Dylan A. Shell

Department of Computer Science and Engineering
Texas A&M University
301 Harvey R. Bright Building
College Station, TX 77843-3112

Office: 979-845-2369
Fax: 979-845-1420
dshell@cse.tamu.edu
http://robots.cs.tamu.edu/dshell

Education

2008 **Doctor of Philosophy**

Department of Computer Science, University of Southern California, Los Angeles, California
Dissertation: *Macroscopic Approaches to Control: Multi-Robot Systems and Beyond*

Advisor: Professor Maja Matarić

2006 **Master of Science**

Department of Computer Science, University of Southern California, Los Angeles, California

2001 **Bachelor of Science with Honours** (with distinction)

School of Computer Science, University of the Witwatersrand, Johannesburg, South Africa
Research report: *The Gap between Random Context and Context-Sensitive Grammars*

Supervisor: Associate Professor Sigrid Ewert

2000 **Bachelor of Science** (with distinction)

School of Computational & Applied Mathematics and School of Computer Science, University of the Witwatersrand, Johannesburg, South Africa

Academic and Professional Experience

Aug 2009 – **Assistant Professor**

Department of Computer Science and Engineering, Texas A&M, College Station, Texas.

Aug 2008 – Aug 2009 **Postdoctoral Research Associate**

Interaction Laboratory, Department of Computer Science, University of Southern California, Los Angeles, California.

2002 – aug 2008 **Graduate Research Assistant**

Interaction Laboratory, USC Robotics Research Lab, Center for Robotics and Embedded Systems, University of Southern California, Los Angeles, California.

1998 – 2002 **Founding Partner**

Silver Dragon Digital Creations, Information Technology company with G. Konidaris & M. Nanabhay. Highlight: mention of company's web application in "An outlet for political protest in Zimbabwe," *Time Europe*, 155(14), April 10, 2000.

1999 **Student Intern**

Liberty Holdings Limited. Developed software for monitoring status of multi-OS distributed infrastructure.

1998 **Student Intern**

Liberty Holdings Limited. Developed parsing software. Produced UNIX training and quick-reference materials. Tutored several technical employees with these materials.

Scholarships, Awards and Honors

- Montague-CTE Scholars Award, 2013–2014.
- Runner-up, Best Student Paper, International Symposium on Distributed Autonomous Robotic Systems (DARS) 2012.
- Faculty Service Excellence Award, Spring 2010.
- Best Paper Award, Artificial Intelligence and Agents, ACM Symposium on Applied Computing 2009.
- USC Graduate School Dissertation Completion Fellowship, Fall 2007 and Spring 2008.
- IEEE International Conference on Intelligent Robots and Systems (IROS) Best Reviewer Award, 2008.
- Travel support for the AUVSI, NSF/FAA/DHS Workshop on UAS Research Directions for the National Air Space, 2008.
- Member of the Honor Society of Phi Kappa Phi, 2008.

- George Bekey USC Robotics Lab Service Award, 2007.
- Best Poster Presentation Award, IEEE RO-MAN, 2007.
- USC Department of Computer Science, Best Teaching Assistant Award, 2007.
- USC Center for Excellence in Teaching Future Professoriate Program, 2005, 2006.
- USC Annenberg Communications Critical Pathway Fellowship, 2004.
- Altech systems prize, runner-up for Computer Science Honours Research project, 2001.
- National Research Foundation Scholarship for Computer Science Honours, 2001.
- E. J. A. Loerincz Scholarship, 2000.
- N. Pendock Award for Computational and Applied Mathematics Digital Image Processing, (with R. Phillips and J. Adler) 2000.
- Liberty Life medals (3) for outstanding student in Computer Science, 1998, 1999 & 2000.
- Sander and Laurie Ostrowiak Memorial Scholarship, 1999.
- Computer Science Department Annual Prizes, 1999 & 2000.
- Computer Society of South Africa Book Prize, 1998.
- Certificates of Merit (9) and First Class (4) for Coursework in Computer Science and Computation & Applied Mathematics, 1998–2001.
- Manduel Award for Enterprise, (with M. Nanabhay) 1997, also shared runner-up in Microsoft/Global Schools Homepage Competition for Jeppe.

Publications

Journal Articles (Peer Reviewed)

[J10] L. Liu and **D. A. Shell**. Physically Routing Robots through a Multi-robot Network: Flexibility through a Three Dimensional Matching Graph. *International Journal of Robotics Research*, 32(12): 1475–1494, September 2013.

[J9] L. Liu and **D. A. Shell**. An Anytime Assignment Algorithm: From Local Task Swapping to Global Optimality. *Autonomous Robots*, 35(4): 271–286, November 2013.

[J8] B. Fine and **D. A. Shell**. Unifying Microscopic Flocking Motion Models for Virtual, Robotic, and Biological Flock Members. *Autonomous Robots* 35(2–3): 195–219, October 2013.

[J7] L. Liu and **D. A. Shell**. Large-scale multi-robot task allocation via dynamic partitioning and distribution. *Autonomous Robots*, 33(3): 291–307, October 2012.

