

Scott R. Kuindersma

Contact Information

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Research Interests

Robotics, optimal control, machine learning, control of underactuated dynamical systems

Education

Doctor of Philosophy in Computer Science *Expected:* September 2012
University of Massachusetts Amherst Amherst, MA
Advisors: Roderic Grupen, Andrew Barto

Master of Science in Computer Science February 2009
University of Massachusetts Amherst Amherst, MA
GPA: 3.93

Bachelor of Science *summa cum laude* in Information Technology May 2006
Bryant University Smithfield, RI
Minor in Mathematics
GPA: 3.93 Major: 4.0 Minor: 4.0

Employment History

University of Massachusetts Amherst
Research Assistant, Laboratory for Perceptual Robotics July 2008–Present
Designed and executed multiple integrated experiments with the uBot-5 and accumulated well over 1000 hours of robot hardware experience. Created and implemented algorithms for efficiently learning dynamic behaviors.

NASA Johnson Space Center
Graduate Fellow Intern, Robonaut 2 Laboratory Summer 2011
Contributed to the development of autonomous drill manipulation controllers for Robonaut 2. Created a dynamic simulator of Robonaut 2 and implemented prototype zero-gravity body orientation controllers.

Graduate Fellow Intern, Dexterous Robotics Laboratory Summer 2010
Worked with the Project M team developing control algorithms in simulation for a bipedal robot designed to operate autonomously on the moon.

University of Massachusetts Amherst
Research Assistant, Computational Biology Laboratory January 2007–May 2008
Worked with a team creating and implementing coarse-to-fine algorithms for microarray cancer classification.

Teaching Assistant, Computer Science Department Fall 2006
Graded and co-lectured the undergraduate Data Structures course.

EMC Corporation
Software Engineering Intern
Developed network monitoring software in C and Perl.

Westboro, MA
Summer 2005

Bryant University
Research Assistant, Science and Technology Department

Smithfield, RI
Summer 2004

Participated in research on computational modeling of neural plasticity in the mouse visual cortex.

Awards

- **NASA GSRP Fellowship** September 2009–August 2012
- Best Student Video, AAAI 2011 Video Competition August 2011
- Massachusetts Space Grant Fellowship Fall 2008
- Massachusetts Space Grant Fellowship Summer 2009
- George J. Kelley Award (ranked 1st in graduating class of over 700) May 2006

Conference and Workshop Papers

1. **S. Kuindersma**, R. Grupen, and A. Barto. Variational Bayesian Optimization for Runtime Risk-Sensitive Control. To Appear in *Robotics: Science and Systems VIII (RSS)*, Sydney, NSW, Australia, July 2012.
2. **S. Kuindersma**, R. Grupen, and A. Barto. Learning Dynamic Arm Motions for Postural Recovery. In *Proceedings of the Eleventh IEEE-RAS International Conference on Humanoid Robots*, Bled, Slovenia, October 2011.
3. G.D. Konidaris, **S.R. Kuindersma**, R.A. Grupen, and A.G. Barto. Autonomous Skill Acquisition on a Mobile Manipulator. In *Proceedings of the Twenty-Fifth Conference on Artificial Intelligence (AAAI-11)*, San Francisco, CA, August 2011.
4. G.D. Konidaris, **S.R. Kuindersma**, R.A. Grupen, and A.G. Barto. CST: Constructing Skill Trees by Demonstration. In *Proceedings of the ICML Workshop on New Developments in Imitation Learning*, Bellevue, WA, July 2011.
5. G.D. Konidaris, **S.R. Kuindersma**, R.A. Grupen, and A.G. Barto. Acquiring Transferable Mobile Manipulation Skills. In *RSS 2011 Workshop on Mobile Manipulation: Learning to Manipulate*, Los Angeles, CA, June 2011.
6. G.D. Konidaris, **S.R. Kuindersma**, A.G. Barto, and R.A. Grupen. Constructing Skill Trees for Reinforcement Learning Agents from Demonstration Trajectories. In *Advances in Neural Information Processing Systems 23 (NIPS)*, Vancouver, BC, December 2010.
7. **S.R. Kuindersma**, E. Hannigan, D. Ruiken, and R.A. Grupen. Dexterous Mobility with the uBot-5 Mobile Manipulator. In *Proceedings of the 14th International Conference on Advanced Robotics (ICAR 2009)*, Munich, Germany, June 2009.

