

ROBIN ROBERSON MURPHY

Curriculum Vitae *as of 2/04*

Computer Science and Engineering
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1 Educational Background:

Ph.D. Received September, 1992, in Computer Science. College of Computing, Georgia Institute of Technology. Minor area: Computer Integrated Manufacturing Systems (CIMS) multidisciplinary program.

- Thesis title: An Architecture for Intelligent Robotic Sensor Fusion.
- Thesis advisor: Ronald C. Arkin.
- Thesis area: Artificial Intelligence (mobile robotics, sensor fusion).
- Minor: Computer Integrated Manufacturing Systems.
- Funding: *Rockwell International Doctoral Fellow*.

M.S. Received June, 1989, in Computer Science. School of Information and Computer Science, Georgia Institute of Technology. Funding: *Computer Integrated Manufacturing Systems Fellowship*.

B.M.E. Received August, 1980, in Mechanical Engineering. School of Mechanical Engineering, Georgia Institute of Technology.

2 Employment History:

• Academic

May, 2003 to current: Professor, Department of *Computer Science and Engineering*, joint appointment in *Cognitive and Neural Science*, Department of Psychology, University of South Florida.

January, 2002 to current: Director, Center for Robot-Assisted Search and Rescue.

August, 1998 to May, 2003: Associate Professor, Department of *Computer Science and Engineering*, joint appointment in *Cognitive and Neural Science*, Department of Psychology, University of South Florida.

August, 1994 to May, 1998: Associate Director, Center for Robotics and Intelligent Systems, Colorado School of Mines.

August, 1992 to August, 1998: Assistant Professor, Department of Mathematical and Computer Sciences, Colorado School of Mines.

September, 1989 to December, 1989: Graduate Teaching Assistant: ICS 6361, School of Information and Computer Science, Georgia Institute of Technology, Atlanta, Georgia.

September, 1987 to August, 1988: CIMS Research Assistant, School of Information and Computer Science, Georgia Institute of Technology, Atlanta, Georgia.

- **DoD/Government**

Clearance: secret

2002-current: Member, USMC Chemical Biological Incident Response Force (CBIRF) Technical Advisory Panel

2001-2: member, National Research Council study on Unmanned Ground Vehicles (for Army BAST)

2001-5: member, United States Air Force Scientific Advisory Board

- 2002-3 Unmanned Aerial Vehicles in Perspective Study
- 2002-3 Army Science Board study on Future Combat Systems, panel on Robotics
- 2001-2 Predictive Battlespace Awareness Study

2001: ad hoc member, United States Air Force Scientific Advisory Board

- 2001 Study on Migration of Databases for Command and Control

2000–current: Consultant, Institute for Defense Analyses.

- GOTCHA program concept
- DARPA Technology Risk Reduction Experiment for Future Combat Systems

1998 to 1999: Consultant, in the Defense Science Study Group, Institute for Defense Analyses, DARPA. Think pieces:

- “Evolving Autonomy: A Strategy for Development of Unmanned Vehicle Systems”
- “Multi-Dimensional Integration of Biological Detection and Delivery Platforms for Detect to Warn” with J. Jacobs (Honeywell), D. Lagoudas (Texas A&M)
- “Structure for Laboratory for National Information Infrastructure Protection,” with G. Orsak (Southern Methodist), M. Hill (Wisconsin). This was also part of a IDA study initiated by the White House.

1999-2000: Member, DARPA Technical Advisory Board for MSTARS program

1998-1999: Member, DARPA Technical Advisory Board for Micro Air Vehicle program.

Co-chaired (with Jim McMichael, Alan Rudolph) DARPA Workshop on Biological Inspirations for Micro Air Vehicles (April 21-22, 1999).

Participant, OSD DDR&E Focus Group on Micro Air Vehicles, Dec. 1998

ONR External Panel Review, Naval Research Laboratory: Integrated Autonomous Systems, 1998.

Emergency Response Experience:

Technical search specialist, Florida Task Force 3 regional urban search and rescue team.

Team leader, CRASAR robot-assisted USAR response team– participated in WTC response from 9/12-22/02.

US Marine Corps Chemical Biological Incident Response Force (CBIRF)– completed basic CBIRF course (with honors), organizing a robot technology day for CBIRF on Aug. 15-16.

Instructor, Fire Department Instructor's Conference, 2002.

- **Industrial**

Member, Board of Directors, Continental Divide Robotics, Inc., 2000-current: CDR provides continuous parolee tracking and monitoring.

Co-owner, Chief Research Officer, 1997-1999: Rocky Mountain Automated Systems, Inc., a company specializing in applying artificial intelligence and sensor fusion to improve GPS tracking.

Consultant, Northrop Grumman Corporation, 1997-1999: advised on transfer of sensor failure and recovery research to unmanned aerial vehicle IRAD program.

Software Project Engineer, 1984-1986: The Turbitrol Company, Atlanta, Georgia.

Project Engineer, Division Metering Group (1980-1982), and Mechanical Engineer, Maintenance Technical Services (1982-1984), Dow Chemical, USA, Louisiana Division, Plaquemine, Louisiana.

3 Publications:

- **Books**

1. **Murphy, R.R.**, *Introduction to AI Robotics*, MIT Press, 2000.

- **Book Editing**

1. **Kortenkamp, D., Bonasso, P., and Murphy, R.R.**, co-editors, *Artificial Intelligence for Mobile Robots: Case Studies of Successful Systems*, MIT Press, publication Feb., 1998. *new edition in prep*

- **Chapters in Books**

1. **Casper, J., Micire, M., Hyams, J., and Murphy, R.**, "A Case Study of How Mobile Robot Competitions Promote Research," *RoboCup 2001: Robot Soccer World Cup V*, Springer, A. Birk, S. Coradeschi, S. Tadokoro, editors, 2002.
2. **Murphy, R.R.** "Marsupial Robots," *Robot Teams*, ed. T. Balch, L. Parker, editors, 2002, pp. 271-290.
3. **Blitch, J., Murphy, R., Durkin, T.**, "Mobile Semiautonomous Robots for Urban Search and Rescue," *Encyclopedia of Microcomputers, vol. 28*, ed. Allen Kent, James G. Williams, 2002.
4. **Murphy, R.R., Casper, J., and Micire, M.**, "Potential Tasks and Research Issues of Mobile Robots in RoboCup Rescue," *RoboCup-2000: Robot Soccer World Cup IV*, ed., Peter Stone, Tucker Balch, Gerhard Kraetschmar, Springer Verlag, Berlin, 2001., pp. 339-344.
5. **Murphy, R.R.**, "Fuzzy Logic for Fusion of Tactical Influences on Vehicle Speed Control," *Fuzzy logic techniques for autonomous vehicle navigation*, A. Saffioti, D. Driankov, editors, 2001.
6. **Murphy, R.R., and Rosenblatt, M.**, "Robocamp: One Hands-on Week of Exploring Science through Robotics," *Robots for Kids*, A. Druin, J. Hendler, editors, Academic Press, 2000, pp. 297-332.
7. **Murphy, R.R.**, "Coordination and Control of Sensing for Mobility using Action-Oriented Perception," *Artificial Intelligence for Mobile Robots*, MIT Press, Feb., 1998.

