

Dinesh Manocha

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Dinesh Manocha is currently a Distinguished Professor of Computer Science at the University of North Carolina at Chapel Hill. He co-leads a major research group with more than 24 members on geometric and simulation algorithms with applications to computer graphics, robotics and virtual environments. He is also involved in a number of inter-disciplinary activities and committees at the Department, College and the University Level. He has published more than 280 papers in the leading conferences and journals in computer graphics, robotics, computational geometry, databases, multimedia, high performance computing and symbolic computation, and received 12 best paper awards. He has also served as program committee member or program chair of more than 75 leading conferences in this area. Moreover, he has served as a member of the editorial board or guest editor of eleven leading journals. He has won many awards including NSF Career Award, ONR Young Investigator Award, Sloan Fellowship, Honda Research Award and UNC Hettleman Prize. He is an ACM Fellow.

Manocha has supervised 45 M.S. and Ph.D. students over the last 17 years at UNC Chapel Hill. His research group has developed many well-known software packages for collision detection, triangulation, GPU-based algorithms, solid modeling and solving algebraic systems. These packages have been downloaded by more than 100,000 users worldwide and licensed to more than 40 industrial organizations including Intel, Microsoft, Disney, Ford, Kawasaki, Siemens, Phillips Labs, MSC Software, Lockheed Martin, Raytheon etc. His group is actively collaborating with many industrial organizations including Disney, Boeing, Intel, NVIDIA, Microsoft, SAIC, ARA and Lockheed. Manocha's research is currently supported by ARO, NSF, DARPA, RDECOM, ONR and many industrial partners, and he has served as a PI or Co-PI on more than 55 grants.

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EDUCATION

University of California at Berkeley

Ph.D. in Computer Science, May 1992

Thesis title: Algebraic and Numeric Techniques for Modeling and Robotics

Thesis supervisor: John F. Canny

Major: Geometric and Solid Modeling, Computer Graphics, Numeric and Symbolic Computation, Robotics

Minors: Mathematics and Software Systems

M.S. in Computer Science, 1990

Specialization in Computer Graphics and Geometric Modeling

Indian Institute of Technology, Delhi, India

B.E. in Computer Science and Engineering, 1987

APPOINTMENTS

- Phi Delta Theta/Matthew Mason Distinguished Professor, Department of Computer Science, Professor, University of North Carolina at Chapel Hill, July, 2006 –present.
- Visiting Researcher, Microsoft, April – August, 2008.
- Professor, Department of Computer Science, University of North Carolina at Chapel Hill, January 2001-present.
- Associate Professor, Department of Computer Science, University of North Carolina at Chapel Hill, January 1998-December 2000.
- Visiting Researcher, Microcomputer Research Lab (MRL) at Intel, Santa Clara, CA, May 1998-August 1998; May 1999-August 1999.
- Assistant Professor, Department of Computer Science, University of North Carolina at Chapel Hill, July 1992-December 1997.
- Post Doctorate Researcher, Department of Electrical Engineering and Computer Science, University of California at Berkeley, May 1992-August 1992.
- Research & Teaching Assistant, Department of Electrical Engineering and Computer Science, University of California at Berkeley, August 1988-May 1992.
- Research Visitor, General Motors Research Laboratory, May 1989-August 1989.
- Research Visitor, Olivetti Research Center, May 1988-August 1988.

HONORS AND AWARDS

1. 2009: ACM Fellow
2. 2008: Best Paper Award at CAD Conference
3. 2008: NVIDIA Professor Partnership Award
4. 2007: 2nd Best Paper Award and Honorable Mention, Computer and Graphics
5. 2007: Best Paper Award at ACM VRST Conference
6. 2007: Simulation Technology Demonstration at the Capitol Hill (by invitation)
7. 2006: Awarded Phi Delta Theta/Matthew Mason Distinguished Professorship, UNC Chapel Hill
8. 2006: IndySort (Sort Benchmark) Co-winner, ACM SIGMOD
9. 2005: Best Paper, Research and Development Track, I/ITSEC
10. 2005: Best Paper Award, IEEE VR
11. 2004: Best Paper Award, Pacific Graphics
12. 2003: Best Paper Award, ACM/SIGGRAPH Conference on Solid Modeling and Applications
13. 2001: Best Paper Award, ACM Multimedia Conference

14. 2001: Best Panel Award, IEEE Visualization Conference
15. 1999: Best Paper Award, Eurographics Conference
16. 1998: Hettleman Award for Scholarly Achievement, UNC Chapel Hill
17. 1998: Honda Research Award
18. 1997: Office of Naval Research Young Investigator Award
19. 1996: Best Paper Award, SuperComputing, 1996
20. 1995: National Science Foundation CAREER Award
21. 1995: Presidential Faculty Fellow nominee, The University of North Carolina at Chapel Hill
22. 1995: Alfred P. Sloan Fellow
23. 1993: Research Award from University Research Council, University of North Carolina at Chapel Hill
24. 1992: Junior Faculty Award at the University of North Carolina at Chapel Hill
25. 1992: Research award by Mitsubishi Electric Research Laboratory for research on inverse kinematics and its application to robotics and graphics
26. 1991: IBM Graduate Fellowship
27. 1988: Alfred and Chella D. Moore Fellowship for graduate studies in Computer Science at the University of California at Berkeley
28. 1983-87: Merit Prizes and Certificates for Academic Excellence at the Indian Institute of Technology, Delhi, India
29. 1983: Merit Prize and Certificate for obtaining VII position in All India Senior Secondary Certificate Examination
30. 1981-87: National Talent Scholarship by the Government of India
31. 1979-81: Junior Science Talent Scholarship by the Government of India

PROGRAM & WORKSHOP CHAIR & ADVISORY POSITIONS

1. Program Co-Chair, ACM Solid and Physical Modeling, 2008
2. Advisory Board, SIGGRAPH ASIA Program Committee, 2008, 2009
3. Workshop Co-Chair, Multi-Core and Many-Core Computing, ACM SuperComputing 2007
4. Program Co-Chair, ACM Solid and Physical Modeling, 2007
5. Workshop Co-Chair, EDGE Computing Workshop, 2006
6. Program Co-Chair, Pacific Graphics, 2005.
7. Workshop Co-Chair, ACM Workshop on General Purpose Computation using Graphics Processors, ACM SIGGRAPH, 2004.
8. Workshop Co-Chair, WIHAVE, Workshop on Intelligence, Human Augmentation and Virtual Environments, 2002.
9. Video Program Committee Chair: ACM Symposium on Computational Geometry, 2001.
10. Program Chair: ACM Workshop on Applied Computational Geometry, Philadelphia, PA, 1996.
11. Program Co-Chair: Workshop on Simulation, Behavior, and Action in Virtual Environments, Iowa (sponsored by ONR and ACM SIGGRAPH), 1995.