1. G.D. Konidaris, **S.R. Kuindersma**, R.A. Grupen, and A.G. Barto. Robot Learning from Demonstration by Constructing Skill Trees. *International Journal of Robotics Research*, 31(3):360-375, March 2012.
2. B. Blais, M. Frenkel, **S. Kuindersma**, R. Muhammad, H.Z. Shouval, L.N. Cooper, and M.F. Bear. Recovery from monocular deprivation using binocular deprivation: Experimental observations and theoretical analysis. *J Neurophysiol*, 100(4):2217-2224, October 2008.
3. **S.R. Kuindersma** and B.S. Blais. Teaching Bayesian Model Comparison With the Three-Sided Coin. *The American Statistician*, 61(3):239-244, August 2007.

Refereed Abstracts

1. **S.R. Kuindersma**, G.D. Konidaris, R.A. Grupen, and A.G. Barto. Learning from a Single Demonstration: Motion Planning with Skill Segmentation (extended abstract). In *NIPS Workshop on Learning and Planning from Batch Time Series Data*, Whistler, BC, December 2010.
2. **S. Kuindersma**. Control Model Learning for Whole-Body Mobile Manipulation (extended abstract). In *Proceedings of the Twenty-Fourth Conference on Artificial Intelligence (AAAI-10)*, Atlanta, GA, July 2010.
3. B.S. Blais and **S.R. Kuindersma**. A Hierarchical Spatiotemporal Model of Neocortex with Probabilistic Feedback. In *Proceedings of the 12th International Conference on Cognitive and Neural Systems (ICCN 2008)*, Boston, MA, May 2008.
4. B.S. Blais and **S.R. Kuindersma**. Developing receptive fields in spiking-rate models of synaptic plasticity. In *Society for Neuroscience Conference Abstracts*, Washington, DC, November 2005.
5. B.S. Blais, M.Y. Frenkel, **S.R. Kuindersma**, and M.F. Bear. Exploring the roles of structure and noise in the mouse visual system. In *Proceedings of the 9th International Conference on Cognitive and Neural Systems (ICCN 2005)*, Boston, MA, May 2005.

Symposium Talks

1. **S.R. Kuindersma**. Variable Risk Policy Search for Dynamic Manipulation. *New England Manipulation Symposium (NEMS)*, iRobot Corporation, May 2012.
2. **S.R. Kuindersma**. Manipulating Dynamics: Contributions of Arm Motions to Balance Recovery. *New England Manipulation Symposium (NEMS)*, Yale University, May 2011.
3. **S.R. Kuindersma**. Learning Whole-Body Strategies for Mobile Manipulation. *New England Manipulation Symposium (NEMS)*, University of Massachusetts Amherst, May 2010.
4. **S.R. Kuindersma**. Control Model Learning for Whole-Body Mobile Manipulation. *North East Student Colloquium on Artificial Intelligence (NESCAI)*, Amherst, MA, April 2010.

5. **S.R. Kuindersma.** Dexterous Mobility with the uBot-5 Mobile Manipulator. *New England Manipulation Symposium (NEMS)*, WPI, May 2009.

Professional Service and Memberships

- Editorial Assistant, Robotics and Autonomous Systems Journal (2009–present)
- Program Committee Member, New England Manipulation Symposium (NEMS 2010)
- Student Volunteer, AAAI-11
- Journal Reviewing: Robotics and Autonomous Systems (2009–2012)
- Conference Reviewing: Humanoids (2009–2011), NESCAI (2010), ICRA (2010, 2012), AAAI-SSS (2012)
- Member of AAAI and IEEE
- Member of the Technical Committee on Mobile Manipulation

References

Available upon request.