8. **Murphy, R.R., and Hershberger, D.,** “Handling Sensing Failures with Partial Causal Models,” *Modelling and Planning for Sensor Based Intelligent Robot Systems*, Horst Bunke, Robert C. Bolles, and Hartmut Noltemeier, editors, World Scientific, 1997, pp. 96-110.
9. **Murphy, R.R., Lindner, J., and Taylor, B.,** “Sensor Fusion and Learning for Environmental Modeling”, *Modelling and Planning for Sensor Based Intelligent Robot Systems*, Horst Bunke, Takeo Kanade, and Hartmut Noltemeier, editors, World Scientific, 1995, pp. 191–208.
10. **Murphy, R.R.,** “Sensor Fusion”, *The Handbook of Brain Theory and Neural Networks*, Michael A. Arbib, editor, Bradford Books/The MIT Press, 1995, pp. 857–859.
11. **Murphy, R.R.,** “Visual Techniques for the Controlled Movement of Docking”, *NATO ASI Workshop on Active Perception and Robot Vision*, Arun K. Sood and Harry Wechsler, editors, Springer-Verlag, 1992, pp. 701–720.

• Editorials

1. *IEEE Intelligent Systems*, “Rats, Robots, and Rescue,” Expert Opinion column.

• Editorial Service

1. *IEEE Systems, Man and Cybernetics Part*, guest editor with Erika Rogers, special issue “Human-Robot Interaction,” Vol.34, No.2, May 2004.
2. *IEEE Intelligent Systems and Their Applications*, guest editor, special issue “Robots and Education,” Nov-Dec. 2000.
3. *Robotics and Autonomous Systems*, Special Column Editor and on-going guest columnist: “Robotics Competition Corner,” 1997-9.

Associate Editor, 2000-current, *IEEE Intelligent Systems* magazine, 2000-current.

Associate Editor, 1997-current, *Robotics and Autonomous Systems* journal.

• In Refereed Journals

*Invited

1. **Murphy, R.,** “Rescue Robotics for Homeland Security,” *Communications of the ACM*, to appear, special issue on Homeland Security.
2. **Murphy, R.,** “Human-Robot Interaction in Rescue Robotics,” *IEEE Systems, Man and Cybernetics Part A*, special issue on Human-Robot Interaction, vol.34, No.2, May 2004.

*In Print, In Press, or Accepted

1. Burke, J., Murphy, R.R., Rogers, E., Scholtz, J., and Lumelsky, V., “Final Report for the DARPA/NSF Interdisciplinary Study on Human-Robot Interaction,” *IEEE Systems, Man and Cybernetics Part A*, vol.34, No.2, May 2004.
2. Murphy, R. R., and Rogers, E., “Introduction to the Special Issue on Human-Robot Interaction,” *IEEE Systems, Man and Cybernetics Part A*, vol.34, No.2, May 2004.

3. **Burke, J., Murphy, R.R., Coover, M., Riddle, D.**, "Moonlight in Miami: An Ethnographic Study of Human-Robot Interaction," in *USAR*, to appear *Human-Computer Interaction*, special issue on Human-Robot Interaction, Volume 19, Nos. 1-2, 2004.
4. **Gage, A., and Murphy, R.R.**, "Sensor scheduling in mobile robots using incomplete information via Min-Conflict with Happiness," *IEEE Transactions on Systems, Man and Cybernetics Part B*, Volume: 34, Issue: 1, pp:454 - 467, Feb. 2004.
5. **Murphy, R.**, "Rescue Robots at the World Trade Center," *Journal of the Japan Society of Mechanical Engineers*, special issue on Disaster Response Robotics, vol. 102, no. 1019, 2003, pp. 794-802.
6. **Casper, J., and Murphy, R.R.**, "Human-Robot Interaction during the Robot-Assisted Urban Search and Rescue Response at the World Trade Center," *IEEE Transactions on Systems, Man and Cybernetics*, vol. 33, no. 3, June 2003, pp. 367 -385.
7. **Murphy, R., Lisetti, C., Irish, L., Tardif, R.**, "Emotion-Based Control of Cooperating Heterogeneous Mobile Robots," *IEEE Transactions on Robotics and Automation*, special issue on Multi-Robot Systems, vol. 18, no 5, Oct. 2002, pp. 744-757.
8. **Minten, B., Murphy, R., Hyams, J., and Micire, M.**, "Low Order Complexity Vision-Based Docking," *IEEE Transactions on Robotics and Automation*, Volume: 17 Issue: 6, Dec 2001 Page(s): 922 -930.
9. **Hyams, J., Powell, M., Murphy, R.R.**, "Position Estimation and Cooperative Navigation of Micro-rovers Using Color Segmentation," *Autonomous Robots*, special issue on CIRA'99, vol. 9, no. 1, August 2000, pp.7-16.
10. **Murphy, R., Hughes, K., Noll, E., and Marzilli, A.**, "Integrating Explicit Path Planning with Reactive Control for Mobile Robots using Trulla," *Robotics and Autonomous Systems*, no. 27, 1999, pp. 225-245.
11. **Murphy, R., and Hershberger, D.**, "Handling Sensing Failures in Autonomous Mobile Robots," *International Journal of Robotics Research*, vol. 18, no. 4, 1999, pp. 382-400.
12. **Murphy, R.R.**, "Case Studies of Gibson's Ecological Approach to Mobile Robots," *IEEE Transactions on Systems, Man and Cybernetics Part A: Systems and Humans*, vol 29, no. 1., Jan, 1999, pp 105-111.
13. **Murphy, R.**, "Teaching Image Computation in an Upper Level Elective on Robotics," *International Journal of Pattern Recognition and Artificial Intelligence*, special issue on education, Vol. 12, no.8, 1998, pp 1081-1093.
14. **Murphy, R.R.**, "Sensor and Information Fusion for Improved Vision-Based Vehicle Guidance," *IEEE Intelligent Systems and Their Applications*, special issue on *Vision-Based Driving Assistance in Vehicles of the Future*, Nov/Dec, 1998, pp 49-56.
15. **Murphy, R.R.**, "Dempster-Shafer Theory for Sensor Fusion in Autonomous Mobile Robots", *IEEE Transactions on Robotics and Automation*, vol. 14, no.2, April, 1998, pp. 197-206.
16. **Murphy, R., Hershberger, D., and Blauvelt, G.R.**, "Learning Landmark Triples by Experimentation," *Robotics and Autonomous Systems*, special issue on *Robotic Learning: The New Wave*, Dec. 1997, vol. 22, no.3-4, pp.377-392.
17. **Murphy, R.R.**, "Mobile Robotics at CSM: Reinventing a Failed Technology," *CSM Quarterly*, vol. 97, no. 1, 1997, pp. 31-37.

18. **Murphy, R., and Mali, A., 1997** "Lessons Learned in Integrating Sensing into Autonomous Mobile Robot Architectures," invited submission to *Journal of Experimental and Theoretical Artificial Intelligence, special issue on Software Architectures for Hardware Agents*, vol. 9, no. 2, 1997, pp. 191-209.
19. **Murphy, R. R., and Rogers, E., 1996.** "Cooperative Assistance for Remote Robot Supervision," *Presence*, special issue on Starkfest, vol. 5, no. 2, Spring 1996, pp. 224-240.
20. **Murphy, R.R., 1996.** "Biological and Cognitive Foundations of Intelligent Sensor Fusion", *IEEE Transactions on Systems, Man, and Cybernetics*, vol. 26, No. 1, Jan, 1996, pp. 42-51. **This paper is a reference for Wright-Patterson Small Business Innovation Research Award CFP AF97-119.**
21. **Arkin, R.C. and Murphy, R.R., 1988.** "Autonomous Navigation in a Manufacturing Environment", *IEEE Transactions on Robotics and Automation*, vol. 6, no. 4, August, 1990, pp. 445-454.

