

Curriculum Vitae, Randal C. Nelson

Personal

Address:

Department of Computer Science
University of Rochester
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Birthdate:

October 21, 1958

Citizenship:

United States

Marital Status:

Married, three children

Education

Degrees

Ph.D.

Computer Science, August 1988, University of Maryland
Advisor: John (Yiannis) Aloimonos
Thesis: Visual Navigation

M.S.

Computer Science, 1985, University of Maryland
Advisor: Hanan Samet
Paper: Hierarchical Representation of Linear Geographic Features

B.S.

Physics with Honor, 1981, University of Wyoming
Mathematics, 1982, University of Wyoming

Scholastic Awards and Honors:

- 1987: Washington Chapter ACM Samuel Alexander Fellowship
- 1986-1987: University of Maryland Graduate School Fellowship
- 1985: GEISCO Graduate Scholarship, University of Maryland
- 1981: Semifinalist in Rhodes Scholarship competition (100 in Nation)
- 1981: Carl Cinnamon Award for outstanding physics graduate, University of Wyoming
- 1980: NSF Undergraduate Research Participation Program grant, Rensselaer Polytechnic Institute
- 1977-1981: University Scholar's Grant, University of Wyoming

Research Areas

Machine Vision and Robotics, particularly motion analysis, detection and recognition, visual robot control, 3D object recognition, and representations for integration of perception and action.

Work Experience

- 1994-present: Associate Professor, Department of Computer Science, University of Rochester, computer vision and robotics.
- 1988-1994: Assistant Professor, Department of Computer Science, University of Rochester, computer vision and robotics.
- 1985-1988: Research Assistant, University of Maryland, Computer Vision Laboratory, research on computer vision and visual navigation.
- 1984-1985: Research assistant, University of Maryland, Center for Automation Research. Developed data structures and software for Geographic Information System based on hierarchical data structures.
- 1983-1984: Teaching assistant, University of Maryland, Department of Computer Science.
- 1981-1982: Teaching assistant, Dartmouth College, Department of Physics.
- 1980: Research assistant under NSF Undergraduate Research Participation Program at Rensselaer Polytechnic Institute, Department of Physics and Astronomy. Worked with computer models for radiative transport in astronomical infrared sources.

Professional Activities

- Editorships:
 - Associate Editor, IEEE PAMI, 1998 - 2003
- Proposal Reviewer:
 - National Science Foundation
 - Air Force Office of Scientific Research
- NSF Proposal Evaluation Panel Member:
 - 1992, 1995, 1998, 1999, 2000, 2001, 2002, 2003, 2005, 2007, 2008
- Program Committee Member:
 - IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 1994, 1996, 1997, 1998, 1999, 2001, 2003, 2004, 2005, 2006, 2007, 2008.
 - International Conference on Computer Vision (ICCV), 1998, 2003, 2007.
 - International Conference on Pattern Recognition (ICPR), 1994, 1996, 2000.
 - European Conference on Computer Vision (ECCV), 2008.
 - International Conference on Computer Vision Systems (ICVS), 2003.
 - Workshop on Applications of Computer Vision (WACV), 2005.
 - American Association for Artificial Intelligence (AAAI), Annual Conference 1996, 2004.
 - SPIE Conference on Sensor Fusion 1997.

- Journal Referee:
 - International Journal of Computer Vision.
 - Journal of Computer Vision, Graphics, and Image Processing.
 - Journal of Computer Vision and Image Understanding.
 - IEEE Transactions on Pattern Analysis and Machine Intelligence.
 - IEEE Transaction on Systems, Man and Cybernetics.
 - IEEE Transactions on Robotics and Automation.
 - IEEE Control Systems Magazine.
 - VIDERE.
 - Image and Vision Computing Journal.
 - International Journal of Robotics Research.
 - ACM Transactions on Graphics.
 - ACM Computing Surveys.
 - Journal of Visual Communication and Image Representation.
 - Journal of the American Optical Society A.
- Conference Reviewer:
 - Computer Vision and Pattern Recognition (CVPR).
 - International Conference on Computer Vision (ICCV).
 - International Conference on Pattern Recognition (ICPR).
 - European Conference on Computer Vision (ECCV).
 - International Conference on Computer Vision Systems (ICVS).
 - Workshop on Applications of Computer Vision (WACV).
 - International Joint Conference on Artificial Intelligence (IJCAI).
 - International Conference on Robotics and Automation (ICRA).
 - American Association for Artificial Intelligence (AAAI).
 - International Conference on Machine Learning (ICML).
- Faculty Instructor, Connectionist Models Summer School, Institute for Neural Computation UCSD, La Jolla, CA, June 1990.
- Guest Editor, International Journal of Computer Vision Vol. 7 No. 3, Rochester Special Issue, November 1991.
- Panelist, NSF Workshop on Challenges in Computer Vision; New Directions of Research, Maui, Hawaii, June 7-8 1991.
- Panelist, NSF Workshop on Active Vision, Chicago, Aug 5-7, 1991.
- Invited participant, Rank Prize Funds Symposium on Active Vision, Sept. 9-12, 1991, Grasmere, Great Britain.
- Invited participant, ECUS/NSF Workshop on Vision July 18-25, 1992, Sjaellands Odde, Denmark.
- Steering Committee, and participant NSF/DARPA Workshop on Learning and Vision, October 15-17, 1992, Harpers Ferry, West Virginia.
- Invited Participant Workshop on Functionality August 16-17, 1993, Harpers Ferry, West Virginia.
- Chair, Motion Session, 12th ICPR, October 9-13, 1994 Jerusalem, Israel.
- Invited Participant NSF/DARPA Workshop on Perception of Action, May 1997, Cape Cod MA.

