

# Todd Hester

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CONTACT INFORMATION	Department of Computer Science The University of Texas at Austin 1 University Station C0500 Austin, TX 78712	Voice: (512) 232-1874 E-mail: <a href="mailto:todd@cs.utexas.edu">todd@cs.utexas.edu</a> WWW: <a href="http://www.cs.utexas.edu/~todd/">www.cs.utexas.edu/~todd/</a>
RESEARCH INTERESTS	Robotics: Robot soccer, Localization, Biped Locomotion Reinforcement Learning: Model-Based Reinforcement Learning, Exploration	
EDUCATION	<b>The University of Texas at Austin</b> , Austin, TX USA Ph.D. Candidate, Department of Computer Science, GPA: 4.0 <ul style="list-style-type: none"><li>• Research: Reinforcement Learning and Robotics</li><li>• Advisor: Professor Peter Stone</li><li>• Area of Study: Artificial Intelligence</li></ul> <b>Northeastern University</b> , Boston, MA USA B.S., Computer Engineering, April 2005, GPA: 3.9 <ul style="list-style-type: none"><li>• <i>Summa cum Laude</i>, with Honors</li><li>• Capstone Design Project: Portable Muscle Oxygenation Detector</li></ul>	
AWARDS AND HONORS	<b>The University of Texas at Austin</b> <ul style="list-style-type: none"><li>• RoboCup SPL U.S. Open Champions, 2010</li><li>• RoboCup SPL International Competition, 3rd place, 2010</li><li>• Department of Computer Science Outstanding Teaching Assistant Award, 2009</li><li>• RoboCup SPL U.S. Open Champions, 2009</li><li>• RoboCup SPL International Competition, 4th place, 2009</li><li>• Microelectronics and Computer Development Graduate Fellowship, 2006-2008</li></ul> <b>Northeastern University</b> <ul style="list-style-type: none"><li>• Ell Scholarship, 2000-2005</li><li>• Sears B. Condit Award, 2005</li><li>• Capstone Design Competition Winner, 2005</li></ul>	
ACADEMIC EXPERIENCE	<b>The University of Texas at Austin</b> , Austin, TX USA <i>Teaching Assistant</i> <ul style="list-style-type: none"><li>• Fall 2009: CS 393R - Autonomous Robotics (<b>Outstanding TA Award</b>)</li><li>• Spring 2009: CS 307 - Foundations of Computing</li></ul> <i>Graduate Research Assistant</i>	
ORGANIZING COMMITTEES	<ul style="list-style-type: none"><li>• 2012 AAAI Spring Symposium on Designing Intelligent Robots: Re-Integrating AI</li></ul>	
PROGRAM COMMITTEES	<ul style="list-style-type: none"><li>• 2012 International Conference on Machine Learning (ICML)</li><li>• 2012 European Workshop on Reinforcement Learning (EWRL)</li><li>• 2012 RoboCup Symposium</li><li>• AAMAS 2012 Workshop on Adaptive and Learning Agents (ALA)</li><li>• 2012 AAAI Spring Symposium on Designing Intelligent Robots: Re-Integrating AI</li><li>• 2011 RoboCup Symposium</li><li>• 2011 International Joint Conference on Artificial Intelligence (IJCAI)</li><li>• AAMAS 2010 Workshop on Agents in Real-time and Dynamic Environments</li></ul>	

TECHNICAL  
COMMITTEES

- RoboCup Standard Platform League 2010
- RoboCup Standard Platform League 2009

REVIEWER

- 2012 IEEE International Conference on Robotics and Automation (ICRA)
- 2012 Humanoids Workshop on Humanoid Soccer Robots
- 2011 IEEE International Conference on Intelligent Robots and Systems (IROS)
- 2011 Humanoids Workshop on Humanoid Soccer Robots
- 2011 IEEE International Conference on Robotics and Automation (ICRA)
- Transactions on Information Technology in BioMedicine
- 2010 IEEE-RAS International Conference on Humanoid Robots

CODE RELEASES

- Reinforcement Learning ROS Package

PUBLICATIONS

**Journal Articles**

- [1] S. Patel, R. Hughes, T. Hester, J. Stein, M. Akay, J. G. Dy, and P. Bonato, "A novel approach to monitor rehabilitation outcomes in stroke survivors using wearable technology," *Proceedings of the IEEE*, vol. 98, no. 3, 2010.
- [2] S. Patel, T. Hester, R. Hughes, N. Huggins, A. Flaherty, D. Standaert, J. Growdon, and P. Bonato, "Processing wearable sensor data to optimize deep-brain stimulation," *IEEE Pervasive Computing*, vol. 7, no. 1, pp. 56–61, 2008.