***In Review**

1. **Carlson, J., and Murphy R.R.,** "How UGVs Physically Fail in the Field," submitted to *IEEE Transactions on Robotics*.
2. **Patel, S., and Murphy, R.R.,** "Color Signaling of Emotions for Robots: A Review of Cognitive and Ethological Literature," submitted to *Adaptive Behavior*.

• Magazines

1. **Murphy, R.R.** "NSF Summer Field Institute for Rescue Robots for Research and Response (R4)," *AI Magazine*, submitted.
2. **Murphy, R. R.,** "Rescue Robots at the World Trade Center from Sept. 11-21, 2001," *IEEE Robotics and Automation Magazine*, to appear.
3. **Gage, A., Murphy, R., and Minten, B.,** "Shadowbowl 2003: Lessons Learned from a Reach-back Exercise with Rescue Robots," *IEEE Robotics and Automation Magazine*, to appear.
4. **Murphy, R.R., Osuka, M., and Schultz, A.,** "USAR Competitions for Physically Situated Agents," *IEEE Robotics and Automation Magazine*, special issue on Rescue Robotics, Sept 2002.
5. **Murphy, R.R.,** "RoboCup-Rescue Roadmap," *IEEE Robotics and Automation Magazine*, special issue on Rescue Robotics, Sept 2002.
6. **Murphy, R.R., Blitch, J., and Casper, J.** "AAAI/RoboCup-2001 Urban Search and Rescue Events: Reality and Competition," *AI Magazine*, vol. 23, no.1, 2002, pp.37-42.
7. **Murphy, R.R.,** "Competing for a Robotics Education," *IEEE Robotics and Automation Society Magazine*, June 2001, pp. 44-55.
8. **Murphy, R.R.,** "Marsupial Robots for Urban Search and Rescue," *IEEE Intelligent Systems*, vol. 15, no. 2, March 2000, pp 14-19.
9. **Murphy, R.R.** "Using Robot Competitions in the Classroom to Promote Intellectual Development," *AI Magazine*, vol. 21, no.1, pp.77-90.

10. **Hexmoor, H., Meeden, L., and Murphy, R.R.**, "Is Robot Learning A New Subfield? The RoboLearn-96 Workshop," *AI Magazine*, Winter, 1997, vol. 18, no. 4, pp. 149-152.

• **In Refereed Conference Proceedings (past 10 years)**

***To Appear**

1. **J. Carlson, R. Murphy, A. Nelson**, "Follow-up Analysis of Mobile Robot Failures," to appear *2004 IEEE International Conference on Robotics and Automation (ICRA)*, 2004.
2. **B. Zimmer, M. Long, J. Carlson, R. Murphy**, "Distributed Error Handling and HRI," to appear *2004 IEEE International Conference on Robotics and Automation (ICRA)*, 2004.
3. **A. Gage, R. Murphy**, "Robust, Distributed Recruitment of Mobile Robots Using Emotions," to appear *2004 IEEE International Conference on Robotics and Automation (ICRA)*, 2004.

***In Print**

1. **Murphy, R., Shyy, W., Gonzales, N., Fitz-Coy, N., and Papila, N.**, "Remote Resupply Systems for Unmanned FCS-related Vehicles," *Proc. SPIE Vol. 5083, Unmanned Ground Vehicle Technology V*; Grant R. Gerhart, Charles M. Shoemaker, Douglas W. Gage; Eds., 2003, p. 285-302.
2. **Carlson, J., and Murphy, R.**, "Reliability Analysis of Mobile Robots," *ICRA 2003*, Vol1, 2003 Pages:274-281.
3. **Casper, J., and Murphy, R.R.** "Workflow Study on Human-Robot Interaction in USAR via Min-Conflict with Happiness," *ICRA 2002*, pp 1997-2003.(finalist for the Anton Phillips Best Student Paper Award)
4. **Murphy, R.R.**, "Marsupial Robots for Law Enforcement," *SPIE Law Enforcement Technologies*, Nov., 2000.
5. **Murphy, R.**, "Biomimetic Search for Urban Search and Rescue," *IROS 2000*, Takamatsu, Japan, Oct., 2000.*invited*
6. **Murphy, R., Casper, J., Hyams, J., Micire, M., and Minten, B.**, "Mobility and Sensing Demands in USAR," session on Rescue Engineering, *IECON-2K*, Oct. 25-28, Nagoya, Japan. *invited*
7. **Minten, B., Hyams, J., and Murphy, R.** "A Communication-Free Behavior for Docking Multiple Robots," *Distributed Autonomous Robots (DARS) 2000*, Nov. 2000.
8. **Majchrzak, D., Sarkar, S., Sheppard, B., and Murphy, R.** "Motion Detection From Temporally Integrated Images," *ICPR 2000*, July, 2000.
9. **Gage, A., and Murphy, R.** "Sensor Allocation for Behavioral Sensor Fusion using Min-Conflict with Happiness," *IROS 2000*, Oct. 2000.
10. **Casper, J., and Murphy, R.R.**, "Issues in Intelligent Robots for Search and Rescue," *SPIE Ground Vehicle Technology II*, Orlando, FL, April, 2000.
11. **Hyams, J., Minten, B., Micire, M., and Murphy, R.R.**, "Vision-based docking under variable lighting conditions," *SPIE Ground Vehicle Technology II*, Orlando, FL, April, 2000.