- Panelist, NSF Workshop on Experimental Systems, Sept 1998, Ann Arbor MI.
- Speaker/Participant at DARPA Workshop on Biologically Inspired Approaches for Micro Air Vehicles. Arlington, Virginia, April, 1999.
- Invited plenary speaker, International Conference on Pattern Recognition, Oct. 2000, Barcelona, Spain.
- Session Chair, International Conference on Pattern Recognition, Oct. 2000, Barcelona, Spain.
- Session chair, International Conference on Pattern Recognition, July 2002, Quebec, Canada.

Advisees and Degree Committees

Ph.D. Advisor

- Corinna Cortes, Prediction of Generalization in Learning Machines, 1993.
- Ramprasad Polana, Temporal Texture and Activity Recognition, 1994.
- Martin Jagersand Perceptual Action: Visual Space Control of Manipulation, 1997.
- Olac Fuentes Virtual Tools: Redundancy Reduction in Complex Manipulators, 1997.
- Andrea Selinger Analysis and Applications of Feature-based Object Recognition, 2001.
- Isaac Green Experiments in Generic Object Recognition, 2003.
- Brandon Sanders Object Discovery, 2005.

Ph.D. Committee Member

- Michael J. Swain, Color Indexing, 1990.
- Patrice Y. Simard, Learning State Space Dynamics in Recurrent Networks, 1990.
- David J. Coombs, Real-time Gaze Holding in Binocular Robot Vision, 1991.
- Nigel H. Goddard, The Perception of Articulated Motion: Recognizing Moving Light Displays, 1991.
- Lambert Wixson, Searching for Objects in 3-D Space, 1993.
- Raymond Rimey, Control of Selective Perception Using Bayes Nets and Decision Theory, 1993.
- Virginia de Sa, A Computational Model of Human Object Recognition, 1994.
- Jeff Schneider, Intelligent Exploration for Robot Skill Learning, 1994.
- Polly K. Pook, The Feature Space of Manipulation, 1995
- R. Andrew McCallum, Learning with Incomplete Selective Perception, 1995.
- Ramesh Sarukkai, Contextual Coding Pyramids for Speech Classification, 1996.
- Meng Yao (EE), Blue Noise Halftoning, 1996.
- Yucel Altunbasak (EE), Content-Based, Object Scalable Methods for Very Low Bit-Rate Video Coding and Multimedia Applications, 1997.
- Rajesh Rao Object Recognition using Steerable Filters and Sparse Distributed Memory, 1997.
- Justinian Rosca, Discovery of Subroutines in Genetic Programming, 1997.
- James Vallino, Augmenting Reality with Minimal Calibration, 1998.

- Garbis Salgian, Visual Navigation, 1998.
- Rodrigo Carceroni, Shape and Motion Estimation from Multi-View Image Sequences in Minimally Constrained Environments, 2001.
- Amit Singhal, Main Subject Detection in Consumer Photographs, 2001.
- Mufit Ferman (ECE), Clustering Methods for Content-Based Video Analysis, 2001.
- Chris Eveland Reconstructing World Structure for Robot Navigation, 2002.
- Ahmet Akhin (ECE), Sports Video Processing for Discription, Summaraziation, and Search, 2003.
- Shiloh Dockstader (ECE), Video-Based Analysis of Human Motion, 2003.
- Yaowu Xu (ECE) Object Segmentation and Image Labeling by Learning from Examples, 2003
- Rahul Bhotika Scene-Space Methods for Bayesian Inference of 3D Shape and Motion, 2003
- Bo Hu 2005
- Matt Boutell 2005
- Xue Gu 2006
- Oztan Harmanaci (ECE) 2006

Department Service

- Chair, Graduate Admissions Committee, 1992-96, 1998-2001, 2003-2006.
- Member, Graduate Admissions Committee, 1989-91, 1997.
- Chair, Computer Laboratory Committee, 1994-95, 1996-97.
- Member, Computer Laboratory Committee, 1988-94, 1995-96, 1998-2006.
- Member, Ph.D. Qualifying Exam Committee 1988-89, 1997.

University Service

- Freshman Advising Workshop, 1993.
- Member, Academic Computing Steering Committee, 1988-89
- Member, Unix Subcommittee, 1988-89.
- Member, Senate Committee on Status of Academic Computing, 1995-96.
- Member, Subcommittee on Academic Honesty, 1997.

Courses Taught

- Introduction to Computer Science (CSC 108), Spring 1992.
- Computation and Formal Systems (CSC 173), Spring 1998, 1999.
- Artificial Intelligence Programming in LISP (CSC 206), Fall 1989.
- Computer Vision (CSC 246/446), Fall 1988, 1992, 1994, 1995, 1996, 1998 - 2001, Spring 2004, 2006.
- Mathematical Foundations of AI (CSC 442), Spring 1991, 1995, 1996, 1997.
- Introduction to Artificial Intelligence (CSC 240), Spring 1994.
- Introduction to Computer Graphics, Fall 1997, 1998, 1999.
- Introduction to Cryptology Fall, 2002.
- Undergraduate Problem Seminar (CSC 200) Spring 2003, 2005.
- Graduate Problem Seminar (CSC 400), Fall 2003, 2004, 2005.
- Seminar: Advanced Computer Vision, Spring 1989.
- Seminar: Behavioral Robotics, Spring 1990.
- Seminar: Robot Hand-eye Coordination, Fall 1990.
- Seminar: Vision and Motor Coordination, Fall 1991.
- Seminar: Learning for Machine Vision and Robotics, Spring 1993.
- Seminar: Robot Hand-eye Coordination, Fall 1994.

