

# Justin W. Hart

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## Education

December 2014 Ph.D., Computer Science, Yale University  
Dissertation: *Robotic Self-Modeling*  
Committee: Brian Scassellati (Advisor), Steven W. Zucker  
Aaron Dollar (Mechanical Engineering), Chad Jenkins (Brown University)  
May 2010 M.Phil., Computer Science, Yale University  
May 2008 M.S., Computer Science, Yale University  
January 2006 M.Eng., Computer Science, Cornell University  
May 2001 B.S., Computer Science (Cum Laude), West Virginia University

## Research Positions

12/16 - Present Postdoctoral Fellow, Department of Computer Science, University of Texas at Austin  
11/14 - 12/16 Postdoctoral Fellow, Department of Mechanical Engineering, University of British Columbia  
09/13 - 11/14 Visiting Scholar, Department of Mechanical Engineering, University of British Columbia  
09/06 - 12/14 Ph.D. Candidate, Department of Computer Science, Yale University  
06/05 - 09/06 Research Assistant, Intelligent Information Systems Institute, Cornell University

## Teaching Assistantships

<i>CPSC 473/573 Intelligent Robotics</i>	Spring 2008 - 2010	Yale University
<i>CPSC 671 Advanced Artificial Intelligence</i>	Fall 2009	Yale University
<i>CPSC 112 Introduction to Programming</i>	Fall 2011	Yale University

## Industry Experience

12/01 - 12/04 Software Engineer, SFA, Incorporated

## Other Professional Activities

04/17 - Present Leader of the UT Austin Villa @ Home RoboCup@Home team.

## Publications

JOURNAL ARTICLES (PEER-REVIEWED)

**J1** WJ. W. Hart, and B. Scassellati. Robot Self-Modeling. (2017) *International Journal of Humanoid Robotics*. (to appear)

- J2** W. A. Bainbridge, J. W. Hart, E. S. Kim, and B. Scassellati. The benefits of interactions with physically present robots over video-displayed agents. (2010) *International Journal of Social Robotics*. vol. 3(1), p.41-52

## CONFERENCE PUBLICATIONS (PEER-REVIEWED)

- C1** J. Thomason, A. Padmakumar, J. Sinapov, J. W. Hart P, and R. Mooney. Opportunistic Active Learning for Grounding Natural Language Descriptionst. In *Proceedings of the 1st Annual Conference on Robot Learning (CORL-17)*. Mountain View, California, November 2017. (in submission)
- C2** J. W. Hart and B. Scassellati. Mirror Perspective-Taking with a Humanoid Robot. In *Proceedings of the 26th AAAI Conference on Artificial Intelligence (AAAI-12)*. Toronto, Ontario, Canada, July 2012. (Acceptance rate: 26%)
- C3** J. W. Hart and B. Scassellati. A Robotic Model of the Ecological Self. In *Proceedings of the 11th IEEE-RAS International Conference on Humanoid Robots (HUMANOIDS 2011)*. Bled, Slovenia, October 2011.
- C4** E. Avrunin, J. W. Hart, A. Douglas, and B. Scassellati. Effects Related to Synchrony and Repertoire in Perceptions of Robot Dance. In *Proceedings of the 6th ACM/IEEE International Conference on Human-Robot Interaction (HRI 2011)*. Lausanne, Switzerland, March 2011. (Acceptance rate: 22%)
- C5** E. Short, J. W. Hart, M. Vu, and B. Scassellati. No Fair!! An Interaction with a Cheating Robot. In *Proceeding of the 5th ACM/IEEE International Conference on Human-Robot Interaction (HRI 2010)*. Osaka, Japan, March 2010. (Acceptance rate: 21%, Nominated for Best Paper)
- C6** W. A. Bainbridge, J. W. Hart, E. S. Kim, and B. Scassellati. The Effect of Presence on Human-Robot Interaction. In *Proceedings of the 17th IEEE International Symposium on Robot and Human Interactive Communication (ROMAN)*. Munich, Germany, August 2008.
- C7** A. Sabharwal, C. Ansotegui, C. P. Gomes, J. W. Hart, and B. Selman. QBF Modeling: Exploiting Player Symmetry for Simplicity and Efficiency. In *Proceedings of the 9th International Conference on Theory and Applications of Satisfiability Testing (SAT-06)*. Seattle, WA, USA, August 2006.