[J6] Y.-H. Kim, S.-W. Lee, H. Yang, and **D. A. Shell**. Toward Autonomous Robotic Containment Booms: Visual Servoing for Robust Inter-vehicle Docking of Surface Vehicles. *Journal of Intelligent Service Robotics*, 5(1): 1–18, January 2012.

[J5] L. Liu and **D. A. Shell**. Assessing Optimal Assignment under Uncertainty: An Interval-based Algorithm. *International Journal of Robotics Research*, 30(7): 936–953, June 2011.

[J4] M. Buller, P. Cuddihy, E. Davis, P. Doherty, F. Doshi-Velez, E. Erdem, D. H. Fisher, N. Green, K. Hinkelmann, M. L. Maher, J. McLurkin, R. T. Maheswaran, S. Rubinelli, N. Schurr, D. Scott, **D. A. Shell**, P. A. Szekely, B. Thönssen, and A. Urken. Reports of the AAAI 2011 Spring Symposia. *AI Magazine*, 32(3): 119–127, Fall 2011.

[J3] R. Murphy, **D. A. Shell**, A. Hopper, B. Duncan, B. Fine, K. Pratt, and T. Zourntos. A Midsummer Nights Dream (with Flying Robots). *Autonomous Robots*, 30(2): 143–156, February 2010. (Public coverage of the work appeared in the Wired blog [18-Nov-2009], Engaget blog [18-Nov-2009], and Autonomous Robots blog [8-Dec-2010].)

[J2] B. Atcheson, S. Ewert, and **D. A. Shell**. A Note on the Generative Capacity of Random Context, *South African Computer Journal*, 36:95–98,2006.

[J1] **D. A. Shell** and M. J. Matarić. Insights Toward Robot-Assisted Evacuation. *Advanced Robotics, The International Journal of the Robotics Society of Japan*, 19(8): 797–818, 2005.

Invited Book Chapters

[BC1] **D. A. Shell** and M. J. Matarić. Behavior-Based Methods for Modeling and Structuring Control of Social Robots. In *Cognition and Multi-Agent Interaction: From Cognitive Modeling to Social Simulation*, Ron Sun (eds.), Cambridge University Press, 2005.

Conference Papers (Peer Reviewed)

[C39] C. Nam and **D. A. Shell**. Assignment Algorithms for Modeling Resource Contention and Interference in Multi-Robot Task-Allocation. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Hong Kong, China, May 2014.

[C38] R. Hosseini Teshnizi and **D. A. Shell**. Computing cell-based decompositions dynamically for planning motions of tethered robots. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Hong Kong, China, May 2014.

[C37] Y.-H. Kim and **D. A. Shell**. Distributed Robotic Sampling of Non-homogeneous Spatio-Temporal Fields via Recursive Geometric Sub-division In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, Hong Kong, China, May 2014.

[C36] J. O'Kane and **D. A. Shell**. Finding concise plans: Hardness and algorithms. In *Proceedings of the IEEE International Conference on Intelligent Robots and Systems (IROS)*, pages 4803–4810, Tokyo Big Sight, Japan, November 2013.

[C35] J-H Kim and **D. A. Shell**. Improving the performance of self-organized robotic clustering: modeling and planning sequential changes to the division of labor. In *Proceedings of the IEEE*

International Conference on Intelligent Robots and Systems (IROS), pages 4314–4319, Tokyo Big Sight, Japan, November 2013.

[C34] B. Fine and **D. A. Shell**. Eliciting Collective Behaviors through Automatically Generated Environments. In *Proceedings of the IEEE International Conference on Intelligent Robots and Systems (IROS)*, pages 3303–3308, Tokyo Big Sight, Japan, November 2013.

[C33] L. Liu and **D. A. Shell**. Optimal Market-based Multi-Robot Task Allocation via Strategic Pricing. In *Proceedings of Robotics: Science and Systems Conference (RSS-2013)*, Berlin Germany, June 2013.

[C32] A. Ghoshal and **D. A. Shell**. Covering space with simple robots: from chains to random trees In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, pages 914–920, Karlsruhe, Germany, May 2013.

[C31] J. O'Kane and **D. A. Shell**. Automatic Reduction of Combinatorial Filters. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, pages 4082–4089, Karlsruhe, Germany, May 2013.

[C30] L. Liu and **D. A. Shell**. Multi-robot Formation Morphing through a Graph Matching Problem. In *Proceedings of the International Symposium on Distributed Autonomous Robotic Systems (DARS)*, Baltimore, Maryland, November 2012. (Runner-up for Best Student Paper Award.)

[C29] E. Drumwright and **D. A. Shell**. Extensive analysis of Linear Complementarity Problem (LCP) solver performance on randomly generated rigid body contact problems. In *Proceedings of the IEEE International Conference on Intelligent Robots and Systems (IROS)*, pages 5034–5039, Algarve, Portugal, October 2012.