12. **Hyams, J., Powell, M., and Murphy, R.R.**, "Position Estimation and Cooperative Navigation of Micro-rovers Using Color Segmentation," *1999 IEEE International Symposium on Computational Intelligence in Robotics and Automation (CIRA 99)*, Monterey, CA, Nov. 1999, pp. 195-201.
13. **Gage, A., and Murphy, R.R.**, "Allocating Sensor Resources to Multiple Behaviors," *IROS 99*, Kyongju, South Korea, pp. 247-253.
14. **Spofford, J., Blich, J., Klarquist, W., Murphy, R.,**, "Vision-guided heterogeneous mobile robot docking," *SPIE Conference on Sensor Fusion and Decentralized Control in Robotic Systems II*, Boston, MA, vol. 3839, Sept. 1999, pp 112-121.
15. **Murphy, R.**, "Summary of Panel Discussion," proceedings *SPIE Unmanned Ground Vehicle Technology*, 7-8 April, 1999, Orlando, FL., vol. 3693, pp. 291-294.
16. **Robin R. Murphy, Michelle Ausmus, Magda Bugajska, Tanya Ellis, Tonia Johnson, Nia Kelley, Jodi Kiefer, Lisa Pollock**, "Marsupial-like Mobile Robot Societies," *Agents 99*, Seattle, WA, May 1-5, 1999, pp. 364-365.
17. **Murphy, R.R., and Hershberger, D.**, "Classifying and Recovering from Sensing Failures in Autonomous Mobile Robots," *Japan-USA Symposium on Flexible Automation (1998JUSFA)*, July 13-15, 1998, Ohtsu, Japan.
18. **Diaz, D., and Flowers, T., and Murphy, R. R.**, "Intelligent Exploration Strategy for the Find Life on Mars Competition," *Robotics 98*, Albuquerque, NM.
19. **Murphy, R.R., and Rogers, E.**, "Intelligent Assistance for Human Supervisory Control of Multiple Robots," *SPIE International Symposium on Aerospace: Robotic and Semi-Robotic Ground Vehicle Technology*, vol. 3366, April 13-17, 1998, Orlando, FL., pp. 52-60.
20. **Murphy, R. R., and Martinez, J.**, "Lessons Learned from the NSF REU Site Grant: Multiple Autonomous Mobile Robots for Search and Rescue Applications," *Frontiers in Education 97*, Pittsburgh, PA, Nov.5-8, 1997.
21. **Rogers, E., Thompson, C., and Murphy, R. R.**, "Outbreak Agent: Intelligent Wearable Technology for Hazardous Environments," *International Conference on Systems, Man and Cybernetics*, 1997, pp. 3198-3203. *invited*
22. **Murphy, R. R., Hawkins, D.K., and Schoppers, M.J.**, "Reactive Combination of Belief Over Time Using Direct Perception," *IJCAI-97*, Nagoya, Japan, Aug. 23-29, 1997, pp.1353-1358.
23. **Murphy, R.R., Marzilli, A., and Hughes, K.**, "When to Explicitly Replan Paths for Autonomous Mobile Robots," *1997 IEEE International Conference on Robotics and Automation*, April 22-24, 1997, Albuquerque, NM, vol. 4, pp.3519-3526.
24. **Rogers, E., Murphy, R.R., and Ericson, B.**, "Agent-Based Expert Assistance for Visual Problem Solving," *Autonomous Agents 97*, Marina del Rey, CA, Feb. 5-8, 1997, pp. 156-163.
25. **Murphy, R.R.**, "Adaptive Rule of Combination for Observations Over Time," *1996 Multisensor Fusion and Integration for Intelligent Systems (MFI96)*, Dec. 8-11, 1996, Washington DC, pp.125-131.
26. **Murphy, R.R., Gomes, K., and Hershberger, D.**, "Ultrasonic Data Fusion as a Function of Robot Velocity," *1996 SPIE Sensor Fusion and Distributed Robotic Agents*, Nov. 21-22, 1996, Boston, MA., pp. 114-126.

27. **Murphy, R.R.**, "Use of Scripts for Coordinating Perception and Action," *IROS-96*, Nov. 4-8, 1996, Osaka, Japan, pp.156-161.
28. **Murphy, R.R., and Hawkins, D.K.**, "Behavioral Speed Control Based on Tactical Information," *IROS-96*, Nov. 4-8, 1996, Osaka, Japan, pp.1715-1721.
29. **Gifford, K.K., and Murphy, R.R.**, "Incorporating Terrain Uncertainties in Autonomous Vehicle Path Planning," *IROS-96*, Nov. 4-8, 1996, Osaka, Japan, pp.1134-1140.
30. **Murphy, R.R., and Hershberger, D.**, "Classifying and Recovering from Sensing Failures in Autonomous Mobile Robots," *AAAI-96*, August 5-7, 1996, Portland, OR., pp. 922-929.
31. **Murphy, R., and Sprouse, J.**, "Strategies for Searching an Area with Semi-Autonomous Mobile Robots," *2nd Conference on Robotics for Challenging Environments*, June 1-6, 1996, Albuquerque, NM. pp. 15-21.
32. **Blitch, J., and Murphy, R.**, "Alternative Scenarios for Military Deployment of Unmanned Ground Vehicles," *2nd Conference on Robotics for Challenging Environments*, June 1-6, 1996, Albuquerque, NM. pp. 36-42.
33. **Gifford, K.K., and Murphy, R.R.**, "Incorporating Terrain Uncertainties in Autonomous Vehicle Path Planning," *2nd Conference on Robotics for Challenging Environments*, June 1-6, 1996, Albuquerque, NM. pp. 8-14.
34. **Murphy, R., and Schopper, M.J.**, "Learning Landmark Triples Through Experimentation," *ROBOLEARN-96: An International Workshop on Learning for Autonomous Robots*, May 19-20, 1996, Key West, FL., 79-83.
35. **Murphy, R. R., Hughes, K., and Noll, E.**, "An Explicit Path Planner to Facilitate Reactive Control and Terrain Preferences," *1996 IEEE International Conference on Robotics and Automation.*, April 22-29, 1996, Minneapolis, MN., vol. 3., pp. 2067-2072.
36. **Rogers, E., and Murphy, R.R.**, "Knowledge-Based Image Enhancement for Cooperative Tele-Assistance," *1995 Symposium on Human Interaction with Complex Systems*, Sept. 17-20, 1995, Greensboro, NC.
37. **Murphy, R. R.**, "An Artificial Intelligence Approach to the 1994 AUVS Unmanned Ground Vehicle Competition", *1995 IEEE International Conference on Systems, Man and Cybernetics*. Oct., 1995, Vancouver, BC., pp. 1723-1728.
38. **Rogers, E., Murphy, R.R., and Warsi, N.**, "Cooperative Assistance for Remote Robot Assistance", *1995 IEEE International Conference on Systems, Man and Cybernetics*. Oct., 1995, Vancouver, BC., pp. 4581-4586.
39. **Murphy, R. R., and Rogers, E.**, "Estimating Time Available for Sensor Fusion Exception Handling," *Sensor Fusion and Networked Robotics VIII*, Oct. 22-26, 1995, Philadelphia, PA.
40. **Murphy, R. R., Hoff, W., Blitch, J., Gough, V., Hoffman, J., Hawkins, D., Krosley, R., Lyon, T., Mali, A., MacMillan, J., Warshawsky, S.**, "Colorado School of Mines Behavioral Approach to the 1995 UGV Competition," *Mobile Robots X*, Oct. 22-26, 1995, Philadelphia, PA., pp. 220-227.
41. **Murphy, R. R., Hoff, W., Blitch, J., Gough, V., Hoffman, J., Hawkins, D., Krosley, R., Lyon, T., Mali, A., MacMillan, J., Warshawsky, S.**, "Implementation and Comparison of Two Computer Vision Based Road Following Approaches," *International Symposium on Advanced Transportation Applications*, Sept. 19-22, 1995, Stuttgart, Germany, pp. 441-448.