## WORKSHOP PAPERS

- W1** J. W. Hart, Sheikholeslami, M. K. X. J. Pan, W. P. Chan, and E. A. Croft. Predictions of Human Task Performance and Handover Trajectories for Human-Robot Interaction. In *HRI 2015 Workshop on Human-Robot Teaming*. Portland, Oregon, USA, March 2-5, 2015.
- W2** J. W. Hart, B. Gleeson, M. K. X. J. Pan, A. Moon, K. MacLean, and E. A. Croft. Gesture, Gaze, Touch, and Hesitation: Timing Cues for Collaborative Work. In *HRI Workshop on Timing in Human-Robot Interaction 2014*. Bielefeld, Germany, March 3-6, 2014.
- W3** J. W. Hart and B. Scassellati. Robotic Self-Models Inspired by Human Development. In *Proceedings of the AAAI-10 Workshop on Metacognition for Robust Social Systems*. Atlanta, Georgia, USA, July 11, 2010.
- W4** J. W. Hart, B. Scassellati, and S. W. Zucker. Epipolar Geometry for Humanoid Robotic Heads. In *Proceedings of the 4th International Cognitive Vision Workshop*. Santorini, Greece, May 2008.

## BOOK CHAPTERS

- B1** J. W. Hart S. Sheikholeslami, E. Croft, K. MacLean, F. P. Ferrie, C. Gosselin and D. Laurandean (2017) Developing Robot Assistants with Communicative Cues for Safe, Fluent HRI. In Abbass, H., Scholz J., and Reid, D. (Eds.). *Foundations of Trusted Autonomy*. Berlin, Germany: Springer. (to appear)

- B2** J. W. Hart and B. Scassellati. (2014) Robotic Self-Modeling. In Pitt, Jeremy (Ed.). *The Computer After Me*. London, UK: Imperial College Press.
- B3** J. W. Hart and B. Scassellati. (2011) Robotic Models of Self. In Cox, M. T., and Raja, A. (Eds.). *Metareasoning: Thinking about Thinking*. Cambridge, MA, USA: MIT Press.

## LETTERS & SHORT PAPERS

- L1** J. W. Hart, and B. Scassellati. Self-Awareness and Social Competencies. (2010) *AMD NEWSLETTER: The Newsletter of the Autonomous Mental Development Technical Committee*. vol. 12(1), Spring 2015.

## Talks and Posters

### INVITED TALKS<sup>1</sup>

- I1** J. W. Hart. Robot Self-Modeling and Self-Other Reasoning. *Mensa National Gathering*. Vancouver, BC, Canada, August 1, 2015.
- I2** J. W. Hart. Robot Self-Modeling and Self-Other Reasoning. *UBC Postdoc Talks*. Vancouver, BC, Canada, July 8, 2015.
- I3** J. W. Hart. Learning about people to build better robots. *Creative Mornings: Vancouver*. Vancouver, BC, Canada, May 1, 2015.
- I4** J. W. Hart. Robotic Self-Modeling. *Ideacity*. Toronto, Ontario, Canada, June 2013.
- I5** J. W. Hart. Robotic Self-Modeling. *Society of Manufacturing Engineers Annual Conference*. Baltimore, MD, USA June 2013.
- I5** J. W. Hart. Robot Self-Modeling. *UT Austin Forum for Artificial Intelligence*. Austin, TX, USA, April 19, 2013.

### CONFERENCE AND WORKSHOP TALKS (INCLUDING INVITED TALKS)

- T1** J. W. Hart. Robot Self-Modeling. *The Development of the Self: from self-perception to interaction under uncertainty. Workshop at ICDL-Epirob*. Lisbon Portugal, September 18, 2017.
- T2** J. W. Hart and B. Scassellati. Creating Social Agency. *NSF-JST workshop on Human-Robot Interaction*. Menlo Park, CA, USA, August 2010.
- T3** J. W. Hart, B. Scassellati, and S. W. Zucker. Estimating the Kinematics of Unseen Joints that Affect the Stereo Vision System. *The 4th Annual New England Manipulation Symposium*. Providence, RI, USA, May 2008.