[C28] S. Kristek and **D. A. Shell**. Orienting deformable polygonal parts without sensors. In *Proceedings of the IEEE International Conference on Intelligent Robots and Systems (IROS)*, pages 973–979, Algarve, Portugal, October 2012.

[C27] L. Liu and **D. A. Shell**. An Efficient Distributed Topo-Geometric Spatial Density Estimation Method for Multi-Robot Systems. In *Proceedings of the IEEE International Conference on Intelligent Robots and Systems (IROS)*, pages 828–833, Algarve, Portugal, October 2012.

[C26] Y. Song, J.-H. Kim, and **D. A. Shell**, Self-organized Clustering of Square Objects by Multiple Robots. In *Proceedings of the International Conference on Swarm Intelligence (ANTS)*, pages 308–315, Brussels, Belgium, September 2012.

[C25] B. Fine and **D. A. Shell**. Examining the Information Requirements for Flocking Motion. In *Proceedings of the International Conference on Simulation of Adaptive Behavior (SAB)*, pages 442–452, Odense, Denmark, August 2012.

[C24] T. Mitra and **D. A. Shell**. Cost, Precision, and Task Structure in Aggression-Based Arbitration for Minimalist Robot Cooperation. In *Proceedings of the International Conference on Simulation of Adaptive Behavior (SAB)*, pages 431–441, Odense, Denmark, August 2012.

[C23] L. Liu and **D. A. Shell**. A Distributable and Computation-flexible Assignment Algorithm: From Local Task Swapping to Global Optimality. In *Proceedings of Robotics: Science and Systems Conference (RSS-2012)*, Sydney Australia, July 2012.

[C22] Y.-H. Kim, **D. A. Shell**, C. Ho, and S. Saripalli. Spatial Interpolation for Robotic Sampling: Uncertainty with two Models of Variance. In *Springer Tracts in Advanced Robotics, Vol. 88, Proceedings of the International Symposium on Experimental Robotics (ISER)*, Québec City, Canada, June 2012.

[C21] R. Leontie, E. Drumwright, **D. A. Shell**, and R. Simha. Load Equalization on a Two-Armed Robot via Proprioceptive Sensing. In *Springer Tracts in Advanced Robotics, Vol. 88, Proceedings of the International Symposium on Experimental Robotics (ISER)*, Québec City, Canada, June 2012.

[C20] L. Liu and **D. A. Shell**. Tunable Routing Solutions for Multi-Robot Navigation via the Assignment Problem: A 3D Representation of the Matching Graph. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, pages 4800–4805, Saint Paul, Minnesota, USA, May 2012.

[C19] B. Fine and **D. A. Shell**. Flocking: Don't need no stinkin' robot recognition. In *Proceedings of the IEEE International Conference on Intelligent Robots and Systems (IROS)*, pages 5001–5006, San Francisco, California, USA, September 2011.

[C18] L. Liu and **D. A. Shell**. Multi-level Partitioning and Distribution of the Assignment Problem for Large-scale Multi-robot Task Allocation. In *Proceedings of Robotics: Science and Systems Conference (RSS-2011)*, Los Angeles, California, USA, June 2011.

[C17] E. Drumwright and **D. A. Shell**. An Evaluation of Methods for Modeling Contact in Multibody Simulation. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, pages 1695–1701, Shanghai, China, May 2011.

[C16] L. Liu, B. Fine, **D. A. Shell**, and A. Klappenecker. Approximate Characterization of Multi-Robot Swarm 'Shapes' in Sublinear-Time. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, pages 2588–2594, Shanghai, China, May 2011.

[C15] E. Drumwright and **D. A. Shell**. Modeling Contact Friction and Joint Friction in Dynamic Robotic Simulation using the Principle of Maximum Dissipation. In *Proceedings of the Workshop on the Algorithmic Foundations of Robotics (WAFR) — Springer Tracts in Advanced Robotics: Algorithmic Foundations of Robotics IX*, pages 249–266, Singapore, December 2010.

[C14] E. Drumwright, J. Hsu, N.Koenig, and **D. A. Shell**. Extending Open Dynamics Engine for Robotics. In *Proceedings of the International Conference on Simulation, Modeling and*

Programming for Autonomous Robots (SIMPAR) — Lecture Notes in Computer Science, Volume 6472, pages 38–50, Darmstadt, Germany, November 2010.

[C13] L. Liu and **D.A. Shell**. Assessing Optimal Assignment under Uncertainty: An Interval-based Algorithm. In *Proceedings of Robotics: Science and Systems Conference (RSS-2010)*, Zaragoza, Spain, June 2010.

[C12] **D. A. Shell** and M. J. Matarić. High-Fidelity Radio Communications Modeling for Multi-Robot Simulation. In *Proceedings of the IEEE International Conference on Intelligent Robots and Systems (IROS)*, pages 2559–2564, St. Louis, Missouri, USA, October 2009.

[C11] **D. A. Shell** and E. Drumwright. Precise Generalized Exact Contact Point and Normal Determination for Rigid Body Simulation. In *Proceedings of the ACM Symposium on Applied Computing (ACM SAC)*, Honolulu, Hawaii, USA, March 2009.