Grant Support

Principle Investigator and Co-PI

- National Science Foundation Grant No. IRI-9010692, "Temporal Texture and Action Identification: a Recognition Approach to Motion" (PI), \$48,309, 7/1/90 - 6/31/92.
- Air Force Office of Scientific Research Contract Number 91-0288, "Detection and Stabilization of Moving Objects by a Moving Observer" (PI), \$98,028, 6/1/91 - 5/31/93.
- DARPA/ISTO MDA972-92-J-1012, "A Behavioral Approach to Machine Vision", (Co-PI with Chris Brown, and Dana Ballard), \$752,038, 12/1/91 - 11/30/94.
- National Science Foundation Grant No. CDA-9121975, "Multi-Institutional Research in Active Vision", (Co-PI with Chris Brown) \$37,000, 12/1/91 - 11/30/94, Grant to allow 4 Institutions to develop the same robot head hardware.
- Office of Naval Research Grant No. N00014-93-I-0221, "Learning Object Recognition from Manipulation" (PI with Co-PI Chris Brown), \$329,688, 7/1/93 - 6/30/96.
- National Science Foundation Grant No. IRI-9303980, "Control of Perception in Active Vision" (Co-PI with Chris Brown), \$15,000, 1/1/93 - 12/31/95, Grant to promote European collaboration in cooperation with ES-PRIT.
- DARPA, Via University of Maryland Subcontract No. Z840902, "Integrated Active Vision for UGV RSTA" (Co-PI with Chris Brown), \$333,334, 7/1/93 - 6/30/96.

- National Science Foundation, "Rapid Prototyping of Parallel Robot Vision Systems Using Virtual Reality and Systems Simulation" (Co-PI with Tom LeBlanc, Dana Ballard, Chris Brown, and Michael Scott), \$1,500,000, 1994 - 1999.
- ARPA, "High-Performance Vehicle with Visual and Deictic Control", (Co-PI with Chris Brown and Roger Gans), \$68,000, 1995.
- NSF, CISE Research Instrumentation, "High Performance Vehicle with Visual and Deictic Control" (PI with Co-PIs with Chris Brown and Roger Gans), \$17,100, 1995.
- Office of Naval Research, N00014-96-1-0671, "Virtual Tools for Visual Command and Control of Semi-Autonomous Robot Systems", (PI with Co-PI Chris Brown), \$341,324, 1996 - 1999.
- DARPA, DAAB07-97-C-J027, "Calibration-free View Augmentation for Semi-Autonomous VSAMs", (Co-PI with Chris Brown), \$400,000, 4/97 - 3/99.
- NSF, EIA-9972881, "A Laboratory for Intelligent Multi-Sense Interfaces" (PI with Co-PIs Christopher Brown, Sandhya Dwarkadas, Kiriakos Kutulakos, and Michael Scott), \$109,998 9/99 - 8/00.
- NSF, IIS-9977206, "Towards Minimally Supervised Training of Object Recognition Systems from Visual Corpora", (PI) \$279,670, 9/99 - 8/02.
- Department of Education, GAANN, P200A000306 "Research and Education in Intelligent, Multisense Interfaces", (PI with Co-PI Mitsu Ogihara), \$588,032, 9/00 - 8/03.
- NSF, EIA-0080124, "CISE Research Infrastructure: Spatial Intelligence for Computer-Enhanced Interaction with Physical Environments", (PI with Co-PIs Christopher Brown, George Ferguson, Kiriakos Kutulakos, and Michael Scott), \$1,847,084, 7/00 - 6/05.
- NSF, EIA-0080124, Supplement "REU Supplement: Mobile Robots for Spatial Intelligence" (PI with Co-PI Christopher Brown), \$20,000
- NSF, ECS-0225413, "Distributed Architecture for a Voluble, Intelligent Environment" (PI with Co-PI Sandhya Dwarkadas), \$250,000, 9/02 - 8/05.
- NSF, HLC-0308049, "Grounding Language in Visual Percepts", (PI), \$298,993, 6/03 - 5/06.

Publications

Refereed Journals

- H. Samet, C. A. Shaffer, R. C. Nelson, Y-G Huang, K. Fujimura, and A Rosenfeld, "Recent developments in linear quadtree-based geographic information systems", *Image and Vision Computing*, Vol. 5, No. 3, August 1987, 187-197.
- Randal C. Nelson and John Aloimonos, "Determining Motion Parameters from Spherical Flow Fields (or the advantages of having eyes in the back of your head)", *Biological Cybernetics*, Vol. 58, 1988, 261-273.
- Randal C. Nelson and John Aloimonos, "Obstacle Avoidance Using Flow Field Divergence", *IEEE Transactions on PAMI*, Vol. 11, 10, Oct. 1989, 1102-1106.
- Randal C. Nelson "Visual Homing Using an Associative Memory", *Biological Cybernetics*, Vol. 65, 1991, 281-291.
- Dana H. Ballard, Randal C. Nelson, and Brian Yamauchi, "Animate Vision", *Optics News*, Vol. 15, No. 5, May 1989, 9-, Invited article.
- Clifford A. Shaffer, Hanan Samet, and Randal C. Nelson, "Quilt: A Geographic Information System Based on Quadtrees", *International Journal of Geographic Information Systems*, Vol. 4, 2, August 1990, 103-131.