EDITORIAL DUTIES

1. Associate Editor, *Journal of Applicable Algebra* (AAECC), 2003-2008
2. Associate Editor, *ACM Transactions on Graphics*, 2008-onwards
3. Associate Editor, *International Journal of High Performance Computing Applications*, 2009-onwards
4. Associate Editor, *Graphical Models and Image Processing*, 1999-Present
5. Associate Editor, *IEEE Transactions on Visualization and Computer Graphics*, 1999-2003
6. Guest Co-Editor, *International Journal on Computational Geometry and Applications*, two special issues on Applied Computational Geometry, 1998.
7. Guest Co-Editor, *IEEE Computer Graphics and Applications*, special issue on handling large datasets, 2007

8. Co-Editor, *Proceedings of IEEE*, Special issue on Edge Computing, 2007.
9. Guest Co-Editor, *Parallel Computing*, Special issue on “Computing with Accelerators”, 2007.
10. Guest Co-Editor, *Computer-Aided Design*, Special issue on Solid and Physical Modeling, 2007.
11. Guest Co-Editor, *Computer Aided Geometric Design*, Special issue on Solid and Physical Modeling, 2007.
12. Guest Co-Editor, *IEEE Transactions on Automation Science and Engineering*, Special issue on Solid and Physics Modeling, 2007.
13. Guest Co-Editor, *Computer-Aided Design*, Special issue on Solid and Physical Modeling, 2008.
14. Guest Co-Editor, *Computer Aided Geometric Design*, Special issue on Solid and Physical Modeling, 2008.
15. Guest Co-Editor, *IEEE Transactions on Automation Science and Engineering*, Special issue on Solid and Physics Modeling, 2008.

CONTRACTS AND GRANTS

Current Support

1. 2009-2010: “Interactive Crowd & Traffic Simulation for Urban Training Environments”, Army, RDECOM, PI (about \$500K)
2. 2009-2012, “PetaScale Acoustic Simulation”, NSF, PI (about \$850K)
3. 2009-2010, “Interactive Sound Rendering for Computer Games”, Microsoft, Co-PI, \$80K (Direct Costs)
4. 2009-2012, “Interactive Auditory Displays”, NSF, Co-PI (about \$500K)
5. 2008-2010: “High Performance Many-Core Clusters for Modeling and Simulation”, Army Research Office, Co-PI (about \$150K)
6. 2008-2009: “Interactive Ray Tracing”, PI, NVIDIA, \$25K (Direct Costs) + Equipment Support
7. 2007-2010: “Research in GPGPU and Many-Core Computing”, Co-PI, Intel, \$225K (Direct Costs) + Equipment support.
8. 2006-2010: “Multiresolution Algorithms for Processing Giga-Models: Real-time Visualization, Reasoning, and Interaction”, Army Research Office, Co-PI, \$490K.

Pending Support

9. 2010-2013: “Digital Layout and Assembly of Large CAD Structures”, NSF, PI (\$450K)
10. 2010-2013: “Interactive Acoustic Simulation in Complex Urban Environments”, ARO, PI, \$500K

Past Support

11. 2008-2009: “Experiential Technologies for Urban Warfare and Disaster Response”, Army, RDECOM, PI (about \$725K).
12. 2005-2009: “Exploiting Cyber-Infrastructure for Creation and Use of Multi-Disciplinary Engineering Models”, NSF, Co-PI, \$1.150M.
13. 2007-2008: “Research in Interactive Collision Detection and Cloth Simulation”, PI, Disney, \$50K (Direct Costs).
14. 2004-2009: “Multiresolution Algorithms for Virtual Prototyping of Massive CAD Models”, NSF, PI (about \$384K).
15. 2006 – 2008: “Research in Edge Computing”, Disruptive Technology Office, PI, \$200K.
16. 2006-2008: “High Performance Clusters for Modeling and Simulation”, Army Research Office, DURIP program, PI, \$82K.
17. 2002-2007: “Handling Complex Datasets: Representation, Interactive Display and Interaction”, Army Research Office, PI (about \$395K).

18. 2006: "Support for EDGE Workshop", DARPA, DTO, NSF, NVIDIA and ATI, PI, \$65K.
19. 2005-2009: "Computer Generated Force Scalability, Army RDECOM, PI (about \$2.5M).
20. 2003-2007: "Enabling Real-Time Interaction for Moving Avatars in Virtual Environments", Office of Naval Research, Co-PI (about \$660,000).
21. 2001-2006: "High Fidelity Virtual Touch: Algorithms, Applications and Evaluation", National Science Foundation, Co-PI (about \$370K).
22. 2004-2006: "Portable Walkthrough and Computer Generated Force Computation", DOD, PI (about \$80K).
23. 2005-2007: "Missile Plume Simulation Improvements using GPU Chemical Kinetics Coprocessor", \$50K, PI, MDA.
24. 2001-2005: "Real time Physically-Based Modeling and Interaction", Intel, Co-PI (\$225K, direct costs + \$75K equipment).
25. 2005-2006: "Efficient layouts of large datasets", DOE LLNL, PI (about \$30K)
26. 2004-2006: "Interactive OneSAF Computations using COTS Graphics Hardware", DARPA, PI (about \$875K).
27. 2000-2005: "Real Time Interaction in Virtual Environments", Office of Naval Research, Co-PI (about \$645K).
28. 1999-2005: "Research in Walkthroughs and Simulation", Alias/Wavefront, Principal Investigator (\$495K software donation).
29. 1999-2004: "Real-Time Walkthroughs of Serious Synthetic Environments", National Science Foundation, Principal PI (about \$480,000).
30. 2004: "Support for ACM Workshop on General Purpose Computation using Graphics Processors", NVIDIA, ATI, 3D Labs, RDECOM, PEO-STRI & Army Research office. Co-PI, (about \$35K).
31. 1999-2002: "Accurate Boundary Evaluation and Interactive Display of Large Solid Models", Army Research Office, PI (about \$250,000).
32. 1999-2003: "Interactive Display of Complex Datasets", Lawrence Livermore National Labs (DOE ASCI Program), PI (about \$1,250,000).
33. 2001-2003: "Instrumentation for Interactive Display of Complex Datasets", Army Research Office, PI (about \$173K).
34. 2000-2003: "Video Based Representations and Rendering of Large Real and Synthetic Environments", Office of Naval Research, PI (about \$315K).
35. 1998-2001: "Acquisition of a Graphics Supercomputer for Synthetic Environments Serving Science and Engineering", National Science Foundation, Co-Pr (about \$1,460,000).
36. 1997-2000: "Interactive Walkthrough of large CAD models", Office of Naval Research, PI (about \$375,000).
37. 1999-2000: "Support for Research in Collision Detection and Interactive Walkthroughs", Intel, PI (about \$130,000).
38. 1999-2000: "Web based Distance Education Curricula for Computer Graphics and Scientific Computing", UNC Chapel Hill, PI (about \$12,000).
39. 1998-2000: "Instrumentation for Interactive Synthetic Environments, Department of Defense DURIP Award, PI (about \$232,000).
40. 1997-99: "Interactive Computer Graphics", Intel Research Award, PI (about \$290,000).
41. 1997-98: "Virtual Reality Station", Office of Naval Research, PI (about \$160,000).
42. 1997-2000: "Technology for Education 2000 Program", Intel, Co-PI (about \$2,870,000).
43. 1996-2000: "CAREER: Algebraic and Geometric Techniques for Interference Detection in Static and Dynamic Environments", National Science Foundation, PI (about \$200,000).
44. 1996-97: "Interactive Modeling and Interactive Visualization of Complex Datasets", DOD DURIP Proposal, PI (about \$137,000).
45. 1996-99: "Modeling and interactive walkthrough of large CAD models", Army Research Office, PI (about \$246,000).
46. 1995-97: "Sloan Fellowship", (about \$30,000).