[C10] E. Drumwright and **D. A. Shell**. A Robust and Tractable Contact Model for Dynamic Robotic Simulation. In *Proceedings of the ACM Symposium on Applied Computing (ACM SAC)*, pages 1176–1180, Honolulu, Hawaii, USA, March 2009. (Winner of Best Paper Award, Artificial Intelligence and Agents.)

[C9] J. Wainer, D. J. Feil-Seifer, **D. A. Shell**, and M. J. Matarić. Embodiment and Human-Robot Interaction: A task-based perspective, Short paper in *Proceedings of the IEEE International Workshop on Robot and Human Interactive Communication*, pages 117–122, Jeju Island, South Korea, August 2007.

[C8] **D. A. Shell** and M. J. Matarić. On foraging strategies for large-scale multi-robot systems. In *Proceedings of the IEEE International Conference on Intelligent Robots and Systems (IROS)*, pages 2717–2723, Bejing, China, October 2006.

[C7] J. Wainer, D. J. Feil-Seifer, **D. A. Shell**, and M. J. Matarić. The role of physical embodiment in human-robot interaction. Short paper in *Proceedings of the IEEE International Workshop on Robot and Human Interactive Communication (RO-MAN)*, pages 117–122, Hatfield, United Kingdom, Sep 2006. (Winner of Best Poster Presentation Award.)

[C6] **D. A. Shell** and M. J. Matarić. Ergodic Dynamics for Large-Scale Distributed Robot Systems. In *Proceedings of the Fifth International Conference on Unconventional Computation (UC) — Lecture Notes in Computer Science* 4135, pages 254–266, York, United Kingdom, September 2006.

[C5] **D. A. Shell** and M. J. Matarić. Principled synthesis for large-scale systems: task sequencing. In *Proceedings of the International Symposium on Distributed Autonomous Robotic Systems (DARS)*, pages 207–216, Minneapolis/St. Paul, Minnesota, USA, July 2006.

[C4] **D. A. Shell** and M. J. Matarić. Directional Audio Beacon Deployment: an Assistive Multi-Robot Application. In *Proceedings of the IEEE International Conference on Robotics and Automation (ICRA)*, pages 2588–2594, New Orleans, Louisiana, USA, April–May 2004.

[C3] **D. A. Shell** and M. J. Matarić. Human Motion-Based Environment Complexity Measures for Robotics. In *Proceedings of the IEEE International Conference on Intelligent Robots and Systems (IROS)*, pages 2559–2564, Las Vegas, Nevada, USA, October 2003.

[C2] G. Konidaris, **D. A. Shell** and N. Oren. Evolving Neural Networks for the Capture Game. In *Proceedings of the SAICSIT Postgraduate Symposium*, Port Elizabeth, South Africa, September 2002.

[C1] J. Adler, G. Christelis, J. Deneys, G. Konidaris, G. Lewis, A. Lipson, R. Phillips, D. Scott-Dawkins, **D. A. Shell**, B. Strydom, W. Trakman and L. Van Gool. Finding Adjacencies in Non-Overlapping Polygons. In *Proceedings of the SAICSIT Conference (Electronic Paper)*, Pretoria, South Africa, September 2001.

Workshops/Conferences/Invited Contributions (Editor/Committee Reviewed)

[W19] Y.-H. Kim and **D. A. Shell**. Efficient modeling of non-homogeneous field dynamics for distributed robotic sampling. Appeared in *the Robotics: Science and Systems Workshop, Robotic Exploration, Monitoring and Information Collection*, Berlin Germany, June 2013.

[W18] L. Liu and **D. A. Shell**. Tackling Task Allocation Uncertainty via a Combinatorial Method. Appeared in the *IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR)*, College Station, Texas, USA, November 2012.

[W17] L. Liu and **D. A. Shell**. Distribute the Task Swapping Assignment Method under Communication Constraints. Appeared in the *Symposium on Emerging Topics in Control and Modeling: Networked Systems (CMNS)*, Urbana-Champaign, Illinos, USA, October 2012.

[W16] B. Fine and **D. A. Shell**. Flocking Motions: Examination of Information Requirements. Appeared in the *Symposium on Emerging Topics in Control and Modeling: Networked Systems (CMNS)*, Urbana-Champaign, Illinos, USA, October 2012.

[W15] T. Ahmed and **D. A. Shell**. Quantifying Uncertainty in Networked Robotic Systems Appeared in the *Symposium on Emerging Topics in Control and Modeling: Networked Systems (CMNS)*, Urbana-Champaign, Illinos, USA, October 2012.

[W14] **D. Shell**, R. Murphy, A. Guerin, and A. Casey, Artistic Elements and Practical Challenges in A Midsummer Nights Dream with Unmanned Vehicles. Appeared in *IEEE International Conference on Robotics and Automation (ICRA) Workshop on Robotics and Performing Arts: Reciprocal influences*, Saint Paul, Minnesota, USA, May 2012.