- Randal C. Nelson, “Qualitative detection of Motion by a Moving Observer”, *International Journal of Computer Vision*, Vol. 7, 1, November 1991, 33-46.
- Randal C. Nelson, “Vision as Intelligent Behavior: Research in Machine Vision at the University of Rochester”, *International Journal of Computer Vision* Vol. 7, 1, November 1991, 5-9.
- Randal C. Nelson and Ramprasad Polana, “Qualitative Recognition of Motion Using Temporal Texture”, *CVGIP Image Understanding*, Vol. 56, 1, July 1992, 78-89.
- Randal C. Nelson, “Finding Line Segments by Stick Growing”, *IEEE Transactions on PAMI*, Vol. 16, 5, May 1994, 519-523.
- Ramprasad Polana, and Randal C. Nelson, “Detecting Activities”, *Journal of Visual Communication and Image Representation* June 1994.
- Ramprasad Polana, and Randal C. Nelson, “Detection and Recognition of Periodic, Non-rigid Motion”, *International Journal of Computer Vision*, Vol. 23, 3, June/July 1997, 261-282.
- Randal C. Nelson and Andrea Selinger, “Large Scale Tests of a Keyed, Appearance-Based 3-D Object Recognition System”, *Vision Research* Special issue on computational vision, Vol. 38, No. 15-16, Aug. 1998, 2469-88.
- Olac Fuentes and Randal C. Nelson, “Learning Dextrous Manipulation Strategies for Multifingered Robot Hands Using the Evolution Strategy”, Special combined issue of *Machine Learning*, Vol. 31, 223-237, 1998, and *Autonomous Robots*, Vol 5, 395-405, 1998.
- Andrea Selinger and Randal C. Nelson “A perceptual Grouping Hierarchy for Appearance-Based 3D Object Recognition”, *Computer Vision and Image Understanding*, Vol 76, No. 1, 83-92, October 1999.

Books and Chapters

- Randal C. Nelson, Visual Learning and the Development of Intelligence, In *Early Visual Learning*, Shree K. Nayar and Tomaso Poggio, Editors, Oxford University Press, 1996, 215-236.
- Randal C. Nelson, “From Visual Homing to Object Recognition” , in *Visual Navigation* Yiannis Aloimonos, Editor, Lawrence Earlbaum, 1997, 218-250.
- Ramprasad Polana and Randal C. Nelson “Temporal Texture and Activity Recognition”, In *Motion-Based Recognition* Mubarak Shah and Ramesh Jain Editors. Kluwer Academic, 1997.

Refereed Conferences

- Randal C. Nelson and Hanan Samet, “A Consistent Hierarchical Representation for Vector Data”, ACM SIGGRAPH '86, Dallas, August, 197-206.
- Randal C. Nelson and Hanan Samet, “A Population Analysis for Hierarchical Data Structures”, ACM SIGMOD '87, San Francisco, May, 270-277.
Randal C. Nelson and John Aloimonos, “Determining Motion Parameters from Spherical Flow Fields”, IEEE Workshop on Computer Vision, Miami Beach, December 1987, 145-150.
- Randal C. Nelson and John Aloimonos, “Using Flow Field Divergence for Obstacle Avoidance: Towards Qualitative Vision”, ICCV 2, Tarpon Springs FLA, December 1988, 188-196.
- Randal C. Nelson, Dana H. Ballard, and Steven D. Whitehead “Visual Behavior and Intelligent Agents”, Proceedings, SPIE Symposium on Advances in Intelligent Robotics Systems, Volume 1198, Sensor Fusion II: Human and Machine Strategies, 34-49, Philadelphia, PA, Nov. 1989.
- Brian Yamauchi and Randal C. Nelson “A Behavior-Based Architecture for Robots Using Real-Time Vision”, International Conference on Robotics and Automation 1991.