**Book Chapters**

- [1] T. Hester and P. Stone, "Learning and using models," in *Reinforcement Learning: State of the Art* (M. Wiering and M. van Otterlo, eds.), Berlin, Germany: Springer Verlag, 2011.
- [2] P. Stone, M. Quinlan, and T. Hester, "The essence of soccer: Can robots play too?," in *Soccer and Philosophy*, vol. 51 of *Popular Culture and Philosophy*, Open Court Publishing Company, 2010.

**Refereed Conference Papers**

- [1] T. Hester, M. Quinlan, and P. Stone, "RTMBA: A real-time model-based reinforcement learning architecture for robot control," in *IEEE International Conference on Robotics and Automation (ICRA)*, May 2012.
- [2] T. Hester and P. Stone, "Real time targeted exploration in large domains," in *The Ninth International Conference on Development and Learning (ICDL)*, August 2010.
- [3] T. Hester, M. Quinlan, and P. Stone, "Generalized model learning for reinforcement learning on a humanoid robot," in *IEEE International Conference on Robotics and Automation (ICRA)*, May 2010.
- [4] S. Kalyanakrishnan, T. Hester, M. Quinlan, Y. Bentor, and P. Stone, "Three humanoid soccer platforms: Comparison and synthesis," in *Proceedings of the RoboCup International Symposium 2009*, July 2009.
- [5] T. Hester and P. Stone, "Generalized model learning for reinforcement learning in factored domains," in *The Eighth International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, May 2009.

- [6] T. Hester and P. Stone, “Negative information and line observations for monte carlo localization,” in *IEEE International Conference on Robotics and Automation (ICRA)*, May 2008.
- [7] N. K. Jong, T. Hester, and P. Stone, “The utility of temporal abstraction in reinforcement learning,” in *The Seventh International Joint Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, May 2008.
- [8] P. Boissy, T. Hester, D. M. Sherrill, H. Corriveau, and P. Bonato, “Monitoring mobility assistive device use in post-stroke patients,” in *29th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBS)*, 2007.
- [9] S. Patel, T. Hester, R. Hughes, N. Huggins, D. Standaert, A. Flaherty, and P. Bonato, “Using wearable sensors to enhance DBS parameter adjustment for Parkinson’s disease patients through measures of motor response,” in *3rd IEEE/EMBS International Summer School on Medical Devices and Biosensors*, pp. 141–144, 2006.
- [10] T. Hester, D. M. Sherrill, M. Hamel, K. Perreault, P. Boissy, and P. Bonato, “Identification of tasks performed by stroke patients using a mobility assistive device,” in *28th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBS)*, pp. 1501–1504, 2006.
- [11] P. Boissy, T. Hester, D. M. Sherrill, H. Corriveau, and P. Bonato, “Monitoring mobility assistive device use in patients after stroke,” in *16th Congress of the International Society of Electrophysiology and Kinesiology (ISEK)*, 2006.
- [12] T. Hester, R. Hughes, D. M. Sherrill, S. Patel, N. Huggins, A. Flaherty, and D. Standaert, “Adjusting DBS settings to optimize Parkinson’s control therapy,” in *16th Congress of the International Society of Electrophysiology and Kinesiology (ISEK)*, 2006.

#### Refereed Workshop Papers

- [1] T. Hester and P. Stone, “TEXPLORE: Real-time sample-efficient reinforcement learning for robots,” in *Proceedings of the AAAI Spring Symposium on Designing Intelligent Robots: Re-integrating AI*, March 2012.
- [2] S. Barrett, K. Genter, T. Hester, M. Quinlan, and P. Stone, “Controlled kicking under uncertainty,” in *Proceedings of the 5th Humanoids Workshop on Humanoid Soccer Robots*, Dec 2010.
- [3] T. Hester and P. Stone, “An empirical comparison of abstraction in models of Markov Decision Processes,” in *Proceedings of the ICML/UAI/COLT Workshop on Abstraction in Reinforcement Learning*, June 2009.
- [4] T. Hester, D. M. Sherrill, P. Bonato, M. Hamel, K. Perreault, and P. Boissy, “Using wearable sensors to analyze the quality of use of mobility assistive devices,” in *Third Annual Workshop on Wearable and Implantable Body Sensor Networks (BSN)*, pp. 127–130, April 2006.
- [5] T. Hester, R. Hughes, D. M. Sherrill, B. Knorr, M. Akay, J. Stein, and P. Bonato, “Using wearable sensors to measure motor abilities following stroke,” in *Third Annual Workshop on Wearable and Implantable Body Sensor Networks (BSN)*, pp. 5–8, April 2006.
- [6] S. Patel, D. Sherrill, R. Hughes, T. Hester, T. Lie-Nemeth, P. Bonato, D. Standaert, and N. Huggins, “Analysis of the severity of dyskinesia in patients with Parkinson’s disease via wearable sensors,” in *Third Annual Workshop on Wearable and Implantable Body Sensor Networks (BSN)*, pp. 123–126, April 2006.