47. 1996-98: "Interactive Collision Detection for Virtual Environments", Ford Motor Company, PI (about \$22,500).
48. 1994-98: "Numeric and Symbolic Manipulation of Polynomial Systems", National Science Foundation, PI (about \$200,000).
49. 1996-97: "Supplemental Support for Interactive Model Construction, Display and Collision Detection for Virtual Environments", Office of Naval Research, PI (about \$25,000).
50. 1995-96: "Simulation-Based Design", DARPA Sub-Contract, Monitored by Lockheed Martin, Co-PI (about \$400,000).
51. 1996: "Travel support for ACM Workshop on Applied Computational Geometry", National Science Foundation, PI (about \$8,000).
52. 1995-96: "Model construction and interactive walkthrough of large CAD models", Army Research Office, PI (about \$125,000).
53. 1994-97: "Interactive Model Construction, Display and Collision Detection for Virtual Environments", Office of Naval Research, PI (about \$250,000).
54. 1994: "Modeling with Non-Linear Constraints", University Research Council, UNC Chapel Hill, PI (about \$2000).
55. 1994-95: "Workshop on simulation and interaction in virtual environments", Office of Naval Research, Co-PI (about \$10,000).
56. 1993-96: "Enabling Technologies and Application Demonstrations for Synthetic Environments", Advanced Research Projects Agency, Senior Investigator. Fred Brooks and Henry Fuchs, Principal Investigators (about \$3,300,000).
57. 1993: Junior Faculty Award, UNC Chapel Hill, PI (about \$3000).

PROGRAM COMMITTEES

1. ACM/Eurographics Symposium on Geometric Processing, 2010
2. ACM Symposium on Interactive 3D Graphics and Games, 2010
3. Geometric Modeling and Processing, 2010
4. High Performance Graphics, 2009-2010
5. Workshop on Language, Compiler, and Architecture Support for GPGPU, 2010
6. Robotics: Science and Systems, 2009
7. Workshop on Exploiting Parallelism using Hardware-Assisted Methods, 2009
8. ACM Solid and Physical Modeling, 2003-2006, 2009
9. EAA Auralization Symposium, 2009
10. ACM SIGGRAPH, 2007-2008
11. ACM SIGGRAPH Asia, 2008-09
12. Shape Modeling, 2009
13. IEEE Conference on Interactive Ray Tracing, 2006-2008
14. ACM Symposium on Interactive 3D Graphics and Games, 2007-2009
15. 3D Data Processing, Visualization and Transmission 2006-2008
16. Robotics: Science and System: 2006-2008
17. ACM SIGGRAPH/Eurographics Workshop on Computer Animation, 2003-2010
18. ACM SIGGRAPH/Eurographics Workshop on Graphics Hardware, 2004-2008
19. Computer Animation and Social Agents, 2003-2009
20. ACM/Eurographics Symposium on Geometry Processing, 2003-2008
21. Computer Graphics International, 1998-2005
22. Eurographics, 2002-2004
23. Pacific Graphics, 2004-2010
24. International Symposium on 3D Data Processing, Visualization and Transmission, 2004-2008
25. X Mathematics of Surfaces Conference, England, 2003
26. IEEE Visualization, 2001-2002, 2008
27. IEEE VR Conference, 2000-2002

28. Computer Animation, 2001-2002
29. ACM SIGGRAPH, 2000
30. Indian Conference on Computer Vision, Graphics and Image Processing, 2000
31. Workshop on Algorithmic Foundations of Robotics, 2000
32. ACM Symposium on Solid Modeling, Ann Arbor, MI, 1997-2001
33. International Association of Science and Technology for Development (IASTED), Computer Graphics and Imaging, Canada, 1999
34. IEEE VRAIS'98 Conference, Atlanta, GA, 1998
35. 3rd ASME Design for Manufacturing Conference, Atlanta, GA 1998
36. ACM Symposium on Computational Geometry, Minneapolis, MN, 1998
37. International Association of Science and Technology for Development (IASTED), Computer Graphics and Imaging, Canada, 1998
38. Constructive Solid Geometry'98, Winchester, England, 1998
39. IEEE VRAIS'97 Conference, Albuquerque, NM, 1997
40. ACM Symposium on Computational Geometry, Nice, France, 1997
41. Workshop on Collaborative CAD, Atlanta, GA, 1997
42. VRST'96 Conference, Hong Kong, 1996
43. IEEE VRAIS'96 Conference, San Francisco, 1996
44. Constructive Solid Geometry (CSG)'96 Conference, Winchester, England, 1996
45. 2nd IEEE Computer Society Workshop on Shape and Pattern Matching in Computational Biology, Boston, MA, 1995

PANELS

- NSF Panels on New Technologies, Visualization, Geometric Computing, CPA, Compilers, Graphics, Engineering Design, SBIR.
- NSF CISE Infrastructure Awards.

INVITED TALKS AND DISTINGUISHED LECTURES

1. Distinguished Lecture Series Speaker, UNC Charlotte, February 2010
2. Invited speaker, Motion in Games, Zeist, Netherlands, 2009
3. Keynote speaker, IEEE International conference on Computer-Aided Design and Computer Graphics, 2009
4. Keynote speaker, Computer Animation and Social Agents (CASA), Seoul, Korea, 2008
5. Invited speaker, Workshop on Geometric Modeling, SUNY, Stony Brook, NY, 2008
6. Invited speaker, Workshop on programming massively parallel processors, NCSA, UIUC, 2008
7. Invited speaker, Workshop on Motion in Games (MiG), Utrecht, Holland, 2008
8. Keynote speaker, TCS Workshop on Virtual Reality, New Delhi, India, 2008
9. Keynote speaker, IAPR International Conf. on Discrete Geometry for Computer Imagery, 2008
10. Invited speaker, DARPA workshop on Virtual Cityscapes, Reno, 2008
11. Invited speaker, Workshop on Algorithmic Motion Planning, IROS, 2007
12. Invited speaker, Workshop on Geometric Processing, Tsinghua University, June 2007
13. Invited Speaker, Workshop on Many-Core Computing, Microsoft Research, 2007
14. Invited speaker, Workshop on Non-Linear Computational Geometry, IMA, May 2007
15. Invited Speaker, Swarms Workshop, Univ. of Pennsylvania, May 2007
16. Invited speaker, DARPA workshop on Constructive Simulation, San Diego, January 2007
17. Invited speaker, DARPA Workshop on Future Directions for High Performance Embedded Processing, Orlando, December 2006
18. Invited Speaker, GPGPU Workshop, ACM/IEEE SuperComputing 2006
19. Invited Workshop Speaker, Oak Ridge National Labs, September 2006
20. Invited Panel Speaker, NSF DMII PI Meeting, July, 2006