- Randal C. Nelson, “Qualitative Detection of Motion by a Moving Observer”, Proc. IEEE Conference on Computer Vision and Pattern Recognition, Maui Hawaii, June 1991, 173-178.
- Ramprasad Polana and Randal C. Nelson, “Recognition of Motion from Temporal Texture”, Proc. IEEE Conference on Computer Vision and Pattern Recognition, Champaign, Illinois, June 1992, 129-134.
- Ramprasad Polana and Randal C. Nelson, “Detecting Activities”, Proc. IEEE Conference on Computer Vision and Pattern Recognition, New York, NY, June 1993, 2-7.
- Ramprasad Polana and Randal C. Nelson, “Recognition of Activities”, Proc. International Conference on Pattern Recognition, Jerusalem, Israel, October 1994, A815-820.
- Ramprasad Polana and Randal C. Nelson “Low Level Recognition of Human Motion (or How to Get Your Man without Finding his Body Parts)” IEEE Computer Society Workshop on Motion of Nonrigid and Articulate Objects, Austin, TX, October 1994.
- Randal C. Nelson, Martin Jagersand, and Olac Fuentes, “Virtual Tools: A Framework for Simplifying Sensory-Motor Control in Complex Robotic Systems”, Workshop on Vision for Robotics, at IROS95, Pittsburgh, PA, Aug, 1995.
- Martin Jagersand and Randal C. Nelson, “Visual space task specification, planning and control” In Proceedings of the 1995 IEEE Symposium on Computer Vision, Coral Gables FL, Dec, 1995.
- Martin Jagersand, Olac Fuentes, and Randal C. Nelson, “Acquiring Visual-Motor Models for Robot Hand Fine-Manipulation”, Proc. European Conference on Computer Vision (ECCV96), Cambridge England, April 1996, 603-612.
- Olac Fuentes and Randal C. Nelson, “The Virtual Tool Approach to Dextrous Telemanipulation” Proc. International Conference on Robotics and Automation (ICRA96), Minneapolis Minnesota, April 1996.
- Galen C. Hunt and Randal C. Nelson, “Lineal Feature Extraction by Parallel Stick Growing”, Third International Workshop on Parallel Algorithms for Irregularly Structured Problems (IRREGULAR96), Santa Barbara CA, August, 1996.
- Olac Fuentes and Randal C. Nelson, “Experiments on Dextrous Manipulation without Prior Object Models”, Proceedings of the 1996 IEEE International Symposium on Intelligent Control, Dearborn, Michigan, September 1996.
- Olac Fuentes and Randal C. Nelson, “Learning Dextrous Manipulation Skills for Multifingered Robot Hands”. Proceedings of the US-Japan Robotics Graduate Student Forum. Osaka, Japan, November 1996.
- Olac Fuentes and Randal C. Nelson, “Learning Dextrous Manipulation Skills Using Multisensory Information”, Proceedings of the 1996 IEEE/SICE/RSJ/ International Conference on Multisensor Fusion and Integration for Intelligent Systems, Washington, D.C., December 1996.
- Martin Jagersand, Olac Fuentes, and Randal C. Nelson, “Experimental Evaluation of Uncalibrated Visual Servoing for Precision Manipulation”, Proc. of International Conference on Robotics and Automation (ICRA’97), Albuquerque NM, April 1997.
- Olac Fuentes and Randal C. Nelson “Learning Dextrous Manipulation Skills Using the Evolution Strategy” Proc. of International Conference on Robotics and Automation (ICRA’97) Albuquerque NM, April, 1997.
- Randal C. Nelson and Andrea Selinger “A Cubist Approach to Object Recognition”, International Conference on Computer Vision (ICCV98), Bombay, India, January 1998, 614-621.
- Andrea Selinger and Randal C. Nelson, “A Perceptual Grouping Hierarchy for Appearance-based 3D Object Recognition” Workshop on Perceptual Organization (with CVPR98), Santa Barabara CA, June 1998.
- Andrea Selinger and Randal C. Nelson, “Improving Appearance-Based Object Recognition in Cluttered Backgrounds”, International Conference on Pattern Recognition (ICPR00), Barcelona, Spain, September 2000, Volume 1, 46-50.

- Andrea Selinger and Randal C. Nelson, "Minimally Supervised Acquisition of 3D Recognition Models from Cluttered Images", Computer Vision and Pattern Recognition (CVPR01), Kauai, Hawaii, December, 2001, Volume 1, 213-220.
- Andrea Selinger and Randal C. Nelson, "Appearance-Based Object Recognition Using Multiple Views" Computer Vision and Pattern Recognition (CVPR01), Kauai, Hawaii, December, 2001, Volume 1, 905-911.
- Brandon Sanders, Randal C. Nelson, and Rahul Sukthankar, "The OD Theory of TOD: The Use and Limits of Temporal Information for Object Discovery" Proceedings of AAAI, Edmonton, Alberta, July 2002, 777-784.
- Brandon Sanders, Randal C. Nelson, and Rahul Sukthankar, "A Theory of the Quasi-static World", International Conference on Pattern Recognition (ICPR02), Quebec City, Quebec, August, 2002, volume 3, 1-6.
- Randal Nelson and Isaac Green, "Tracking Objects Using Recognition", International Conference on Pattern Recognition (ICPR02), Quebec City, Quebec, August, 2002, Volume 2, 1025-1030.
- Isaac A. Green and Randal C. Nelson "Propagating segmented regions during a camera saccade" International Conference on Pattern Recognition (ICPR04), Cambridge, UK, August, 2004.
- Randal C. Nelson, "Generating Verbal Descriptions of Colored Objects: Towards Grounding Language in Perception" Workshop on Applications of Computer Vision, (WACV 2005) Breckenridge, Colorado, January, 2005.

Other Publications and Technical Reports

- Hanan Samet, Azriel Rosenfeld, Clifford A. Shaffer, Randal C. Nelson, Yuan-Geng Huang, "Application of Hierarchical data structures to Geographical Information Systems: Phase III", Technical Report 1457, Computer Science Department, University of Maryland, November 1984.
- Hanan Samet, Azriel Rosenfeld, Clifford A. Shaffer, Randal C. Nelson, Yuan-Geng Huang, Kikuo Fujimura, "Application of Hierarchical data structures to Geographical Information Systems: Phase IV", Technical Report 1587, Computer Science Department, University of Maryland, December 1985.
- Clifford A. Shaffer, Hanan Samet, and Randal C. Nelson, "Quilt: A Geographic Information System Based on Quadrees", Technical Report 1885, Computer Science Department, University of Maryland, July 1987.
- Randal C. Nelson, Visual Navigation, Doctoral Dissertation, 1988, also University of Maryland CS-TR-2087, August 1988.
- Randal C. Nelson "Visual Homing Using an Associative Memory," Proc. AAAI Spring Symposium Series, Palo Alto CA, March 1989.
- Randal C. Nelson "Visual Homing Using an Associative Memory", Proceedings DARPA Image Understanding Workshop, Palo Alto, CA, May 1989 245-262.
- Chris M. Brown and Randal C. Nelson, "Image understanding at the University of Rochester", Proceedings DARPA Image Understanding Workshop, Stanford University, CA, May 1989, 122-127.
- Randal C. Nelson, "Qualitative detection of Motion by a Moving Observer", University of Rochester Department of Computer Science TR 341, April, 1990.
- Randal C. Nelson, "Qualitative Detection of Motion by a Moving Observer", Proc. AAAI-90 Workshop on Qualitative Vision, July 29, 1990 Boston MA.
- Randal C. Nelson, "Qualitative Detection of Motion by a Moving Observer", Proceedings DARPA Image Understanding Workshop, Pittsburgh PA, September 1990, 329-337.
- Chris M. Brown and Randal C. Nelson, "Image Understanding Research at Rochester", Proceedings DARPA Image Understanding Workshop, Pittsburgh PA, September 1990, 76-85.
- Dana H. Ballard, Chris M. Brown and Randal C. Nelson, "Image Understanding Research at Rochester", Proceedings DARPA Image Understanding Workshop, San Diego, CA, January, 1992, 109-114.