42. **Murphy, R., and Blitch, J.,** “Autonomous Mobile Robots for Space Mining,” *International Symposium on Mine Mechanization and Automation*, CSM, June 12-14, 1995, pp. 24:23-24:34.
43. **Lindner, J., Murphy, R., and Nitz, R.,** “Learning the Expected Utility of Sensors and Algorithms”, *IEEE International Conference on Multisensor Fusion and Integration for Intelligent Systems*, Las Vegas, NV, Oct. 2-5, 1994, pp. 583-590.
44. **E. Rogers and Murphy, R.R.,** “Tele-assistance for Semi-Autonomous Robots”, *AIAA/NASA Conference on Intelligent Robots for Field, Factory, Service, and Space*, Houston, March 21-24, 1994, pp. 500-508.
45. **Miller, R.J., and Murphy, R.R.** “Robotic Options for Mining of Near-Earth Objects”, *Space 94: 4th International Conference and Exposition on Engineering, Construction, and Operations in Space*, Albuquerque, NM, Feb. 26-Mar 3, 1994.
46. **Murphy, R.R.,** “Teaching Computer Algorithms and Data Structures to Students in the Engineering and the Physical Sciences”, *1993 Frontiers in Education Conference*, Washington, DC., November, 1993, pp. 397-401.
47. **Murphy, R.R., and Hoffman, J.,** “Comparision of Bayesian and Dempster-Shafer Theory for Applications in AI”, *SPIE Stochastic Methods in Signal Processing, Image Processing, and Computer Vision*, San Diego, CA, July 11-17, 1993. *invited*
48. **Murphy, R.R.,** “Robust Sensor Fusion for Teleoperations”, *1993 IEEE International Conference on Robotics and Automation*, Atlanta, GA, May 2-6, 1993, vol. 2, pp. 572-577. *invited special session on Multisensor Fusion*
49. **Chavez, G.T., and Murphy, R.R.,** “Exception Handling for Sensor Fusion”, *SPIE Sensor Fusion VI*, Boston, MA, Sept. 7-10, 1993, pp. 142-153.
50. **Hughes, K., and Murphy, R.R.,** “Ultrasonic Robot Localization using Dempster-Shafer Theory”, *SPIE Stochastic Methods in Signal Processing, Image Processing, and Computer Vision*, San Diego, CA, July 19-24, 1992. *invited session on Applications for Vision and Robotics*
51. **Murphy, R.R, and Arkin, R.C.,** “SFX: An Architecture for Action-Oriented Sensor Fusion”, *1992 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Raleigh, NC, July 7-10, 1992, pp. 1079-1086.
52. **Murphy, R.R,** “Action-Oriented Sensor Fusion for Telesystems”, *1992 National Telesystems Conference*, Washington, DC, May 19-20, 1992, pp. 10-11-10-14.
53. **Murphy, R.R.,** “State Based Sensor Fusion for Surveillance”, *SPIE Sensor Fusion IV*, Boston, MA, Nov. 1991, pp. 331-345.
54. **Murphy, R.R.,** “An Application of Dempster-Shafer Theory to a Novel Control Scheme for Sensor Fusion”, *SPIE Stochastic Methods in Signal Processing, Image Processing, and Computer Vision*, San Diego, CA, July 21-26, 1991.

***In Review**

- A. Gage and Robin R. Murphy “Affective Recruitment of Distributed Heterogeneous Agents,” submitted to *Nineteenth National Conference on Artificial Intelligence (AAAI-04)*, 2004.
- J. Carlson and R. R. Murphy, “An Investigation of MML Methods for Fault Diagnosis in Mobile Robots,” submitted to *Nineteenth National Conference on Artificial Intelligence (AAAI-04)*, 2004.

- T. Fincannon, L. Barnes, R. Murphy, D. Riddle, "Talking and Gesturing to a Robot: Emergent Social Interaction in Rescue Robots," submitted to *Nineteenth National Conference on Artificial Intelligence (AAAI-04)*, 2004.

• In Refereed Workshop Proceedings

1. **Murphy, R.**, "Human-Robot Interaction in USAR," invited, *ICRA Workshop on Human-Robot Interaction*, May 11, 2002.
2. **Murphy, R.** "Biomimetic Search for Urban Search and Rescue," invited session on Rescue Robots, *IROS 2000*.
3. **Powell, M.W, and Murphy, R.R.**, "Position Estimation of Micro-Rovers using a Spherical Coordinate Transform Color Segmenter," *CVPR 99: Workshop on Perception for Mobile Agents*.
4. **Murphy, R.R., 1996.** "Biological and Cognitive Foundations of Intelligent Sensor Fusion," invited speaker, proceedings of the *DoE/ONR/NSF Workshop on Foundations of Information/Decision Fusion with Applications to Engineering Problems*, Washington, DC, Aug. 7-9, 1996.

4 Research:

• Funded Research

ONR, \$86,460, 1/02/2004-8/31-2004, "NAIMT: A Visual Environment for Design, Development, Testing and Evaluation of Aerial Vehicle Integrated Control and Diagnostics," PI: Robin R. Murphy, Co-PI: Kimon Valavanis

ONR, \$975,686, 05/21/2003-07/31/2004, "NAIMT," PI: Robin R. Murphy.

NSF I/UCRC, \$10,000, 10/1/2003-9/30/2004, "Safety, Security, and Rescue Robots," PI: Robin R. Murphy, Co-PI: Kimon Valavanis, Richard Voyles (UMN).

USF College of Engineering/Visual and Performing Arts Grant, \$20,000, "Videofish: TV Worth Watching," PI: Robin R. Murphy, Co-PI: Hasan Elahi (VAPA), Bill Kearns (FMHI).

DARPA IPTO CSEE, \$180,000, 1/03-9/03, "Ethnographic Studies of RAP Teams Conducting Urban Search and Rescue," PI: Robin R. Murphy.

ARO, \$10,000, 2/03-1/04, "Participation Grant for IEEE Robotics and Automation Society SSRR Workshop 2003," PI: Robin R. Murphy.

NSF, \$1.2M, 10/02-9/05, CISE Distributed Research Resources, "R4: Robots for Rescue, Research and Response." PI: Robin R. Murphy.

NSF, \$96,000, 9/02-8/03, CMS Small Exploratory Research Grant, "Adaptive Shoring for Rescue Robots." (CMS-0229809) PI: Robin R. Murphy.

CDMHA, \$225,000, 11/01-12/02, "Robot-Assisted Search and Rescue." PI: Robin R. Murphy.

Department of Energy, \$548,373, 9/01-8/04, "Distributed Cooperative Sensing for Active Diagnosis and Recovery." (DE-FG02-01ER45904). PI: Robin R. Murphy.

ONR, \$50,000, 05/02-10/02, "Rescue Robots for Naval Research-Industry Partnerships." PI: Robin R. Murphy.

ONR, \$246,000, 04/01/01-9/04, “Cooperation and Collaboration of Heterogeneous Agents with Sensing Uncertainty,” PI: Robin Murphy, formerly co-PI: Christine Lisetti, College of Business. (N00014-01-1-0409)

DARPA ITO Synergistic Cyber-Forces, \$42,717, 1/01/01-12/31/01, “Intelligent Systems Interaction in USAR.”

DARPA TTO FCS, \$239,922, 3/01/01-9/01/03, “Sensor Fault Detection and Recovery for the DARPA PerceptOR Program,” subcontract to SAIC.

DARPA TTO FCS, \$49,969, 1/01/01-9/01/01, “Marsupialism for the DARPA UGCV Program,” subcontract to SAIC.

DARPA ATO Tactical Mobile Robots, \$562,000, 9/99-12/02, “Robust Cooperative Navigation in Docking, Inspection and Surrogate Sensing,” PI: Robin R. Murphy.

DARPA TTO, \$200,000, 8/01/01-9/15/02, “A Study on Resupply for FCS-like Vehicles,” PI: Robin R. Murphy, co-PI: Wei Shyy (UFlorida), Noel Gonzales (ETI).

ONR, \$7,000, “Dynamic Sensor Allocation Using Sensing Quality,” PI: Robin R. Murphy

NSF REU, \$123,748, 5/98-4/00, “Multiple Autonomous Mobile Robots for Search and Rescue Applications,” PI: Robin R. Murphy, Co-PI: Karen Tichenor.

Northrop Grumman Corporation, Military Aircraft Systems Division, 6/97-99, \$107,000, “Support of Robust UAV.”

NSF Research Experience for Undergraduates, 6/97-5/98, \$10,000, supplement to “Reactive Sensing for Autonomous Mobile Robots,” two undergraduates ATO Tactical Mobile Robots.