[W13] E. Drumwright and **D. A. Shell**. An exhaustive analysis of LCP solver performance on randomly generated rigid body contact problems. Appeared as a poster in *Robotics: Science and Systems Workshop, Toward High-Performance Computing Support for the Simulation and Planning of Robot Contact Tasks*, Los Angeles, California, USA, June 2011.

[W12] A. Ghoshal and **D. A. Shell**. Being there, being the RRT: Space filling and searching in place with minimalist robots. Appeared in *AAAI Spring Symposium: Multi-Robot Systems and Physical Data Structures*, Stanford, California, USA, March 2011.

[W11] J-H Kim, Y. Song, and **D. A. Shell**. Robot Spatial Distribution and Boundary Effects Matter in Puck Clustering. Appeared in *AAAI Spring Symposium: Multi-Robot Systems and Physical Data Structures*, Stanford, California, USA, March 2011.

[W10] L. Liu and **D. A. Shell**. Task Insertion and Reassignment in Networked Robots for Topological Morphing. Appeared as poster in *IEEE ICRA Network Science and Systems workshop (IEEE NETSS-ICRA)*, Anchorage, Alaska, USA, May 2010.

[W9] J. O'Hollaren and **D. A. Shell**. Incremental Multi-Robot Deployment for Line-of-Sight Chains Using on Radio Signal Strength. Appeared as poster in *IEEE ICRA Network Science and Systems workshop (IEEE NETSS-ICRA)*, Anchorage, Alaska, USA, May 2010.

[W8] B. A. Duncan, R. R. Murphy, **D. A. Shell**, and A. G. Hopper. A midsummer night's dream: social proof in HRI A late breaking report in *Proceedings of the ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, Osaka, Japan, March 2010.

[W7] M. Emad-Ud-Din and **D. A. Shell**. Estimation of Pedestrian Distribution in Indoor Environments using Multiple Pedestrian Tracking. In *IEEE/RSJ ICRA 2009 Workshop: People Detection and Tracking*, Kobe, Japan, May 2009.

[W6] **D. A. Shell**, S. Viswanathan, J. Huang, R. Ghosh, J. Huang, M. J. Matarić, K. Lerman, and R. Sekuler. Spatial Behavior of Individuals and Groups: Preliminary Findings from a Museum Scenario. In *IEEE/RSJ IROS 2007 Workshop: From Sensors to Human Spatial Concepts (FS2HSC)*, San Diego, California, USA, November 2007.

[W5] **D. A. Shell** and M. J. Matarić. Macroscopic information processing in natural systems as an insight for swarm robotics. In *Proceedings of Robotics: Science and Systems 2007 Workshop: Algorithmic Equivalences Between Biological and Robotic Swarms*, Atlanta, Georgia, USA, June 2007.

[W4] **D. A. Shell** and M. J. Matarić. Principled Synthesis for large-scale multi-robot systems: task sequencing. In *Symposium on Complex Systems Engineering*, Santa Monica, California, USA, January 2007.

[W3] **D. A. Shell**, C. V. Jones and M. J. Matarić. Ergodic Dynamics by Design: A Route to Predictable Multi-Robot Systems. Poster paper in *Proceedings of the Naval Research Laboratory Workshop on Multi-Robot Systems,* pages 291–297, Naval Research Laboratory, Washington, DC, March 2005.

[W2] C. V. Jones, **D. A. Shell**, M. J. Matarić and B. P. Gerkey. Principled Approaches to the Design of Multi-Robot Systems. Invited contribution to *Workshop on Networked Robotics,*

International Conference on Intelligent Robots and Systems, pages 71–80, Sendai, Japan, September 2004.

[W1] **D. A. Shell** and M. J. Matarić. On the use of the term "Stigmergy". Poster Paper in the Proceedings of the *Second International Workshop on the Mathematics and Algorithms of Social Insects*, page 193, Atlanta, Georgia, USA, December 2003.

Grant Writing and Reporting Experience

National Science Foundation grant (Award # 1302393) *"Collaborative Research: Decision-Making on Uncertain Spatial-Temporal Fields: Modeling, Planning and Control with Applications to Adaptive Sampling"* PI: D. Shell, with collaborators S. Saripalli (ASU), and M. Kobilarov (Johns Hopkins), funded by the Division of Information & Intelligent Systems. September 2013–August 2017.

National Science Foundation grant (Award # 11000579) *"Collaborative Research: A Complementarity-Free Contact Model for Robotics Applications"* Co-PI: D. Shell, with collaborators PI: E. Drumwright (GWU), and Co-PI: A. Ruina (Cornell), funded by the Division of Civil, Mechanical, and Manufacturing Innovation. September 2011–August 2014.

Prior to joining the professoriate:

DARPA Grant *"ARTeMUS: Agile Robot Teams for Mobile Networking in Urban Settings"* PI: V. Manikonda (I-A-I); Co-PIs: M. Matarić (USC), P. Stone (University of Texas at Austin) and M. Veloso (Carnegie Mellon University), funded as part of the LANdroid Control Software program. February 2008–February 2009. As a graduate student, I co-authored the USC component of the funded proposal.