21. Invited Speaker, Aiya Napa Workshop on Modeling and Rendering, June 2006
22. Keynote Speaker, Pacific Graphics, October 2005
23. First International Workshop on Data Management on New Hardware, Baltimore, MD, June 2005
24. Motion Planning Workshop, Toulouse, France, January 2005
25. Workshop on Modeling & Simulation: The Next Decade, Las Cruces, NM, December 2004
26. Inter-service/Industry, Training Simulation Conference (I/TSEC), Orlando, FL, December 2004
27. Dist. Lecture Series Speaker, Arizona State University, November 2004
28. Keynote Speaker, Graphics Interface Conference, London, Ontario, May 2004
29. DIMACS Workshop on Computer-Aided Design and Manufacturing, Rutgers, NJ, October 2003
30. Dagstuhl workshop on hierarchical methods, Germany, June 2003
31. Workshop on Geometric Modeling and Animation, FoCM, Minneapolis, August 2002
32. Mini-Symposium on Computational Geometry, Curves and Surfaces Conference, St. Malo, June 2002
33. Mini-Symposium on Robustness, SIAM Conference on Geometric Design, Sacramento, CA, 2001
34. Workshop on Uncertainty in Geometric Computation, The University of Sheffield, July 2001
35. Workshop on Surgical Simulation, Stanford, CA, June 2001
36. NRL Workshop on Augmented Reality, Washington, DC, December 2000
37. AMS Symbolic Computation: Solving Equations in Algebra, Geometry, and Engineering, Mount Holyoke College, MA, 2000
38. Workshop on Key Research Issues and Opportunities in Motion Planning, LAAS Toulouse, France, 2000
39. Workshop on Image Synthesis and Interactive 3D Graphics, Dagstuhl, Germany, 2000
40. Workshop on Motion Support in Virtual Prototyping, Stanford, CA, May 1999
41. Mini-Symposium on Applications of Computer Algebra in Industry, SIAM Annual Meeting, Atlanta, GA, 1999
42. NSF/DOE Workshop on Large Scale Visualization and Data Management, Salt Lake City, Utah, May 1999
43. Eighth IMA Conference on Mathematics of Surfaces, University of Birmingham, England, 1998
44. Workshop on Hierarchical Methods in Computer Graphics, Dagstuhl, Germany, 1998
45. ACM Siggraph Course on Interactive Walkthroughs, Los Angeles, CA, 1997
46. Geometry Software Workshop, Nice, France, June 1997
47. ACM Symposium on Computational Geometry, Nice, France, 1997
48. American Mathematical Society Course on Computational Algebraic Geometry, San Diego, CA, 1997
49. 1st CGC Workshop on Computational Geometry, Johns Hopkins University, Baltimore, MD, October 1996
50. 2nd Workshop on Algorithmic Foundations of Robotics, Toulouse, France, July 1996
51. Graphicon'96: The 6th International Conference & Exhibition on Computer Graphics and Visualization, St. Petersburg, Russia, July 1996
52. Workshop on Software & Mathematical Visualization, Princeton, NJ, June 1996
53. East Coast Computer Algebra Day, IBM TJ Watson Research Center, April 1996
54. Workshop on Algebra for Solving Real Polynomials, Park City, UT, July 1995
55. Geometry Software Workshop, Geometry Center, University of Minnesota, January 1995
56. SPIE Conference on Curves and Surfaces for Computer Graphics, Boston, MA, 1992
57. Invited Mini-Symposium Speaker, SIAM Conference on Geometric Design, Tempe, AZ, 1991, 1993

Courses, Tutorials and Mini-Symposiums

1. *Interactive Sound Rendering (with M. Lin, N. Tsingos, L. Savioja and P. Calamia)* ACM SIGGRAPH 2009
2. *Topologically Robust Computations in Geometric Modeling (with V. Shapiro, H. Edelsbrunner, T. Day and V. Pascucci)* SIAM/ACM Symposium on Solid and Physical Modeling, 2009.
3. *Interactive Massive Model Rendering & Ray Tracing (with S. Yoon, D. Kasik, E. Gobbetti, R. Pajarola and P. Slusallek)*, IEEE Visualization 2009

4. *State of the Art in Massive Model Visualization* (with D. Kasik, B. Bruderlin, W. Correa, A. Dietrich, S. Yoon and P. Slusallek) ACM SIGGRAPH 2007, 2008, ACM SIGGRAPH Asia, 2008.
5. *State of the Art in Interactive Ray Tracing* (with P. Shirley, I. Wald, W. Mark and P. Slusallek) ACM SIGGRAPH 2006.
6. *Query Co-Processing on Commodity Processors* (with A. Ailamaki, N. Govindaraju and S. Harizopoulos), VLDB 2006.
7. *Query Co-Processing on Commodity Processors* (with A. Ailamaki, N. Govindaraju and S. Harizopoulos), ICDE 2006.
8. *Realtime Interactive Massive Model Visualization* (with D. Kasik, I. Wald, B. Bruderlin, W. Correa, E. Gobbetti, Al. Hubrecht and P. Slusallek) Eurographics 2006.
9. *Query Co-processing on Commodity Hardware*, Co-organizer (with N. Govindaraju and Anastassia Ailamaki), International Conference on Data Engineering, 2006.
10. *Collision handling in dynamic simulation Environments*, Co-organizer (with M. Trescher), Eurographics, 2005.
11. *Interactive Geometric and Scientific Computations using Graphics Hardware*, Course Organizer, SIGGRAPH, 2003.
12. *Interactive Geometric Computations with Graphics Hardware*, Course Organizer, ACM SIGGRAPH, 2002.
13. *Handling Large Datasets: Interactive Walkthroughs and Proximity Queries*, Co-Organizer with Ming C. Lin, ACM Solid Modeling, 2002.
14. *Interactive Walkthroughs of Large Geometric Datasets*, Course Organizer, ACM Solid Modeling, 2001.
15. *Interactive Walkthroughs of Large Geometric Environments*, Co-Organizer with Daniel Aliaga, ACM SIGGRAPH, 2000.
16. *Interactive Walkthroughs of Large Geometric Datasets*, Course Organizer, ACM SIGGRAPH, 1999.

