ROSEMARY EMERY-MONTEMERLO

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PRIMARY RESEARCH INTERESTS

- Decentralized control: multi-robot/agent teams
- Robotics: decision- and game-theoretic planning
- Machine learning: reinforcement learning

EDUCATION

August 2005 — Ph.D., Robotics Institute, Carnegie Mellon University, Pittsburgh, PA.
Postgraduate Scholarship, Natural Sciences and Engineering Research Council of Canada (1999-2003).

Dissertation: *Game-Theoretic Control for Robot Teams*

Co-Advisors: Jeff Schneider; Sebastian Thrun
Thesis Committee: Geoff Gordon (Carnegie Mellon), Michael Littman (Rutgers), Jeff Schneider (Carnegie Mellon), Sebastian Thrun (Stanford)

May 1999 — B.A.Sc., Systems Design Engineering (with options in Intelligent Systems and Cognitive Science; co-operative engineering program), University of Waterloo, Ontario, Canada.
Canada Scholarship, Government of Canada (1994-1999); Sandford Fleming Medal for Academic Excellence.

RESEARCH PROJECTS

2002-present — Cooperative multi-robot systems.

Development of decision- and game-theoretic planning algorithms for decentralized control of robot teams with limited communication. Applications include real-time controllers for team of security robots.

Fall 2000 — Using expectation-maximization to learn low complexity 3D Models.

Assisted in the development of an expectation-maximization algorithm for learning low complexity 3D maps of an environment

Summer 2000 — CMU Hammerheads 2000 Team Leader.

Managed development and testing for CMU's first middle-sized RoboCup entry. Responsible for base behaviors as well as integration of all modules into TeamBots.

1999-2001 — Behavior-based control of robot teams.

Design and implementation of modules for robust individual and team-level behaviors within the context of robotic soccer. Integrated control of the Cye robot into TeamBots.

TEACHING EXPERIENCE

Fall 2001 — Teaching Assistant. 15-385: "Robotic Manipulation", Carnegie Mellon University, School of Computer Science.

INDUSTRY EXPERIENCE

Summer 1998 — Controls and Analysis Work Term, Spar Space Systems, Brampton, Canada.

Software design and development of an Electrical Interface Control Document Database. Assisted with the design and testing of SPDM databus.

Fall 1997	Mechanical Designer, Husky Injection Molding Systems Ltd., Bolton, Canada. Design and detailing of a vacuum blower adapter plate. Life and stress analysis for cam follower bearings. Assisted in the preparation of retrofit documentation.
Summer 1996, Fall 1997	Associate Consultant, Netron Inc., Toronto, Canada. Design, prototyping and development for large CICS banking system in the United Kingdom. Assisted in preparation of teaching materials for technical course at Canadian bank.
Fall 1995	Haptic Device Programmer, Canadian Space Agency, St. Hebert, Canada. Algorithmic and software development for 3-D graphics and dynamic contract simulation package for a haptic device.
Winter 1995	Software/Hardware Engineer, Applied AI Systems Inc., Kanata, Canada. Research in the area of neural networks and genetic algorithms for control of a small robot in a complex maze environment.

PUBLICATION LIST

REFEREED JOURNAL ARTICLES

1. S. Thrun, C. Martin, Y. Liu, D. Hähnel, R. Emery-Montemerlo, D. Chakrabarti, and W. Burgard. "A Real-Time Expectation Maximization Algorithm for Acquiring Multi-Planar Maps of Indoor Environments with Mobile Robots." *IEEE Transactions on Robotics and Automation*, 20(3): 433–442, 2004.

REFEREED CONFERENCE ARTICLES

2. R. Emery-Montemerlo, G. Gordon, J. Schneider and S. Thrun. "Game Theoretic Control for Robot Teams". *Proceedings of the 2005 IEEE International Conference on Robotics and Automation (ICRA)*, pp. 1175–1181. Barcelona, Spain, 2005.
3. R. Emery-Montemerlo, G. Gordon, J. Schneider and S. Thrun. "Approximate Solutions for Partially Observable Stochastic Games with Common Payoffs". *Proceedings of the Third International Joint Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, pp. 136–143. New York, New York, 2004.
4. R. Emery, K. Sikorski and T. Balch. "Protocols for Collaboration, Coordination and Dynamic Role Assignment in a Robot Team". *Proceedings of the 2002 IEEE International Conference on Robotics and Automation (ICRA)*, pp. 3008–3015. Washington, D.C., 2002.
5. Y. Liu, R. Emery, D. Chakrabarti, W. Burgard and S. Thrun."Using EM to Learn 3D Environmental Models with Mobile Robots".*Proceedings of the Eighteenth International Conference on Machine Learning (ICML)*, pp. 329–336. Williams College, Massachusetts, 2001.
6. R. Emery and T. Balch."Behaviour-Based Control of a Non-Holonomic Robot in Pushing Tasks". *Proceedings of the 2001 IEEE International Conference on Robotics and Automation (ICRA)*, pp. 2381–2388. Seoul, Korea, 2001.

UNREFEREED ARTICLES

7. S. Stancliff, R. Balasubramanian, T. Balch, R. Emery, K. Sikorski and A. Stroupe. "CMU Hammerheads 2001 Team Description". In A. Birk, S. Coradeschi and S. Tadokoro, editors, *RoboCup-2001: Robot Soccer World Cup V*, volume 2377 of *Lecture Notes in Artificial Intelligence*. pp. 631–634. Springer, Berlin, 2002.
8. R. Emery, T. Balch, R. Shern, K. Sikorski and A. Stroupe. "CMU Hammerheads Team Description". In P. Stone, T. Balch and G. Kreatzschmarr, editors, *RoboCup-2000: Robot Soccer World Cup IV*, volume 2019 of *Lecture Notes in Artificial Intelligence*. pp. 575–578. Springer, Berlin, 2001.

THESIS

9. R. Emery-Montemerlo. *Game-Theoretic Control for Robot Teams*. Doctoral Dissertation. Tech report CMU-RI-TR-05-36. Robotics Institute, Carnegie Mellon University, August 2005.