National Science Foundation grant (Award # 0527725) *"Collaborative Research: Dynamics of Human Behavior – Modeling and Analyzing Individual and Collective Human Spatial Behavior"* PIs: M. Matarić (USC), K. Lerman (USC-ISI), and R. Sekuler (Brandeis), funded as part of the crosscutting Human and Social Dynamics (HSD) program. November 2005–October 2006. As a graduate student, I authored major portions of the funded proposal and coordinated the USC-ISI and Brandeis University collaboration.

- NSF Research Experience for Undergraduate Student (REU) supplement, May–August 2006. As a graduate student, I wrote significant portions of the supplement proposal. Mentored the students D. Krajisnik and M. Cordeiro.
- NSF Research Experience for Undergraduate Students (REU) supplement, May–August 2007. As a graduate student, I wrote the supplement proposal. Mentored the students F. Haynie and S. Nikaein.

Additionally, I have contributed reports, summaries and highlights for ONR MURI and NSF funded projects as well as grant proposals that were not selected for funding.

Teaching Experience

2009– **Instructor**

Department of Computer Science and Engineering, Texas A&M University.

CSCE 420: *Introduction to Artificial Intelligence*, Spring 2010, Fall 2010, Fall 2011, Fall 2012, Fall 2013, Spring 2014. Senior undergraduate elective course surveying fundamental concepts, techniques, logic and programming languages for intelligent systems, with ±50 students. The course has a programming project that allows students to use physical robots.

CSCE 482: *Senior Capstone Design*, Spring 2014. Senior undergraduate capstone design course for computer scientists focused on software design, development methodologies, product evaluations, commmuication, project planning and management. A total of 30 students.

CSCE 483: *Computer System Design*, Fall 2011, Fall 2012. Senior undergraduate capstone design course for computer engineers focused on engineering design, design methodologies, design evaluations, communication, project planning and management. A total of 8–15 students.

CSCE 689: *Special Topics in Multi-Robot Systems*, Fall 2009, Spring 2011. Graduate course on state-of-the-art in control and synthesis techniques for multi-robot systems, with 9∼15 students reading and discussing relevant research papers; the course has a strong project component with all students presenting a final physical robot demonstration.

CSCE 643: *Seminar in Intelligent Systems and Robotics*, Spring 2012. A seminar-style graduate course which is a survey of issues and approaches to control and coordination in distributed robotics, with 6∼10 implementing projects in teams.

CSCI 631: *Programming Environments in AI: Intelligent Agents and Multi-Agent Systems*, Spring 2013. Graduate course on state-of-the-art in control and synthesis techniques for multi-robot systems, with 9∼15 students reading and discussing relevant research papers; the course has a strong communication and project component.

Prior to joining the professoriate:

2005–2006 **Teaching Assistant**

Department of Computer Science, University of Southern California.

CSCI 555: *Advanced Operating Systems*, (2006) Professor: T. Faber. Graduate course on distributed systems and advanced topics in operating systems, with ±60 students reading and discussing relevant papers in the field. Roles: grading and coordinating grading, office hours.

CSCI 584: *Control and Learning in Mobile Robots and Multi-Robot Systems*, (2005) Professor: M. Matarić. Graduate seminar-style course with a survey of issues in robotics. Approximately 20 students. Roles: syllabus refinement, chairing discussion, grading, project guidance, etc. Lectured on "Probabilistic estimation and SLAM" and "Robot controller development with player, stage, and gazebo."

2002 **Course Materials Developer and Teaching Assistant**

School of Computer Science, University of the Witwatersrand, Johannesburg, South Africa. COMS 300E: *Formal Languages and Automata*, Professor: S. Ewert. Course deals with abstract mathematical theory of computation. Roles: development of laboratory and assessment materials, supervision of lab tutors and tutoring, office hours.

2001 **Tutor**

School of Computer Science, University of the Witwatersrand, Johannesburg, South Africa. Weekly tutorial sessions with Higher Diploma students across the Computer Science curriculum (computer organisation, algorithms, databases, programming languages, software engineering, artificial intelligence and operating systems).

Student Advising and Mentoring

Doctoral Students

- *Lantao Liu*; PhD Student, CE advisee, Dissertation Title "Linear Sum Assignment Algorithms for Distributed Multi-robot Systems" Graduated May 2013. Currently a Postdoctoral researcher at Carnegie Mellon University.
- *Benjamin Fine*; PhD Student, CS advisee, Tentative Dissertation Title "Automated planning and manipulation of environments for multi-agent control", Fall 2009–
- *Sasin Janpuangtong*, *Jung-Hwan Kim*, *Young-Ho Kim*, and *Changjoo Nam* have filed degree plans with me as their advisor.

Masters Students

- *Tanushree Mitra*; MS Student, CS advisee, Thesis Title "Cost, precision, and task structure in aggression-based arbitration for minimalist robot cooperation", Graduated May 2011. Currently a Ph.D student at Georgia Institute of Technology.
- *Shawn Kristek*; MS Student, CS advisee, Thesis Title "Orienting deformable polygonal parts without sensors", Graduated Decemeber 2011. Currently works for Weatherford International.