## Technical Reports

- [1] S. Barrett, K. Genter, T. Hester, P. Khandelwal, M. Quinlan, P. Stone, and M. Sridharan, "Austin Villa 2011: Sharing is caring: Better awareness through information sharing," Tech. Rep. UT-AI-TR-12-01, The University of Texas at Austin, Department of Computer Sciences, AI Laboratory, January 2012.
- [2] T. Hester, M. Quinlan, and P. Stone, "A real-time model-based reinforcement learning architecture for robot control," Tech. Rep. arXiv e-Prints 1105.1749, arXiv, May 2011.
- [3] S. Barrett, K. Genter, M. Hausknecht, T. Hester, P. Khandelwal, J. Lee, M. Quinlan, A. Tian, P. Stone, and M. Sridharan, "Austin Villa 2010 standard platform team report," Tech. Rep. UT-AI-TR-11-01, The University of Texas at Austin, Department of Computer Sciences, AI Laboratory, January 2011.
- [4] T. Hester, M. Quinlan, P. Stone, and M. Sridharan, "UT Austin Villa 2009: Naos across Texas," Tech. Rep. UT-AI-TR-09-08, The University of Texas at Austin, Department of Computer Sciences, AI Laboratory, December 2009.
- [5] T. Hester, M. Quinlan, and P. Stone, "UT Austin Villa 2008: Standing on Two Legs," Tech. Rep. UT-AI-TR-08-8, The University of Texas at Austin, Department of Computer Sciences, AI Laboratory, November 2008.

## INVITED TALKS

- "A Real-Time Model-Based Reinforcement Learning Architecture for Robot Control", The 6th Barbados Workshop on Reinforcement Learning, March 2011.
- "Generalized Model Learning for Reinforcement Learning in Factored Domains", The 4th Barbados Workshop on Reinforcement Learning, April 2009.

## PROFESSIONAL EXPERIENCE

### **Ace Academy**, Austin, TX USA

*Robotics Instructor*

**September 2008 to May 2010**

- Taught LEGO Mindstorms Robotics to elementary and middle school students
- Taught Animation to elementary school students

### **Spaulding Rehabilitation Hospital Motion Analysis Lab**, Boston, MA USA

*Research Engineer*

**May 2005 to June 2006**

- Collected data for studies using wearable technology to evaluate movement abilities in different patient populations.
- Designed amplification units for use in motor unit recordings.
- Wrote Labview software to collect and view data from motor units.
- Wrote Matlab software to extract features from accelerometers and EMG to be used to predict clinical scores for Parkinsons Disease and stroke populations.
- Used pattern recognition techniques such as artificial neural networks, self-organizing maps, clustering, and principal components analysis to predict clinical scores and help with clinical decision-making.

### **Motorola**, Marlboro, MA USA

*Software Support Engineer*

**June 2004 to December 2004**

- Analyzed, reproduced, and debugged customer issues with the BSR64000 broadband cable router.
- Visited customers sites for further debugging of problems.
- Solved issues with a combination of software fixes or configuration changes.
- Helped to architect the next generation broadband cable router design.

**Sun Microsystems**, Burlington, MA USA

*Circuit Design Engineer*

**June 2003 to December 2003**

- Wrote Perl scripts to automate various processes and routines.
- Worked on circuit design and layout for the UltraSparc V.
- Ran back end tools and spice simulations on designs.
- Maintained, tested, and characterized custom latch and flop library.

**Air Force Research Laboratory**, Hanscom AFB, MA USA

*Research Engineer*

**October 2001 to March 2003**

- Worked with another student on a project to build a temperature controller device to drive multiple devices in a hyperspectral imager.
- Programmed 8052 microprocessor and GUI and designed and built the circuits to control the temperatures.
- Designed and fabricated various printed circuit boards for the device.
- Worked on design and programming for multiple stepper motor drives.
- Worked on board layout and programming to interface sensors through USB.

**Northeastern University**, Boston, MA USA

*AutoCAD Instructor*

**September 2000 to December 2000**

- Taught AutoCAD to freshmen engineering design classes.

SOCIETIES

Tau Beta Pi  
Eta Kappa Nu  
IEEE Robotics and Automation Society