM: An Obstacle-Based PRM for 3D Workspaces," to appear in *Proceedings of the Workshop on Algorithmic Foundations of Robotics (WAFR'98)*, March 1998.

[13] Yueh-O Wang, Nancy M. Amato, and D. K. Friesen, "Hindsight Helps: Deterministic Task Scheduling with Backtracking," *Proceedings of the 26th International Conference on Parallel Processing*, August 1997, Bloomingdale, Illinois, pp. 170–173.

[14] Nancy M. Amato and Edgar A. Ramos, "On Computing Voronoi Diagrams by Divide-Prune-And-Conquer," *Proceedings of the 12th Annual ACM Symposium on Computational Geometry*, May 1996, Philadelpha, Pennsylvania, pp. 166-175.

[15] Nancy M. Amato and Yan Wu, "A Randomized Roadmap Method for Path and Manipulation Planning," *Proceedings of the 1996 IEEE International Conference on Robotics and Automation*, April 1996, Minneapolis, Minnesota, pp. 113–120.

[16] Lawrence Rauchwerger, Nancy M. Amato, and David A. Padua, "Run–Time Methods for Parallelizing Partially Parallel Loops," *Proceedings of the 9th ACM International Conference on Supercomputing*, July 1995, Barcelona, Spain, pp. 137–146. (Conference version of [4].)

[17] Nancy M. Amato, Michael T. Goodrich, and Edgar A. Ramos, "Computing Faces in Segment and Simplex Arrangements," *Proceedings of the 26th ACM Symposium on Theory of Computing*, May 1995, Las Vegas, Nevada, pp. 672–682.

[18] Nancy M. Amato, Michael T. Goodrich, and Edgar A. Ramos, "Parallel Algorithms for Higher–Dimensional Convex Hulls," *Proceedings of the 35th IEEE Symposium on Foundations of Computer Science*, November 1994, Santa Fe, New Mexico, pp. 683–694.

[19] Nancy M. Amato and Michael C. Loui, "Checking Linked Data Structures," *Proceedings of the 24th Annual International Symposium on Fault-Tolerant Computing*, June 1994, Austin, Texas, pp. 164–173.

[20] Nancy M. Amato, "An Optimal Algorithm for Computing the Separation of Two Simple Polygons," *Lecture Notes in Computer Science Vol. 709: Workshop on Algorithms and Data Structures*, Eds. F. Dehne, J. R. Sack, N. Santoro, S. Whitesides, Springer-Verlag, August 1993, Montréal, Québèc, Canada, pp. 48–59. (Conference version of [7].)

[21] Nancy M. Amato and Franco P. Preparata, "An NC^1 Parallel 3D Convex Hull Algorithm," *Proceedings of the 9th Annual ACM Symposium on Computational Geometry*, May 1993, San Diego, California, pp. 289–297. (Conference version of [6].)

[22] Nancy M. Amato, "Computing the Minimum Visible Vertex Distance Between Two Nonintersecting Simple Polygons," *Proceedings of the 1992 Conference on Information Sciences and Systems*, Vol. II, March 1992, Princeton, New Jersey, pp. 800–805. (Conference version of [5].)

Other Publications and Technical Reports

[23] Amato, N. M., Pietracaprina, A., Pucci, G., Dale, L. K., Perdue, J., "A Cost Model for Communication on a Symmetric MultiProcessor," Technical Report #98-004, Department of Computer Science, Texas A&M University, January 1998. (Submitted for publication.)

[24] Nancy M. Amato, "Parallel Algorithms for Convex Hulls and Proximity Problems," Report No. UIUCDCS-R-94-1883 (UILU-ENG-94-1737), Department of Computer Science, University of Illinois at Urbana-Champaign, December 1994. (Ph.D. Thesis)

[25] Kurt Buehler, Jeffrey Wallace, Michael Shapiro, Nancy M. Amato, and Unni Narayanan, "Next Generation Geographic Modeling Framework Research at USACERL," *GRASSClippings*, Winter 1992, pp. 35–39, 1992. (Not refereed.)

Personal Information

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References

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Papers available at `http://www.cs.tamu.edu/faculty/amato`, or upon request.