- *Asish Ghoshal*, MS Student, CS advisee, Thesis Title "A data-structure inspired approach to multi-robot space coverage", Graduated May 2012. Currently a Ph.D student at Purdue University.
- *Yong Song*, MS Student, CS advisee, Thesis Title "Minimalist Multi-Robot Clustering of Square Objects: New Strategies, Experiments, and Analysis", Graduated May 2013.

Undergraduate Students: Theses

- *Taahir Ahmed*; Honors Student, ECE advisee, Honors-Fellow Thesis Title "S-Circuit Uncertainty", Graduated December 2012.

Undergraduate Students: Directed Students and Other Research

- *Sarena Chism*, TAMU Louis Stokes Alliance for Minority Participation (LSAMP) Scholar, Fall 2009 and Spring 2010.
- *Jared Brandhorst*, Senior student, Direct Studies, Fall 2011.
- *Kate Wells*, Senior student, Spring 2012 — Spring 2013.

Graduate Students: Other

- *Jing Zhou*, China Scholarship Council, Joint Education Project Visiting Scholar, Spring 2011 and Fall 2011.
- Thesis commmitee service:
  Ryan Sinnet (MS in Mechanical Engineering, defense: 4-Mar-2011)
  Sung Huh (MS in Mechanical Engineering, defense:11-Oct-2011)
  Danielle Cummings (PhD in CSE, proposal: 2-Sept-2011)
  Troy McMahon (substitute member, PhD in CSE, proposal: 30-Nov-2011)

Prior to joining the professoriate:

Masters Students

- *Muhammed Emad-Ud-Din*; NSF Dynamics of Human Behavior project, Fall 2007–Spring 2008
- *Joshua Wainer*; Study of physical embodiment in human robot interaction. Fall 2005–Spring 2006
- *Salman Qadri*; NSF Dynamics of Human Behavior project, Spring and Fall 2006

Undergraduate Students

- *John O'Hollaren*; USC Merit Scholar, Fall 2008–Fall 2009.
- *Minal Cordeiro*; NSF REU, Dynamics of Human Behavior project, Summer 2006–Fall 2006.
- *Danko Krajisnik*; NSF REU, Dynamics of Human Behavior project, Summer 2006.
- *Franklin Haynie*; NSF REU, Dynamics of Human Behavior project, Summer 2007.
- *Shirin Nikaein*; NSF REU, Dynamics of Human Behavior project, Summer 2007.
- *Andrew Fisher*; USC Merit Scholar, Fall 2005–Fall 2007.

Professional Activities and Academic Service

Conference Organization

Local Organization Chair for IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR). College Station, Texas. November 2012.

Student Travel Chair for IEEE International Symposium on Safety, Security, and Rescue Robotics (SSRR). For both 2012 and 2013.

Robotics Science and Systems 2012, Sydney, Australia; Publicity chair.

Robotics Science and Systems 2011, Los Angeles, California; Co-chair (with P. Newman) the video session and video award ceremony.

Co-organizer (with J. McLurkin) of the AAAI 2011 Spring Symposium on Multi-Robot Systems and Physical Data Structures (21-23 March 2011).

Student Travel Awards Committee for IEEE/RSJ International Conference on Intelligent Robots and Systems 2011, San Francisco, California. Member of committee (along with D. Song and A. Hsieh)

AUVSI, NSF/FAA/DHS Workshop on UAS Research Directions for the National Air Space 2008 June 10, 2008, San Diego, California. Assisted local organization.

The Eighth International Conference on the Simulation of Adaptive Behavior (SAB '04) July 13–17, 2004, Los Angeles, California. Assisted General Chair with local conference arrangements.

IEEE-RAS/RSJ International Conference on Humanoid Robots (Humanoids '04) November 10–12, 2004, Los Angeles, California. Assisted General Chair with local conference arrangements.

Reviewing and Program Committees

Journals

- IEEE Transactions on Automation Science (2014)
- IEEE Transactions on Robotics (2006, 2009, 2011, 2012)
- Robotics and Autonomous Systems (2006)
- Adaptive Behavior (2007, 2013)
- International Journal of Robotics Research (2005, 2012, 2013)
- Autonomous Robots (2002, 2006, 2007, 2010)
- Journal of Intelligent and Robotic Systems (2011)
- Intelligent Service Robotics (2009)
- Computer Communications (2011)
- International Journal of Social Robotics (2010)
- Swarm Intelligence (2013)

Funding Agencies

- National Science Foundation (panels: 18-19 Nov 2009, 21-22 May 2010, and , 16-17 January 2013; review: 1 February 2013)
- Natural Sciences and Engineering Research Council of Canada (NSERC) (panel: 6-8 May 2012; reviews: 22 Jan 2007, 2 Nov 2009)