- Randal C. Nelson and Ramprasad Polana, “Qualitative Recognition of Motion Using Temporal Texture”, Proc. DARPA Image Understanding Workshop, San Diego, CA, Jan 1992, 555-559.
- Ramprasad Polana and Randal C. Nelson, “Detecting Activities”, Proc. Darpa Image Understanding Workshop, Washington DC, April 1993, 569-573.
- Randal C. Nelson and Chris M. Brown, “Image Understanding Research at Rochester”, Proceedings DARPA Image Understanding Workshop, Washington DC, April, 1993.
- Randal C. Nelson, “Visual Manipulation”, Proc. AAAI Spring Symposium Series, Palo Alto CA, March 1994.
- Randal C. Nelson and Chris M. Brown, “Image Understanding Research at Rochester”, Proceedings DARPA Image Understanding Workshop, Monterey CA, Nov, 1994, 93-98.
- Ramprasad Polana and Randal C. Nelson, “Recognition of Nonrigid Motion”, Proceedings DARPA Image Understanding Workshop, Monterey CA, Nov, 1994, 1219-1224.
- Larry S. Davis, Ruzena Bajcsy, Martin Herman, and Randal C. Nelson, “RSTA on the Move”, Proceedings DARPA Image Understanding Workshop, Monterey CA, Nov, 1994, 435-456.
- Olac Fuentes, Hilcea F. Marengoni, and Randal C. Nelson, “Vision-based Planning and Execution of Precision Grasps”, University of Rochester, Dept of Computer Science TR 546, December 1994.
- Olac Fuentes and Randal C. Nelson, “Morphing Hands and Virtual Tools (or what good is an extra degree of freedom?)”, University of Rochester, Dept of Computer Science TR 551, December 1994.
- Martin Jagersand, and Randal C. Nelson, Adaptive Differential Visual Feedback for Uncalibrated Hand-Eye Coordination and Motor Control”, University of Rochester, Department of Computer Science TR 579, December 1994.
- Randal C. Nelson, “3-D Recognition Via 2-stage Associative Memory”, University of Rochester, Dept of Computer Science TR 565, January 1995.
- Randal C. Nelson, “Rapid Prototyping of Real-World Robot Systems Using Virtual Reality and Systems Simulation”, Proc. AAAI Spring Symposium Series, Palo Alto CA, March 1995.
- Randal C. Nelson, Martin Jagersand, and Olac Fuentes, “Virtual Tools: A Framework for Simplifying Sensory-Motor Control in Complex Robotic Systems” University of Rochester, Department of Computer Science TR 576, March 1995.
- Ramprasad Polana, and Randal C. Nelson, “Non-Parametric Recognition of Non-rigid Motion”, University of Rochester, Department of Computer Science TR 575, March 1995.
- Olac Fuentes and Randal C. Nelson, “Experiments on dextrous manipulation without prior object models”, University of Rochester, Computer Science TR 606, January, 1996.
- Randal C. Nelson, “Memory-Based Recognition for 3-D Objects”, Proc. ARPA Image Understanding Workshop, Palm Springs CA, February 1996.
- Martin Jagersand and Randal C. Nelson, “On-line Estimation of Visual-Motor Models Using Active Vision”, Proc. ARPA Image Understanding Workshop, Palm Springs CA, February 1996.
- Randal C. Nelson and Christopher M. Brown, “Real-Time Recognition and Visual Control: Image Understanding Research at Rochester”, Proc. ARPA Image Understanding Workshop, Palm Springs CA, February 1996.
- Olac Fuentes and Randal C. Nelson, “Learning Dextrous Manipulation Skills for Multifingered Robot Hands”, University of Rochester, Computer Science TR 613, May, 1996.
- Galen C. Hunt and Randal C. Nelson, “Lineal Feature Extraction by Parallel Stick Growing”, University of Rochester, Computer Science TR 625, June, 1996.