SELECTED PRESS COVERAGE

1. *Boeing News Release*, June 2009
2. *Endeavor Magazine*, University of North Carolina, May 2008
3. *Art and Science Magazine*, College of Arts and Sciences, UNC, April 2008
4. *Bio-IT World*, March 2008
5. *Wired Magazine*, November 2006
6. *New York Times*, November 2006
7. *Daily Tar-Heel*, October 2006
8. *Durham Herald*, October 2006
9. *Slashdot News*, May 2006
10. *DARPA Legacy Press Release*, August 2005
11. *Tom's Hardware Guide*, June 2005
12. *Slashdot News*, June 2005
13. *Interactive Shadow Generation*, Millimeter Magazine, June 2003.
14. *Shadow Generation*, ExtremeTech Magazine, April 2003.
15. *Virtual Dreams*, Silicon India, 2002.
16. *Painting with Feeling*, Computer Graphics World, 2001.
17. *Feeling the Brush*, Endeavor, 2001.
18. *Walkthrough of Big Structures*, Technology Research News, 2001.
19. *Painting Software's Brush with Realism*, NewScientist.com, 2001.
20. *Walkthru Project Renders Real-Time 3D Models for Engineering and Architecture*, NSF Press Release, 2001.
21. *Fast Collision Detection*, Gamasutra, 1999, 2000.

DEPARTMENT COMMITTEES

- Faculty Search Committee
- Graduate Admissions
- Publications Committee
- Department Colloquium Organizer
- Library Committee
- Department Chair polling committee
- Adhoc Committee on role of Research Faculty (chair)
- Exam Committee (chair)

UNIVERSITY COMMITTEES

- Graduate School Administrative Board
- Graduate School Fellowship Committee
- Polyani Lectureship Selection Committee

COURSES TAUGHT

- COMP122: Design and Analysis of Algorithms
- COMP136/COMP575: Introduction to Computer Graphics
- COMP205: Scientific and Geometric Computation
- COMP236/770: Computer Graphics
- COMP258: Geometric and Solid Modeling
- COMP259/768: Physically-based Modeling
- COMP290: Advances in Modeling
- COMP290: Rendering Curved Surfaces
- COMP290/790: Robot Motion Planning
- COMP290: General Purpose Computation using Graphics Processors
- COMP 990: Sound Rendering

SOFTWARE SYSTEMS

1. I-COLLIDE (1995) Collision Detection System: A polyhedral collision detection system developed by J. Cohen, M. Lin, D. Manocha, B. Mirtich, K. Ponamgi and J. Canny. More than 11500+ users have ftp'ed the code. The underlying technology has been licensed to Mechanical Design Inc., Division Inc., and Knowledge Revolution. Also used by researchers at Ford Motor Company, Intel, GE, White Sands Missile Range, Lockheed Martin, etc.
2. Polygon Triangulation Utility (1995) Developed by A. Narkhede and D. Manocha. More than 4700+ users worldwide have ftp'ed the code.
3. SPEED Rendering System (1996) A rendering system for interactive display of large NURBS models, developed by S. Kumar and D. Manocha
4. RAPID (1996) Interference Detection System: A general purpose polygonal interference detection system developed by S. Gottschalk, M. Lin and D. Manocha. More than 12,000 users have ftp'ed the code. The underlying technology has been licensed to Division Inc. Also used by researchers at ABB Engineering, Intel, Ford, White Sands Missile Range, etc.
5. V-COLLIDE (1997) Collision Detection System: A general purpose collision detection system for general large environments developed by J. Cohen, S. Gottschalk, T. Hudson, A. Pattekar, M. Lin and D. Manocha. More than 8000 downloads.

6. BOOLE (1997) Solid Modeling System: An accurate solid modeling system for spline models developed by S. Krishnan, D. Manocha, A. Narkhede and J. Keyser. The system was being integrated with BRL-CAD, a public domain solid modeling system with more than 900 users worldwide. Also used by researchers at Air Force Labs.
7. KINEM (1998) Inverse Kinematics Utility: An inverse kinematics utility for general serial manipulators. The system has been used by researchers at Pratt & Whitney, Silma Inc. and Adelph Technologies..
8. MARS (1998) Equation Solver: A zero dimensional equation solver using Matlab and Maple. Developed by A. Wallack, I. Emiris and D. Manocha.
9. MAPC (1999) Library: A package to represent and manipulate algebraic points and curves. Developed by J. Keyser, T. Culver, D. Manocha and S. Krishnan.
10. PQP (1999) Proximity Query System: A general purpose proximity query system for collision detection, distance computation and tolerance queries. Developed by E. Larsen, S. Gottschalk, M. Lin and D. Manocha. 6600+ downloads.
11. PIVOT (2001) Proximity queries using graphics hardware. It provides support for different proximity queries. Developed by K. Hoff, A. Zaferakis, M. Lin and D. Manocha. 1800+ downloads.
12. DEEP (2002) A package for collisions and penetration computation between convex primitives. Developed by Y. Kim, M. Lin and D. Manocha. 450+ downloads as of July'06.
13. HAVOC (2003): A GPU-based library to compute distance fields of 3D objects and proximity query applications. 400+ download till.
14. GPUSORT (2005): A GPU-based Sorting algorithm and library. More than 2800 downloads..
15. OpenCCL (2005): A library to compute cache-oblivious layouts of larges meshes and graphs. More than 600+ downloads.
16. LUGPULIB (2005): A library to compute LU decomposition of dense matrices using graphics hardware. 1500+ downloads.
17. GPUFFT (2006): A library to compute 1D FFT using GPUs. 2200+ downloads.
18. DeformCD (2007): A library for collision detection between deformable models, 150+ downloads.
19. RVOLibrary (2008): A library for multi-agent simulation, 100+ downloads

PUBLICATIONS

Published more than 250 refereed papers in leading conferences and journals in Computer Graphics, Robotics, CAD/CAM, Virtual Reality, Databases, Multimedia, Symbolic Computation, Computational Biology and Computational Geometry.

Books and Monographs

1. *Applied Computational Geometry: Towards Geometric Engineering*, edited by Ming C. Lin and Dinesh Manocha, Springer-Verlag, 1996.
2. *Applications of Computational Algebraic Geometry*, by David Cox, Bernd Sturmfels, Dinesh Manocha, Thomas Sederberg, Xenia Kramer, Rienhard C. Laubenbaches, Rekha Thomas and John Little, American Mathematical Society, 1997.
3. *Proceedings of Pacific Graphics*, edited by Dinesh Manocha, Craig Gotsman and Enhua Wu. Published as special issue of Visual Computer. 2005.
4. *Proceedings of ACM Solid and Physical Modeling*, edited by Dinesh Manocha and Bruno Levy, ACM Press, 2007.

5. *Proceedings of ACM Solid and Physical Modeling*, edited by Bruno Levy, Dinesh Manocha, and Hiromasa Suzuki, ACM Press, 2008.
6. *Edge Computing*, edited by Ming C. Lin and Dinesh Manocha, Special issue of “Proceedings of IEEE”, 2008.
7. *Massive Model Visualization*, Sungeui Yoon, Enrico Gobbetti, David Kasik and Dinesh Manocha. Morgan and Claypool Publishers. 2008.