NSF CISE, 6/97-5/00, \$400,000, “Combined Research-Curriculum Development on Diagnostics, Health Assessment, and Predictive Maintenance of Engineered Processes and Systems,” PI: R. Shoureshi, co-Pi J. Gosink, B. Olds, R. Murphy, J. Steele.

NSF CISE Research Instrumentation, 5/1/97-4/30/98, \$119,996, “Intelligent Assistance for Multiple Robots,” PI: R. Murphy, E. Rogers (co-PI, Clark-Atlanta University).

National Park Service, Geological Resource Division, Oct1,1996-Sept.30,1998, \$35,000, “Computer Technical Assistance and Website Development for National Park Service Geological Resource Division.”

NSF REU Site Grant, AY97-98, \$134,600, “Multiple Autonomous Mobile Robots for Search and Rescue Applications,” PI: R. Murphy, co-PI: Julian Martinez, Director of Minority Engineering Program (co-PI).

NSF, co-funded with **DARPA**, May, 94– May, 98, \$210,000. “Reactive Sensing for Autonomous Mobile Robots.”

NASA SBIR Phase 2, AY94-98, subcontractor \$86,600. “Robotic Whole-body Dexterity and a Software Architecture for Robotic Task Performance in Uncontrolled Environments,” NASA Johnson Space Center, Houston, and Robotics Research Harvesting, Redwood City, CA.

NASA SBIR Phase 1, Jan 1996 – Jun 1996, subcontractor \$21,219. “Robotic Online Learning of Perceptual Models for Navigation and Grasping,” NASA Johnson Space Center, Houston, and Robotics Research Harvesting, Redwood City, CA.

NSF/DOE/EPRI Advanced Control of Energy and Power Systems (ACEPS) I/UCRC, AY95, \$42,000. “Artificial Intelligence for Preventive Maintenance and Control,” PI: Rahmat A. Shoureshi, co-PI: R. Murphy.

National Science Foundation (NSF), Research Experience for Undergraduates, Summer 94, \$4,000. “Reactive Sensing for Autonomous Mobile Robots.”

Colorado Advanced Software Institute, AY94, Technology Transfer Grant \$33,000. “Explanation-Based Learning for Data Fusion,” IBM Federal Systems, Boulder, collaborating company.

NASA SBIR Phase 1, Jan 1993 – Jul 1994, subcontractor \$8,500. “Robotic Whole-body Dexterity and a Software Architecture for Robotic Task Performance in Uncontrolled Environments,” NASA Johnson Space Center, Houston, and Robotics Research Harvesting, Redwood City, CA.

- **Pending Funded Research**

- **Students Advised**

Master’s Students

- Jenn Casper, 5/02, thesis: “Human-Robot Interactions at the World Trade Center,” supported by DARPA SCF Seedling Program. Thesis nominated for USF Best MS Thesis.
- Jeff Hyams, 5/01, thesis: “Robust Vision-Based Perception for Docking,” supported by DARPA TMR.
- Aaron Gage, 5/01, thesis: “Mobile Robot Sensor Allocation Using Min-Conflict with Happiness,” supported by ONR.
- Dale Hawkins, 1/98, thesis: “Persistence of Belief with Direct Perception,” supported by NSF/DARPA Grant.
- Dave Hershberger, 12/97, thesis: “Mobile Robot Sensor Fault Recovery Improvements,” supported by NSF/DARPA Grant.
- John Blitch, 4/96, thesis: “KNOBSAR: An Expert System Prototype for Robot Assisted Urban Search and Rescue,” supported by Army AI Center.
- Brent Taylor, 12/94, thesis: “Theory Revision for Eliminating Background Effects in Target Recognition,” supported by CASI technology transfer grant.
- Greg Chavez, 12/93, thesis: “Exception Handling for Intelligent Sensor Fusion,” supported by a State of Colorado Fellowship.

PhD Students

- Kevin Gifford, PhD in Aerospace Engineering, co-advisor, 12/97, thesis: “Path Planning Strategies for Autonomous Ground Vehicles,” University of Colorado, Boulder (off campus co-advisor).
- Jenny Burke, current, with Industrial Organization.
- Jen Carlson, current.
- Aaron Gage, current.

5 Membership in Professional Societies and Certification:

American Association for Artificial Intelligence (AAAI)
Association for Computing Machinery (ACM)
Association for Unmanned Vehicle Systems International (AUVSI)
Florida Fire Chiefs' Association
Institute of Electrical and Electronics Engineers (IEEE)
Society of Photo-Optical Instrumentation Engineers (SPIE)
Society of Women Engineers (SWE)

Engineer in Training (E.I.T.) Certificate, Georgia, 1980.
Engineer in Training (E.I.T.) Certificate, Louisiana, 1981.

6 Professional Activities and Service:

IEEE Robotics and Automation Society, co-founder and co-chair of Safety, Security, and Rescue Robotics technical committee, 2001-current.

IEEE Computer Society, Distinguished Visitor Program, 2001-2003.

- **University of Texas, Dallas**,
- **IEEE Canaveral Section**, Merritt Island, Florida, Aug. 31, 2001.
- **University of California San Diego**, "Intelligent Robots and Urban Search and Rescue," Jan. 26, 2001.

IEEE Robotics and Automation Society, Secretary, Executive Committee, 2000-2002.

IEEE Robotics and Automation Society, co-chair (Americas) of the Education Committee, 1998-1999.

• Program Committees

Intelligent Autonomous Vehicles (IAV 2004), program committee Lisbon, Portugal, 5-7 July 2004.

IEEE Robotics and Automation Society, general co-chair, *Safety, Security, and Rescue Robotics 2003 Workshop*, to be held, Tampa, FL, Feb. 19-20, 2003.

Reasoning with Uncertainty in Robotics (RUR) workshop at IJCAI-03.

IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 1994, 2003, 2004.

IEEE International Conference on Robotics and Automation, 1997, 2000, 2004 (Tutorial Chair).

AAAI National Conference on AI, Orlando, FL, July, 1997-9.

International Conference on Autonomous Agents, 1998.

SPIE OE/Technology Symposium, Sensor Fusion, 1994-2000.

SPIE Robotic and Semi-Robotic Ground Vehicle Technology, part of SPIE's International Symposium on Aerospace, 1998-9.

IEEE/SICE/RSJ International Conference on Multisensor Fusion and Integration, 1994, 6.

International Dedicated Conference on Robotics, Motion and Machine Vision, 1994-5.

OE/Aerospace Science and Sensing, Intelligent Information Systems, Applications of Artificial Intelligence XI: Machine Vision and Robotics, Orlando, FL, Apr., 1993.

- **Workshop Organization**

1. **DARPA Workshop on Biological Inspirations for Micro Air Vehicles**, Co-chaired (with Jim McMichael, Alan Rudolph), April 21-22, 1999.
2. **1999 AAAI Mobile Robotics Competition and Exhibition**, Madison, WI, 1999.
3. **RoboCup 1998**, program committee, “Collective Robotics Workshop,” Paris, France, July, 1998.
4. **AAAI Spring Symposium**, organizing committee, “Integrated Planning Applications,” Stanford, CA, Mar 27-29, 1995.