- Randal C. Nelson, "Songs of Cesium" *ChemTech*, (Chemistry Journal), "The Last Word", Oct 1996.
- Randal C. Nelson and Christopher M. Brown, "Image Understanding Research at Rochester", Proc. ARPA Image Understanding Workshop, New Orleans, LA, May 1997, 69-77.
- Randal C. Nelson and Andrea Selinger, "Experiments on (Intelligent) Brute Force Methods for Appearance-Based Object Recognition", Proc. ARPA Image Understanding Workshop, New Orleans, LA, May 1997, 1197-1205.
- Randal C. Nelson and Andrea Selinger, "A Cubist Approach to Object Recognition", University of Rochester, Computer Science TR 689, May, 1998.
- Andrea Selinger and Randal C. Nelson, "A Perceptual Grouping Hierarchy for Appearance-Based 3D Object Recognition", University of Rochester, Computer Science TR 690, May, 1998.
- Christopher M. Brown, Kiriakos Kutulakos, and Randal C. Nelson, "Image Understanding Research at Rochester", Proc. ARPA Image Understanding Workshop, Monterey, CA, Nov. 1998, 43-49.
- Andrea Selinger and Randal C. Nelson, "A Perceptual Grouping Hierarchy for 3D Object Recognition and Representation", Proc. ARPA Image Understanding Workshop, Monterey, CA, Nov. 1998, 157-163.
- Andrea Selinger and Randal C. Nelson, "Using Directional Variance to Extract Curves in Images, thus Improving Object Recognition in Clutter", University of Rochester, Computer Science TR 712, April, 1999.
- Andrea Selinger and Randal C. Nelson, "Minimally Supervised Acquisition of 3D Recognition Models from Images", TR724, Computer Science Dept., U. Rochester, January 2000.
- Andrea Selinger and Randal C. Nelson, "Improving Appearance-Based Object Recognition in Cluttered Backgrounds", TR725, Computer Science Dept., U. Rochester, January 2000.
- Andrea Selinger and Randal C. Nelson, "Appearance-Based 3D Object Recognition Using a Perceptual Grouping Hierarchy", Demonstration session, IEEE Conference on Computer Vision and Pattern Recognition, Hilton Head Island, SC, June 13-15, 2000. This was a live demonstration of the object recognition system.
- Randal C. Nelson and Andrea Selinger "Learning 3D Recognition Models for General Objects from Unlabeled Imagery: An Experiment in Intelligent Brute Force" Invited paper, International Conference on Pattern Recognition, Volume 1 Barcelona, Spain, September 2000, 1-8.
- Randal C. Nelson and Andrea Selinger "Appearance-Based Object Recognition Using Multiple Views" TR749, Computer Science Dept., U. Rochester, June 2001.
- Randal C. Nelson and Andrea Selinger "Minimally Supervised Acquisition of 3D Recognition Models from Cluttered Images" TR750, Computer Science Dept., U. Rochester, June 2001.
- Randal Nelson and Isaac Green, "Tracking Objects Using Recognition", TR765, Computer Science Dept., U. Rochester, February 2002.
- Brandon Sanders, Randal C. Nelson, and Rahul Sukthankar, "Discovering Objects Using Temporal Information", TR772, Computer Science Dept., U. Rochester, April 2002.
- Isaac A. Green and Randal C. Nelson "Segmentation Propagation during a Camera Saccade" TR766, Computer Science Dept., U. Rochester, November 2002.
- Bo Hu, Christopher Brown, Randal C. Nelson, "The geometry of point light source from shadows," TR810, Computer Science Dept., U. Rochester, June, 2004.
- Randal C. Nelson, "A method for Generating Color Descriptions of Objects and Implications for the Perceptual Grounding of Language", TR850, Computer Science Dept., U. Rochester, October, 2004.
- Bo hu, Christopher M. Brown, Randal C. Nelson, "Multiple-View 3-D Reconstruction Using a Mirror" TR863, Computer Science Dept., U. Rochester, May, 2005.

- Randal C. Nelson and Yiannis Aloimonos, “Understanding Activity: Learning the Language of Action” AAAI 2005 Fall Symposium on Anticipatory Cognitive Embedded Systems, Arlington, VA, November 2005.
- Randal C. Nelson, “A Brief Note on Translation”, TR890, Computer Science Dept., U. Rochester, February, 2006.
- Randal C. Nelson, “Weatherbot: an Automated Skywatcher”, TR917, Computer Science Dept., U. Rochester, June, 2007.
- Randal C. Nelson, “A Practical Outdoor Activity Detection System”, TR916, Computer Science Dept., U. Rochester, June, 2007.

Some Invited Presentations

- “A Consistent Hierarchical Representation for Vector Data”, ACM SIGGRAPH, August 1986, Dallas.
- “A Quadtree Based Geographic Information System”, November, 1986, University of Mexico, Mexico City.
- “A Population Analysis for Hierarchical Data Structures”, ACM SIGMOD, May 1987, San Francisco.
- “Determining Motion Parameters from Spherical Flow Fields”, IEEE Workshop on Computer Vision, November, 1987, Miami.
- “Using Flow Field Divergence for Obstacle Avoidance”, ICCV 2, December, 1988, Tarpon Springs FLA.
- “Visual Homing Using an Associative Memory”, AAAI Spring Symposium Series, Stanford University, March 1989.
- “Behavioral vision and vision research at the University of Rochester”, NAIC Annual meeting, Blue Mountain Lake, NY, Aug. 1989.
- “Visual Behavior and Intelligent Agents”, SPIE Symposium on Advances in Intelligent Robotics Systems, Philadelphia, PA, Nov. 1989.
- “Qualitative Detection of Motion by a Moving Observer”, AAAI-90 Workshop on Qualitative Vision, July 29, 1990 Boston MA.
- “Qualitative Vision for Robotics”, Oct. 1990, York University, Toronto.
- “Detection of Motion by a Moving Observer”, CVPR-91, Maui, Hawaii, June 1991.
- “Robot Vision as Intelligent Behavior” Rank Prize Funds Symposium on Active Vision, Sept. 1991, Grasmere, Great Britain.
- “Learning from Manipulation: Merging Seeing and Doing in Three Dimensions”, Workshop on Purposive Vision, CVPR-92, Champaign, Illinois, June 1992.
- “Temporal Texture Analysis”, IBM T. J. Watson Research Center, White Plains, NY, July 1992.
- “Vision for Behavior” ECUS/NSF Workshop on Vision, Sjaellands Odde, Denmark, July 1992.
- “Visual Motion Analysis” Royal Institute of Technology, Stockholm, Sweden, July 1992.
- “Learning for Computer Vision: What, Why, How” DARPA PI Workshop, Snowbird UT, Sept. 1992.
- “Visual Learning and Kolmogorov Complexity”, NSF/DARPA Workshop on Machine Learning and Vision, Harpers Ferry, WV, Oct. 1992.
- “Image Understanding at the University of Rochester”, DARPA Image Understanding Workshop, Washington DC, April 1993.