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9. C. Lauterbach, Q. Mo and D. Manocha, “A Hybrid Approach for Simulating Human Motion in Constrained Environment”, *Visual Computer (Proc. Of CASA)*, 2010, to appear.
10. S. Patil, J. van der Berg, S. Curtis, M. C. Lin and D. Manocha, “Directing Crowd Simulations using Navigation Fields”, *IEEE Transactions on Visualization and Computer Graphics*, 12 pages, 2010, to appear.
11. M. Tang, D. Manocha and R. Tong, “MCCD: Multi-core Collision Detection between Deformable Models using Front-Based Decomposition”, *Graphical Models*, 2010, to appear.
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14. J. Sewall, J. van den Berg, M. Lin and D. Manocha. “Virtualized Traffic: Reconstructing Traffic Flows from Discrete Spatio-Temporal”, *IEEE Trans. On Visualization & Computer Graphics*, (Special issue on IEEE VR 2009), 2010, to appear.
15. B. Lloyd, N. Govindaraju, C. Quammen, S. Molnar , and D. Manocha, “Logarithmic Perspective Shadow Maps”, *ACM Trans. on Graphics*, vol. 27, number 4, 32 pages, 2008.
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280. D. Manocha and B. A. Barsky (1991). "Varying the shape parameters of rational continuity." *Proc. of IMACS'91*, pp. 203-207, Dublin, Ireland.
281. D. Manocha (1990). "Regular curves and proper parametrizations." *Proc. of International Symposium on Symbolic and Algebraic Computation*, pp. 271-276, Tokyo, Japan.
282. D. Manocha and B. A. Barsky (1990). "Basis functions for rational continuity." *Proc. of Computer Graphics International '90*, eds. T.S. Chua and T.L. Kunii, pp. 521-542, Springer-Verlag.
283. D. Manocha and J. F. Canny (1990). "Rational curves with polynomial parametrizations." *Proc. of SPIE conference on Curves and Surfaces for Computer Vision and Graphics*, pp. 151-162.

Refereed Video Publications

284. N. Govindaraju, M. C. Lin and D. Manocha (2005). "Reliable Collision Culling using Graphics Processors", *Proc. of 21st ACM Computational Geometry Conference, Video Publication*.
285. Y. J. Kim, M. Otaduy, M. C. Lin and D. Manocha (2003). "Fast penetration depth estimation using rasterization hardware and hierarchical refinement." *Proc. of 19th ACM Computational Geometry Conference, Video Publication*.
286. K. Hoff, T. Culver, J. Keyser, M. Lin and D. Manocha (2000). "Fast computation of generalized voronoi diagrams using graphics hardware." *Proc. of 16th ACM Computational Geometry Conference, Video Publication*.
287. Gregory, A. State, M. Lin, D. Manocha and M. Livingston (1999). "Feature-based surface decomposition for polyhedral morphing." *Proc. of 15th ACM Computational Geometry Conference, Video Publication*.
288. Wilson, E. Larsen, D. Manocha, and M. Lin (1999). "Graph partitioning and ordering for interactive proximity queries." *Proc. of 15th ACM Computational Geometry Conference, Video Publication*.
289. S. Kumar, D. Manocha, W. Garrett and M. Lin (1997). "Hierarchical backface computation." *Proc. of 13th ACM Computational Geometry Conference, Video Publication*, v11-12.
290. S. Kumar and D. Manocha (1996). "The power of coherence: Fast tessellation of surfaces." *Proc. of 12th ACM Computational Geometry Conference, Video Publication*, pp. v17-18.
291. K. Ponamgi, D. Manocha and M. Lin (1995). "Incremental collision detection between solid models." *Proc. of 11th ACM Computational Geometry Conference, Video Publication*, pp. v7-8.
292. J. Cohen, M. Lin, D. Manocha and K. Ponamgi (1994). "Efficient collision detection for interactive environments." *Proc. of 10th ACM Computational Geometry Conference, Video Publication*, pp. 391-392, Stony Brook, NY.

GRADUATE STUDENTS

Currently Supervised

1. Lakulish Antani
2. Anish Chandak
3. Russell Gayle (jointly with Ming C. Lin)
4. Christian Lauterbach
5. Ravish Mehra
6. Qi Mo
7. Jia Pan
8. Micah Taylor
9. David Wilkie
10. Yu Zhang (jointly with Ming C. Lin)

Ph.D. Students Graduated

1. Jonatham Cohen (Ph.D. December '98). First Appointment: Assistant Professor at Johns Hopkins University. Currently a senior research scientist, Lawrence Livermore Labs.
2. Tim Culver (Ph.D. Fall'00). First Appointment: Think3 Inc. Currently, a senior technical staff member, Autodesk.
3. Carl Erikson (Ph.D. Spring'00). First Appointment: BOPS Inc. Currently self-employed.
4. Stefan Gottschalk (Ph.D. Summer'00; Co-Supervised with Ming Lin). First Appointment: Nvidia Inc.
5. Naga Govindraju (Ph.D. Summer'04). First Appointment: Research Assistant Professor, UNC Chapel Hill. Currently a senior researcher at Microsoft.
6. John Keyser (Ph.D. Summer'00). First Appointment: Assistant Professor at Texas A&M University. Currently a Tenured Associate Professor of Computer Science.
7. Shankar Krishnan (Ph.D. July '97). Member of Technical Staff, AT&T Research Labs. Currently, head of graphics/vision research group at AT & T Labs.
8. Subodh Kumar (Ph.D. Fall '96). First Appointment: Assistant Professor, Johns Hopkins University. Currently a chaired professor of Computer Science and Engineering, IIT Delhi, India.
9. Brandon Lloyd (Ph.D. Fall'07). First Appointment: Microsoft.
10. Paul Merrell (Ph.D. Fall'09). First Appointment: Postdoc, Stanford University.
11. Avneesh Sud (Ph.D. Fall'06). First Appointment, Postdoc, UNC Chapel Hill. Currently a researcher at Microsoft.
12. Gokul Varadhan (Ph.D. Fall'05): First Appointment: Google Inc.
13. Andrew Wilson (Ph.D. Fall'02). First Appointment: Sandia National Labs
14. Sungeui Yoon (Ph.D. Fall'05): First Appointment: Lawrence Livermore Labs. Currently an Assistant Professor of Computer Science, KAIST, S. Korea.
15. Hansong Zhang (Ph.D. Fall '98). First Appointment: Silicon Graphics. Currently at a startup.
16. Liangjun Zhang (Ph.D. Summer'09). First Appointment: NSF CI-Fellow, Stanford University

M.S. Students Graduated

1. Bill Baxter (M.S. Spring'01): OLM Digital
2. Sean Curtis (M.S. Spring'08): Disney Animation
3. Mark Foskey (M.S. Spring'01). First Appointment: Research Faculty at UNC Chapel Hill
4. Sean Hanlon (M.S. Spring'05): Constella Group
5. Mark Harris (M.S. Spring'00): NVIDIA
6. Karl Hillesland (M.S. Spring'02): ATI

7. Tom Hudson (M.S. Summer'97). UNC Wilmington
8. Kenny Hoff (M.S. Summer'99). Silicon Graphics
9. Wesley Hunt (M.S. Spring'00): iRock Inc
10. Nitin Jain (M.S. Spring'05): Oracle
11. Eric Larsen (M.S. Spring'99). Sony
12. Sang Woo Lee (M.S. Spring'09). Game Company
13. Gopi Meenakshi (M.S. Spring'99): UC Irvine
14. Atul Narkhede (M.S. Spring '95). Silicon Graphics
15. David O'Brien (M.S. Spring'01): UNC Chapel Hill
16. Amol Pattekar (M.S. Spring'98). Yahoo Inc.
17. Sachin Patil (M.S. Spring'09). UNC Chapel Hill
18. Kris Ponamgi (M.S. Fall '95). Virtus Inc.
19. Brian Salomon (M.S. Fall'07): NVIDIA
20. TVN Sriram (Spring'06): Google
21. Kyle Wilson (M.S. Summer '97). Interactive Magic
22. Andrew Zaferakis (M.S. Spring'02). TriLunar Inc.