Program Committee/Associate Editorial Service

- Robotics Science and Systems 2013, 2014.*(Program Committee Area Chair)*
- International Conference on Autonomous Agents and Multiagent Systems (AAMAS) 2009, 2011. *(Program Committee Member)*
- International Joint Conference on Artificial Intelligence (IJCAI) 2011. *(Program Committee Member)*
- IEEE International Conference on Robotics and Automation (ICRA) 2010, 2012. *(Associate Editor)*
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS) 2012, 2013, 2014. *(Associate Editor)*

Selected Conferences

- Robotics Science and Systems (RSS)
- IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)
- IEEE International Conference on Robotics and Automation (ICRA)
- International Workshop on Robot and Human Interactive Communication (RO-MAN)
- International Conference on Human-Robot Interaction (HRI)
- Workshop on the Algorithmic Foundations of Robotics (WAFR)
- American Control Conference (ACC)
- ACM SIGCHI Conference on Human Factors in Computing Systems (ACM CHI)
- Symposium on Distributed Autonomous Robotic Systems (DARS)
- ACM Symposium On Applied Computing (ACM SAC)

University Committees

- TAMU CSE Department Advisory Committee Fall 2011–Spring 2012, Fall 2012–Spring 2013, Fall 2013–Spring 2014 (Elected).
- TAMU CSE Department, Ad hoc Committee on Peer Evaluation of Teaching, Fall 2012–Spring 2013.
- TAMU CSE Department Library Committee, Fall 2009, Spring 2010, Fall 2010.
- TAMU CSE Webpage Committee, Spring 2011.
- Student representative, USC Academic Senate/Provost Committee on Learner-Centred Teaching (2005).
- Graduate student representative, Information Services Division Workshop (2005).
- Student representative, Seaver Science and Engineering Library meeting (2004 & 2006).

Other

- USC Center for Robotics and Embedded Systems (CRES) webmaster (2003–2008)
- USC Robotics Research Lab webmaster (with N. Koenig & D. Wolf, 2003–2008)
- USC Interaction Lab webmaster (with N. Koenig, 2003–2008)

Invited Lectures

"Skeptics in the Pub: The Robot Revolution", a public lecture given to the Houston Skeptic Society, a group dedicated to promoting science, critical thinking, and rational thought, May 28, 2013.

"Multi-Robot Task Allocation Algorithms: Scale, uncertainty, and performance", Computer Science Seminar, Texas State University in San Marcos, Sept.28, 2012.

"AI Search Strategies: BFS, DFS, A, and D-lite" a talk given to Texas Aggie Game Developers (TAGD), Oct. 17, 2012.

"Current Topics in Distributed AI" a lecture delivered to the local Upsilon Pi Epsilon chapter, the honors society for Computing and Information Disciplines, Nov. 16, 2011.

"Coordination, Resource Arbitration, and Task-Allocation in Multi-Robot Systems" in the TAMU multi-disciplinary series on Systems, Control and Robotics. Apr. 29, 2011.

"Intelligent Robots" at Bryan Science Cafe, Jan. 18, 2011.

"Robots and Artificial Intelligence" panel discussion at Rock the Republic, Oct. 21, 2010.

"Truth seeking devices" at the Bryan Subversive Manifesto for Underground Technology; Aug. 5, 2010 (talk) and Sep. 30, 2010 (demo).

"Minimalist robotic experiments in distributed Artificial Intelligence." at TAMU Department of Recreation, Park and Tourism Sciences. Apr. 9, 2010.

"Sometimes aggregation = simplification", lecture to the Texas A&M Department of Computer Science & Engineering's Industrial Affiliates. Sep. 16, 2009.

"Macroscopic modeling for robot swarms", at Harvey Mudd College for Z. Dodds's Computer Science 154: Robotics class, Mar. 24, 2009.

"Player/Stage/Gazebo", at Intelligent Automation, Inc (IAI) at the invitation of V. Manikonda, Oct. 2, 2008.

"Complexity and Robotic Systems" presented with C. V. Jones for visit of N. Gessler's class Anthropology 137:Artificial Culture, Exploring Human Complex Worlds. Oct. 24, 2004.

"Formalizing Intentional and Emergent Group Behaviour in Robots" presented with M. J. Matarić and C. V. Jones, at the UCLA Institute for Pure and Applied Mathematics (IPAM) workshop on Inverse Problems: Computational Methods and Emerging Applications, Biological and Artificial Swarms. Oct. 3, 2003.

Professional Development

Scientific Integrity Course, University of Southern California, April 2006.

Future Professoriate Program, Center for Excellence in Teaching, University of Southern California. Selected from a university-wide pool of applicants to participate in an intensive year-long program on the development of practical skills and theoretical knowledge necessary for leadership, research, and teaching within the academic field. Fall 2005 and Spring 2006.

Personal

- Member of Toastmasters International, attained level of Competent Communicator (CC) (2006–2008). In 2007–2008 held elected position of Vice President with Special Responsibility for Membership at Santa Monica Club 638.
- Assistant Troop Scouter for 1st Primrose Boy Scout Troop (1999–2002)
- Private pilot's license with over 130 solo hours in Cessna-172 light aircraft (2002)