- “Vision for Doing”, NSF Institutional Infrastructure Workshop, University of Chicago, Chicago Illinois, June 1993.
- “Up with the Gigabyte, Down with the Functional View” AAI Fall Symposium Series, Learning for Vision: What, Why and How, Raleigh NC, October 1993.
- “An Active View of Vision” McGill University, Quebec, Canada, March 1994.
- “Visual Manipulation”, AAI Spring Symposium Series, Towards Physical Interaction and Manipulation, Palo Alto CA, March 1994.
- “Visual Behavior in Machines” Neurology Grand Rounds, School of Medicine, University of Rochester, April 1994.
- “Visual Manipulation and Memory-based Recognition” Institute of Computer Science, FORTH, Heraklion, Crete, Greece. July, 1994.
- “Recognition of Activities”, Proc. International Conference on Pattern Recognition, Jerusalem, Israel, October 1994.
- “Virtual Tools and Memory-based Recognition for Visual Manipulation”, 2nd EC-Israel-US Workshop, Hebrew University of Jerusalem, October 1994.
- “So Why Don’t Thunderstorms Have Souls?”, Proc. AAI Spring Symposium Series, Palo Alto CA, March 1995.
- “Rapid Prototyping of Real-World Robot Systems Using Virtual Reality and Systems Simulation”, AAI Spring Symposium Series, Palo Alto CA, March 1995.
- “Virtual Tools: A Framework for Simplifying Sensory-Motor Control in Complex Robotic Systems”, Workshop on Vision for Robotics, at IROS95, Pittsburgh, PA, Aug, 1995.
- “Real-Time Recognition and Visual Control”, ARPA Image Understanding Workshop, Palm Springs CA, February 1996.
- “Acquiring Visual-Motor Models for Robot Hand Fine-Manipulation”, Poster, Proc. European Conference on Computer Vision (ECCV96), Cambridge England, April 1996, 603-612.
- “Virtual Reality and Real-World Robot Control”, Rochester chapter of the ACM, September 1996.
- “Scaling and Generalization in Appearance-Based Object Recognition Systems”, Radiology Department Seminar, Strong Memorial Hospital, Rochester NY, November 1996.
- “Experiments on (Intelligent) Brute Force Methods for Appearance-Based Object Recognition”, ARPA Image Understanding Workshop, New Orleans, LA, May 1997, 1197-1205.
- “A Cubist Approach to Object Recognition”, Poster, International Conference on Computer Vision (ICCV98), Bombay, India, January 1998.
- “The Perceptual Grouping Hierarchy and Cubist Representations in 3D Object Recognition”, Yale University, May 1998.
- “A Perceptual Grouping Hierarchy for 3D Object Recognition”, University of Maryland, July 1998.
- Speaker, NSF IIP meeting, Las Cruces NM, August, 1999.
- “Appearance-Based 3D Object Recognition Using a Perceptual Grouping Hierarchy”, Demonstration session, IEEE Conference on Computer Vision and Pattern Recognition, Hilton Head Island, SC, June 13-15, 2000. This was a live demonstration of the object recognition system.
- “Learning 3D Recognition Models for General Objects: an Experiment in Intelligent Brute Force” Invited plenary talk at ICPR 2000, Barcelona, September, 2000.

- Radio interview on spatial intelligence, WVXU, Cincinnati OH (Public Radio). Reporter Ann Thompson (513-458-3138), August 8, 2000.
- Radio interview on spatial intelligence, (live) WCCO, Minneapolis MN. Producer: Susan Blanch (612-370-0645); reporter: Al Malmberg, August 11, 2000.
- Radio interview on spatial intelligence, NPR Weekend Edition (Nationally broadcast) Producer: Phil Harrell (202-414-2888), paharrell@npr.org; reporter: Lisa Simioni, August 13, 2000.
- “Cubist Object Recognition”, Talk at Laboratory for Laser Energetics (UR), December, 2000.
- “Spatial Intelligence” Presentation at NSF RI PI meeting, Arlington VA (DC), July, 2001.
- ”Appearance-Based Object Recognition Using Multiple Views” Poster presentation, Computer Vision and Pattern Recognition (CVPR01), Kauai, Hawaii, December, 2001.
- “Object Recognition for Memory Assistance”, Talk, Poster, RI meeting, Snowbird Utah, July, 2002.
- ”Tracking Objects Using Recognition”, Poster presentation, International Conference on Pattern Recognition (ICPR02), Quebec City, Quebec, August, 2002, Volume 2, 1025-1039.
- “Understanding Activity: Learning the Language of Action” AAAI 2005 Fall Symposium on Anticipatory Cognitive Embedded Systems, Arlington, VA, November 4, 2005. (Paper with Yiannis Aloimonos).
- “The Curse of Arithmetic” Invited Presentation at Humanoid Vision Workshop, In conjunction with IEEE-RAS International Conference on Humanoid Robotics (Humanoids-07), Pittsburgh PA, Nov 29 - Dec 1, 2007.