POSTDOCS & VISITING RESEARCHERS

Currently Supervised

Previously Supervised

1. Mark Foskey (Co-Supervised with Ming C. Lin). Research Assistant Professor, UNC Chapel Hill.
2. Naga Govindaraju. Microsoft.
3. Young Kim (Co-Supervised with Ming C. Lin). Assistant Professor, Enwa University, S. Korea.
4. Vivek Kwatra (Co-Supervised with Ming C. Lin). Google Research, California.
5. Avneesh Sud (Co-Supervised with Ming C. Lin). Microsoft
6. Gokul Varadhan: Currently a member of Technical Staff at Google Inc.
7. Min Tang. Associate Professor, Zhejiang University, China.
8. Jur van der Berg (co-supervised with Ming C. Lin)

PH.D. COMMITTEES & EXTERNAL REVIEWERS

1. Rui Bastos (Ph.D. 1999)
2. Michael Bajura (Ph.D. 1997)
3. Deepak Bandopadhyay (Ph.D. 2005)
4. William Baxter (Ph.D. 2004)
5. David Chen (Ph.D. 1998)
6. Fredo Durand (Univ. of Grenoble, France) (Ph.D. 1999)
7. David Eberly (Ph.D. 1994)
8. Jacob Furst (Ph.D. 1999)
9. Nico Gallopo (Ph.D. 2008)
10. Karl Hillesland (Ph.D. 2005)
11. Jesse Cooper Himmelstein (University of Toulouse, Ph.D. 2008)
12. Rong Guodong (National University of Singapore, Ph.D. 2008)
13. Martin Isenburg (Ph.D. 2004)
14. Robert Katz (Ph.D. 2002)
15. Ted Kim (Ph.D. 2006)
16. Hanna Kurniawati (National University of Singapore, Ph.D. 2008)

17. Kok-Lim Low (Ph.D. 2005)
18. Yunshan Liu (in progress)
19. David Luebke (Ph.D. 1998)
20. Ajith Masceranhas (Ph.D. 2005)
21. Bruce Merry (University of Cape Town, Ph.D. 2007)
22. Manfred Minimair (Math Department, NC State, Spring 2001)
23. Miguel Otaduy (Ph.D. 2004)
24. Voicu Popescu (Ph.D. 2001)
25. Cory Quammen (in progress)
26. John Rhoades (Ph.D. 1993)
27. Nikunj Raghuvanshi (in progress)
28. David Rogers (INRIA, Grenoble, Ph.D. 2008)
29. Paul Segars (Bio-Medical Engineering Department) (Ph.D. 2001)
30. Timothy Terribery (Ph.D. 2006)
31. Andrew Thall (Ph.D. 2004)
32. Adrian Theetten (INRIA, Ph.D. 2007)
33. Amitabh Varshney (Ph.D. 1994)
34. Kelly Ward (Ph.D. 2005)
35. Li Yi (Simon Fraser University, Ph.D. 2008)
36. Yunshan Zhu (Ph.D. 1998)

M.S. COMMITTEES

- Daniel Aliaga (M.S. 1993)
- Audra Sugerman (M.S. 1995)
- Atul Narkhede (M.S. 1995)
- Kris Georges (M.S. 1995)

REFEREE FOR

- ACM Transactions on Graphics
- Journal of Symbolic Computation
- Computer Vision, Graphics and Image Processing
- Presence
- IEEE Computer Graphics and Applications
- Computer
- Computer-Aided Design
- Computer Aided Geometric Design
- SIAM Journal on Computing
- Applicable Algebra in Engineering, Communication and Computing
- Journal of Robotics System
- International Journal of Computational Geometry and Applications
- IEEE Transactions on Robotics and Automation
- IEEE International Conference on Robotics and Automation
- Computer Graphics Forum
- IEEE/ACM SuperComputing
- ACM SIGGRAPH
- ACM Interactive 3D Graphics Conference
- ACM/SIGGRAPH Solid Modeling Conference
- ACM Volume Visualization Symposium
- IEEE Visualization

- Graphics Interface
- EuroGraphics
- AAEECC (Applied Algebra and Error Correcting Codes)
- ACM Symposium on Computational Geometry
- International Conference on Robotics & Automation
- International Symposium on Symbolic and Algebraic Computation
- Army Research Office Proposals
- National Science Foundation Proposals
- National Research Council

INVITED COLLOQUIA

- **Bringing Realism to Virtual Environments: Physics, Sound and Crowd**
 1. Department of Computer Science, KAIST, September 2008
 2. AT & T Research Labs, NJ, November, 2008
 3. Department of Computer Science, Univ. of Central Florida, February, 2009
 4. Department of Computer Science, Texas A & M, June 2009
- **Motion Planning in Real and Virtual Worlds: Algorithms and Applications**
 1. University of Tokyo, February 2008
 2. Simon Fraser University, July 2008
 3. Korea Institute of Science and Technology, September 2008
 4. University of Pennsylvania, October 2006.
 5. Rensselaer Polytechnic Institute, October 2006.
- **Interactive Ray Tracing and Sound Rendering in Complex, Dynamic Environments**
 6. Department of Computer Science, Indian Institute of Technology, Delhi (April 2008)
 7. ACM SIGGRAPH Course, Los Angeles (August 2008)
 8. Department of Computer Science, Seoul National University (September 2008)
- **Interactive Rendering of Massive Models: Rasterization or Ray Tracing**
 1. Aiya Napa Seminar, Cyprus, June 2006
 2. Department of Computer Science, University of Stuttgart, July 2006
- **Discrete Geometric Processing with Topological Guarantees**
 1. Peking University, June 2007
 2. Tsinghua University, June 2007
 3. University of Minnesota, May 2007
- **Real-Time Display & Walkthroughs of Massive Models**
 1. Pacific Graphics, October 2005
 2. Institute of Creative Technologies, September, 2004.
 3. Department of Computer Science, ETH, Swiss Federal Institute of Technology, Zurich, July 2004.
 4. ONR PI Meetings, Naval Research Labs, 2000-2004
 5. Department of Computer Science, University of Maryland, May 2003.
 6. Intel, Oregon, August 2002.
 7. ARMY STRICOM, March 2000.