- **Panel Organization**

1. **2001 SPIE Aerosense Unmanned Ground Vehicle Technologies III**, “FCS and Everything Else,” panelists: Scott Fish (DARPA), Doug Gage (DARPA), Grant Gerhart (TACOM), Jeff Kotora (OUSD), Lynne Parker (ORNL), Marion von Fossom (DARPA), moderator: Robin Murphy, Orlando, FL, 2001.
2. **2002 SPIE Aerosense Unmanned Ground Vehicle Technologies IV**, “Robots at the World Trade Center,” panelists: Jenn Casper, Tom Frost, Mark Micire, Scott Pratt, moderator: Robin Murphy, Orlando, FL, 2002.
3. **2001 SPIE Aerosense Unmanned Ground Vehicle Technologies II**, “The View from Government on UGVs,” panelists: John Blitch (DARPA), Doug Gage (DARPA), Fenner Milton (Army Night Vision Lab), LTC vonFossom (DARPA), moderator: Robin Murphy, Orlando, FL, 2002.
4. **2000 SPIE Aerosense Unmanned Ground Vehicle Technologies II**, “Advanced Technologies for Unmanned Ground Vehicles,” panelists: Ray Balcerak (DARPA), John Blitch (DARPA), Ephraim Garcia (DARPA), Bob Nowak (DARPA), moderator: Robin Murphy, Orlando, FL, 2000.
5. **2000 SPIE Aerosense Unmanned Ground Vehicle Technologies**, “Future UGV Applications,” panelists: Jim Albus (NIST), John Blitch (DARPA), Mike Toscano (OUSD), Larry Matties (JPL), moderator: Robin Murphy, Orlando, FL, 1999.

- **Robot Competition Organization**

1. **2002 AAAI/RoboCup Rescue— Physical Agent League**, Edmundton, CA, Aug, 2001,
2. **2001 RoboCup Rescue— Physical Agent League**, Seattle, WA, Aug, 2001, RoboCup organizing committee.
3. **1998 AAAI Mobile Robotics Competition**, Madison, WI, July, 1998, general competition Chair.
4. **1998 International Conference on Autonomous Agents Robot Exhibition**, Minneapolis, MN, May, 1998, chair.

5. **1997 AAAI Mobile Robotics Competition**, Providence, RI, July, 1997. Chair, Fund Raising, and member, Rules Committee.
6. **1996 AAAI Mobile Robotics Competition**, Portland, Oregon, Aug., 1996. Chair, Fund Raising.

- **Referee Work for Journals, Conferences, and Agencies**

IEEE Transactions on Robotics and Automation, IEEE Transactions on Pattern Analysis and Machine Intelligence, IEEE Transactions on Knowledge and Data Engineering, IEEE Expert, International Journal of Pattern Recognition and Artificial Intelligence, Robotics and Autonomous Systems, Autonomous Robots, Journal of Experimental and Theoretical Artificial Intelligence, IEEE Robotics and Automation Society Magazine, IEEE Control Society Magazine, Machine Vision and Applications

Agencies

- ONR External Panel Review, Naval Research Laboratory: Integrated Autonomous Systems.
- NSF Cross-Disciplinary Activities (CISE) directorate, Robotics and Machine Intelligence (CISE) directorate.

- **Corporate and Professional Outreach**

1. **Northrop Grumman Corporation**, “Tutorial: Robust Sensing with SFX-EH,” 2 day tutorial, Los Angeles, July, 1997.
2. **1996 IEEE International Conference on Robotics and Automation**, “Robotics Planning and Execution,” (WS5), organizer, David Musliner, speaker on sensing, Minneapolis, MN, Apr, 1996.
3. **Idaho National Engineering Laboratory**, “Intelligent Control for Mobile Robots,” 1 day short course, Idaho Falls, Idaho, May, 1994.
4. **IEEE International Conference on Multisensor Fusion and Integration '94**, “Multi-sensor Fusion Under Uncertainty: Bayesian and Dempster-Shafer Methods”, co-taught with Dr. Seth Hutchinson, Las Vegas, NV, Oct., 1994.

- **Professional Development**

Academic Management Institute for Women, 1995, by nomination of institute’s CEO. My project was identifying and contacting sponsoring industries for the *NSF Engineering Research Center Proposal*, “Intelligent Machine Systems for Hostile/Uncertain Environments (IMSHUE),” \$2M/yr, which proposed a joint NSF I/UCRC between Colorado School of Mines and University of Colorado, and writing a significant portion of the proposal.

7 Presentations:

- **Invited Conference, Workshop, or Panel Presentations**

1. **NSF, CISE Distinguished Lecture**, “Robot-Assisted Search and Rescue from 9/11 to Now: Where’s the IT?” Nov. 11, 2002.
2. **Carnegie Mellon University WomanSCS Distinguished Lecture**, “Robot-Assisted Search and Rescue,” CMU, Oct. 24, 2002.

3. **ONR Naval Industry-Research Partnership Conference**, luncheon speaker, "Robot-Assisted Search and Rescue: Why Industry-Research Partnerships are Needed," Washington, DC, Aug. 13, 2002.
4. **Innovative Applications of Artificial Intelligence 2002**, invited speaker, "Robot-Assisted Search and Rescue at the WTC: Where's the AI?," Edmonton, CA, Aug. 2, 2002.
5. **NSF**, invited speaker, "Robot-Assisted Urban Search and Rescue at the WTC," Feb. 19, 2002.
6. **CVPR 2001**, invited speaker, "Robot-Assisted Urban Search and Rescue at the WTC," Kauai, Hawaii, Dec. 13, 2001.
7. **ISATED Intelligent Systems and Control Conference**, keynote speaker, "Robot-Assisted Urban Search and Rescue at the WTC," Clearwater, FL, Nov. 19, 2001.
8. **Perceptual User Interfaces Workshop**, keynote speaker, "Robot-Assisted Urban Search and Rescue at the WTC," Orlando, FL, Nov. 16, 2001.
9. **International Disaster and Emergency Response Conference**, "Robot-Assisted Urban Search and Rescue at the WTC," The Hague, Oct. 25, 2001.
10. **National Institute for Urban Search and Rescue (NIUSR) Conference**, "Robot-Assisted Urban Search and Rescue at the WTC," Huntsville, AL, Sept. 26, 2001.
11. **National Institute for Urban Search and Rescue (NIUSR)**, invited speaker, "Magic Machines in these Wondrous Times," with LTC John Blitch, Jan. 22, 2001.
12. **2000 DARPA Workshop on PalmPower**, invited speaker, "Issues with Power for Mobile Robots," Ft. Lauderdale, FL, Nov, 2000.
13. **1997 IEEE Computer Society Workshop on Undergraduate Education and Image-Related Computation**, invited speaker, "Image computation in an upper-level elective on robotics," San Juan, PR, June, 1997.
14. **Murphy, R.R., 1997.** "Intelligent Sensor Fusion," *ProTem-CC/NSF Joint Workshop on Intelligent Robotic Agents*, Porto Alegre, Brazil, Mar. 17-19, 1997.
15. **Murphy, R.R., 1997.** "Robotic Learning: A Shift in Paradigms," keynote talk, *10th International Florida Artificial Intelligence Research Conference*, May 11-14, 1997.
16. **1996 IEEE Conference on Computer Vision and Pattern Recognition (CVPR)**, panel on "Education for Computer Vision," San Francisco, CA, June 18, 1996.
(http://www.marathon.csee.usf.edu/teaching_resources.html)

• Workshop and Symposia Presentations

1. **Murphy, R. R., 1996.** "Allocating Sensing Resources with Incomplete Information," *1996 AAAI Spring Symposium on Planning with Incomplete Information for Robot Problems*, Mar 25-27, Stanford, CA, 1996.
2. **AAAI Spring Symposium**, Plenary Session Speaker on "Integrated Planning Applications," Stanford, CA, Mar 27-29, 1995.
3. **Dagstuhl-Seminar on Environment Modelling and Motion Planning for Autonomous Robots**, Dagstuhl, Germany, Oct. 24-28, 1994.

4. **AAAI 1993 Fall Symposium on Machine Learning in Computer Vision: What, Why and How?**, “Learning to Eliminate Background Effects in Object Recognition”, Raleigh, NC, Oct. 22-24, 1993.
5. **Evidential Accural for SAR Automatic Target Recognition Workshop**, sponsored by AFOSR, “Intelligent Sensor Fusion”, Denver, CO, March 3-4, 1993.
6. **AAAI 1992 Fall Symposium on Applications of Artificial Intelligence to Real-World Autonomous Mobile Robots**, “Sensor Fusion: From Cognitive Theory to Robotic Architecture”, Cambridge, MA, Oct. 23-26, 1992.
7. **AAAI 1992 Spring Symposium on Selective Perception**, “Selective Perception and Sensor Fusion”, Stanford, CA, March 25-27, 1992.
8. **AAAI 1991 Fall Symposium on Sensory Aspects of Robotic Intelligence**, “Towards a Foundation for Sensor Fusion: Grammar and Control”, Monterey, CA, Nov. 15-17, 1991.

• **Invited Seminars and Colloquia at Other Institutions (past 5 years)**

1. **SGI Forum on Rescue and Crisis Management**, “Robot-Assisted Search and Rescue at the WTC: Where’s the IT?,” Sept. 26, 2002.
2. **Penn State University**, “Robot-Assisted Search and Rescue at the WTC: Where’s the AI?” Sept. 12, 2002.
3. **University of Virginia**, “Kangaroos and Emotions,” March 8, 2001.
4. **Vanderbilt University**, “Kangaroos and Emotions,” Feb. 23, 2001.
5. **University of Maryland Computer Science Colloquium**, “Reactive Combination of Belief Over Time Using Direct Perception,” College Park, MD, Oct. 22, 1998.
6. **Ft. Lewis College Colorado Space Grant Colloquium**, “Making Space Robots Less Spacey,” Durango, CO, Jan. 22, 1998.
7. **University of South Florida Computer Science Colloquium**, “Reactive Sensing”, Tampa, FL, Feb. 13, 1997.
8. **Texas A&M, Computer Science Seminar**, “Integrating Sensing into Mobile Robot Architectures,” Mar. 8, 1996.
9. **NASA Johnson Space Center, Robotics and Automation Group Seminar**, “Integrating Sensing into Mobile Robot Architectures,” Mar. 7, 1996.
10. **University of Chicago, Computer Science Seminar**, “Reactive Sensing,” Mar. 8, 1995.
11. **University of Illinois, Urbana-Champaign, Beckman Institute Seminar**, “Reactive Sensing,” Mar. 6, 1995.
12. **University of Colorado, Boulder Computer Science Seminar**, “Biological and Cognitive Foundations of Intelligent Sensor Fusion,” Boulder, CO, Feb. 23, 1995.
13. **Jet Propulsion Laboratory**, “Integrating Sensing into Architectures for Autonomous Mobile Robots,” Pasadena, CA, Jan. 6, 1995.
14. **University of Colorado, Denver Computer Science Seminar**, “Reactive Sensor Fusion,” Denver, CO, Oct. 31, 1994.

15. **University of Utah, Computer Science Colloquia**, “Reactive Sensor Fusion,” Salt Lake City, UT, June 2, 1994.
16. **Colorado State University**, “Research Directions in the CSM Mobile Robotics/Machine Perception Laboratory”, Barney’s Monday Afternoon Meeting (CS dept. seminar series), Fort Collins, CO, Jan. 24, 1994.
17. **Clark-Atlanta University**, “Research Directions in the CSM Mobile Robotics/Machine Perception Laboratory”, Atlanta, GA, Nov. 4, 1993.
18. **Michigan State University Computer Science Colloquium**, “Intelligent Sensor Fusion for Autonomous Mobile Robots”, East Lansing, MI, April 9, 1992.
19. **Rockwell International Science Center**, “A Model of Sensor Fusion for Autonomous Mobile Robots”, Palo Alto, CA, Nov. 14, 1991.

8 Teaching:

Course	Credits	Date (past 5 years)
University of South Florida, Computer Sciences and Engineering		
<i>CIS4930: Introduction to AI</i>	3	S04
<i>CIS4930: Videofish</i>	3	F03
<i>CIS4930/6930: Robots, Agents, People</i>	3	S03
<i>CIS6930: Advanced AI Robotics</i>	3	S01
<i>CIS4930/6930: Intro to AI Robotics</i>	3	F98,F99,F00,F02
<i>CIS6930: Autonomous Agents</i>	3	S00
<i>CIS4250: Computing Ethics</i>	3	S99,S00,S01
<i>ENG4930: Foundations of Engineering</i>	3	F99
Colorado School of Mines, Dept of Math/CS		
<i>MACS306: Software Engineering†</i>	3	F96,7
<i>MACS567: Adv Software Engineering</i>	4	S97
<i>MACS415: Robotics and Computer Vision‡</i>	3	S96,7
<i>MACS574: AI Robotics and Computer Vision‡</i>	4	S96
<i>MACS411: Expert Systems†</i>	3	S96,F97
<i>MACS581: Evidential Reasoning‡</i>	3	F96

†significantly revised course ‡created course

9 Honors and Awards:

USF Outstanding Faculty Research Achievement Award, 2003.

Advisor, IEEE RAS Anton Phillips Best Student Paper Award, Finalist: Jenn Casper.

Eagle Award, *National Institute for Urban Search and Rescue*, 2001.

IEEE Distinguished Visitor, *IEEE Computer Society*, 2001-2002.

Nils Nilsson Technical Achievement Award *AAAI Mobile Robot Competition*, 2000.

MEP Outstanding Faculty Award, CSM Minority Engineering Program, 1997-8.

Defense Science Study Group, Institute for Defense Analyses, DoD, 1998-1999.

“Colorado Institute Equity Excellence Award,” Colorado Institute for Gender Equity, 1997.

“Outstanding CSM Faculty Member, Dept. of Mathematical and Computer Sciences” as selected by the Graduating Senior Class of Dec 1995 and the CSM Alumni Association.

“Outstanding CSM Faculty Member, Dept. of Mathematical and Computer Sciences” as selected by the Graduating Senior Class of May 1994 and the CSM Alumni Association.

10 Institutional and National Service:

- **External Advisory Boards**

NSF Visiting Undergraduate CS Curriculum Advisory Committee, member, University of Virginia, 1992–1995.

- **NSF/Computing Research Association Distributed Mentoring Program**

Pavani Reddy, Hunter College, NY, Summer 1997.

Aliza Marzilli, Emory College, GA, Summer 1996.

Eva Noll, Lasalle University, PA, Summer 1995.

- **McNair Scholars Program Mentoring**

Roberto Montane, research project: “Coaching for Autonomous Mobile Robots,” 2000-2001.

Marsupial Robot Duty: Rescue in Pockets of Rubble, Washington Post, July 5, 1999, pp A9.