8. Department of Computer Science, USC, February 2000.
 9. Department of Computer Science, UCSD, November 1999.
 10. Institute of Creative Technologies, USC, November 1999.
 11. Department of Computer Science, UCLA, May 1999.
 12. Lawrence Livermore National Labs, Livermore, March 1999.
 13. Department of Computer Science, New York University, October 1998.
 14. NASA Ames, Mountain View, CA, August 1998.
 15. Interval Research, Palo Alto, CA, July 1998.
 16. Hewlett-Packard Research Labs, Palo Alto, CA, June 1998.
 17. Intel, Santa Clara, CA, June 1998.
- **General Purpose Computation using Graphics Processors**
 1. Microsoft Research, Asia, June 2007
 2. Intel, Santa Clara, March 2007
 3. MATREX Meeting, RDECOM, February, 2006
 4. SAIC, November 2005
 5. Hong Kong University of Science and Technology (HKUST), October 2005
 6. Workshop on High Performance Embedded Computing, September 2005
 7. Intel, Santa Clara, August 2005
 8. Army Research Labs, July 2005
 9. Army Modeling and Simulation Office, July 2005
 10. High Performance Computing Symposium, June 2005
 11. MERL, Cambridge, MA, June 2005
 12. Army CERDEC, New Jersey, June 2005
 13. Department of Computer Science, University of California at Irvine, September 2004.
 14. National Simulation Center, February 2004
 15. Intel, Oregon, October 2003.
 16. I/ITSEC, November 2004
 17. PEO STRI, May 2003
 18. RDECOM, STTC, Orlando, May 2003
 - **Exact and Accurate Computations with non-linear Algebraic primitives**
 - Max-Planck Institute, Saarbrucken, Germany, June 2002.
 - **Collision Detection between Rigid and Deformable Models**
 - Workshop on Surgical Simulation, Stanford, CA, 2001.
 - **MultiPolynomial Resultants: Algorithms, Implementation and Applications**
 1. US Naval Academy, Annapolis, MD, May 1996.
 2. Invited speaker, East Coast Computer Algebra Day, IBM TJ Watson Research Center, April 1996.
 - **Collision Detection: Algorithms and Applications**
 - Invited minisymposium speaker, SIAM Conference on Geometric Design, November 1995.
 - Second Workshop on Algorithmic Robotics, Toulouse, France, July 1996.
 - **Towards Interactive Walkthrough of large CAD models**
 1. National Institute of Standards and Technology, Gaithersburg, MD, March 1997.
 2. State University of New York at Stony Brook, March 1997.
 3. University of Michigan, Ann Arbor, MI, March 1997.
 4. Northwestern University, February, 1997.
 5. National Institute of Standards and Technology, Gaithersburg, MD, June 1995.

6. Workshop on Geometric Software and Visualization, Princeton, NJ, June 1996.
 7. Invited speaker, Graphicon'96 conference, St. Petersburg, July 1996.
 8. Invited speaker, First CGC Workshop on Computational Geometry, John Hopkins University, October 1996.
- **Modeling and Rendering with Algebraic Constraints**
 1. AT&T Bell Labs, Murray Hill, NJ, May 1995.
 2. University of California at Davis, CA, April 1995.
 3. Naval Postgraduate School, Monterey, CA, April 1995.
 4. Princeton University, Princeton, NJ, April 1995.
 5. University of Utah, Salt Lake City, UT, March 1995.
 6. University of Florida, Gainesville, FL, March 1995.
 - **Interactive Model Construction, Display and Collision Detection for Virtual Environments**
 - ONR PI's meeting, Arlington, VA, March 1995.
 - **Geometric Problems in the Non-linear World**
 - Invited speaker, Geometry software workshop, University of Minnesota, MN, January 1995.
 - **Geometric and Solid Modeling**
 - Invited colloquium, Indian Institute of Technology, N. Delhi, India, January 1994.
 - **Non-Linear Polynomial Equations and Matrix Computations**
 - Invited speaker, "Advances in Computational Mathematics", N. Delhi, India, January 1994.
 - **Surface Intersection in Lower Dimensions**
 - Invited minisymposium speaker, SIAM Conference on Geometric Design, Tempe, AZ, November 1993.
 - **Modeling with Algebraic Constraints**
 1. University of Geneva, Geneva, Switzerland, June 1993.
 2. INRIA, Nice, France, June 1993.
 3. Department of Computer Science, Duke University, Durham, NC, February 1993.
 4. Department of Computer Science, University of North Carolina at Chapel Hill, NC, February 1993.
 - **Robust Methods for Curve and Surface Intersection**
 - Invited presentation, SPIE Conference on Curves and Surfaces for Computer Graphics and Vision, Boston, MA, November 1992.
 - **Non-Linear Geometry and Linear Algebra**
 1. Mitsubishi Electric Research Lab, Cambridge, MA, April 1992.
 2. Department of Computer Science, University of North Carolina at Chapel Hill, NC, April 1992.
 3. School of Computer Science, Carnegie Mellon University, Pittsburgh, PA, April 1992.
 4. College of Computing, Georgia Institute of Technology, Atlanta, GA, April 1992.
 5. Department of Computer Science, University of Toronto, Toronto, Canada, March 1992.
 6. Department of Computer Science, State University of New York, Stony Brook, NY, March 1992.
 7. Department of Computer Science, University of Maryland at College Park, MD, March 1992.
 8. Department of Computer Science, University of California at Santa Barbara, CA, March 1992.
 9. Department of Computer Science, University of Minnesota, Minnesota, MN, March 1992.
 10. Department of Computer Science, University of Waterloo, Waterloo, Canada, March 1992.

11. Department of Computer and Information Science, University of California at Santa Cruz, CA, February 1992.
12. IBM TJ Watson Research Center, Yorktown Heights, NY, February 1992.

- **Algorithms for curve and surface intersections**
 - Invited colloquium, Xerox Palo Alto Research Center, Palo Alto, CA, February 1992.
- **Efficient techniques for implicitization**
 - Invited presentation, Minisymposium on Base Points and Computer Aided Geometric Design, SIAM Conference on Geometric Design, Tempe, AZ, November 1991.
- **Real time inverse kinematics for general 6R manipulators**
 - Invited colloquium, Department of Computer Science, Stanford University, Palo Alto, CA, October 1991.
- **A New Approach for Curve and Surface Intersection**
 - Invited colloquia, Hewlett-Packard Research Laboratories, Palo Alto, CA, March 1991.
- **Efficient Algorithms for Inverse Kinematics**
 - Invited Speaker at Industrial Liaison Program, College of Engineering, University of California, Berkeley, CA, March 1991.
- **Implicitizing Rational Parametric Surfaces**
 - Invited Workshop speaker, Geometric Design Seminar, Wayne State University, Detroit, MI, May 1990.
- **Regular Curves and Proper Parameterizations**
 - Invited colloquium, Indian Institute of Technology, Delhi, January 1990.
- **Multipolynomial Resultant Algorithms**
 - Invited presentation, Minisymposium on Computational Algebraic Geometry and Geometric Modeling, SIAM conference on Geometric Design, Tempe, Arizona, November 1989.