### POSTERS

- P1** J. W. Hart, B. Scassellati, and S. W. Zucker. Calibrating the Eye Motion of a Humanoid Robot. Appeared at *The 7th IEEE International Conference on Development and Learning*. Monterey, CA, USA, August 2008.

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<sup>1</sup>Not including department colloquia

- P2** J. W. Hart, E. Avrunin, D. Golub, B. Scassellati, and S. W. Zucker. Incorporating Active Vision into the Body Schema. Appeared at *The 4th ACM/IEEE International Conference on Human-Robot Interaction (HRI 2008)*. La Jolla, CA, March 2008.
- P3** J. W. Hart, B. Scassellati, and S. W. Zucker. Epipolar Geometry for Humanoid Robotic Heads. Appeared at *The Third North East Student Colloquium on Artificial Intelligence (NESCAI08)*. Ithaca, NY, USA, May 2008.

## Awards & Recognitions

- Society of Manufacturing Engineers Innovation Watch List - 2013

## Program Committee Membership

- Association for the Advancement of Artificial Intelligence Conference on Artificial Intelligence (AAAI): 2017
- The ACM/IEEE International Conference on Human-Robot Interaction (HRI): 2017

## Reviewing

- IEEE Transactions on Human-Machine Systems (THMS): 2017
- The International Journal of Human-Computer Studies (IJHCS): 2017
- The International Journal of Humanoid Robotics (IJHR): 2017, 2016, 2015, 2014, 2012, 2011, 2010, 2009
- The IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS): 2017, 2016, 2015, 2012, 2009
- IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN): 2017, 2016, 2013
- ACM Transactions on Applied Perception (TAP): 2017
- The IEEE International Conference on Robotics and Automation (ICRA): 2017, 2016
- The ACM/IEEE International Conference on Human-Robot Interaction (HRI): 2016, 2015, 2014, 2013, 2012, 2011, 2010
- Pattern Recognition letters: 2016
- International Journal of Human-Computer Studies: 2016
- Robotics, Science, and Systems: 2016
- The ACM Conference on Human Factors in Computing Systems (CHI): 2016
- ICDL-Epirob (formerly ICDL and Epirob): 2016, 2015
- ACM Transactions on Interactive Intelligent Systems (TIIS): 2015

- ASME Journal of Dynamic Systems, Measurement and Control: 2015
- Robotics and Computer Integrated Manufacturing: 2015
- Journal of Intelligent and Robotic Systems (JIRS) Special Issue - Cognitive Robotics Systems: Concepts and Applications: 2015
- ACM Transactions on Interactive Intelligent Systems: 2015
- International Journal of Robotics Research (IJRR): 2015
- Journal of Intelligent and Robotic Systems: 2015, 2014
- IEEE International Conference on Automatic Face and Gesture Recognition: 2014
- The Journal of Human-Robot Interaction (JHRI): 2012 (reviewed for the inaugural issue)
- The International Journal of Social Robotics (SORO): 2012, 2010
- The International Joint Conference on Artificial Intelligence (IJCAI): 2011
- The International Conference on Development and Learning (ICDL): 2010, 2009, 2008
- The IEEE-RAS International Conference on Humanoid Robots (HUMANOIDS): 2010, 2009
- The International Conference on Epigenetic Robotics (EPIROB): 2009
- The International Journal of Machine Learning Research (IJMLR): 2006
- The European Conference on Artificial Intelligence (ECAI): 2006
- The International Conference on Integration of AI and OR Techniques in Constraint Programming for Combinatorial Optimization Problems (CP-AI-OR): 2006

## Graduate Mentoring

**Sara Shiekholeslami & Vidar Skjervy** Conducted study of handover motions, both to interpret human motion and to implement handover motions on robots.

## Undergraduate Mentoring

**Vedanshu Dash & Henry Mak** Constructed materials for study of handover motions.

**Louisa Hardjasa & Alexander Toews** Constructed materials for study on human-robot synchrony during collaborative work. Study to be conducted.

**Eleanor Avrunin & Ashley Douglas** Performed a study on lifelike motion, resulting in conference publication [C3]. Eleanor Avrunin is currently a Computer Science PhD student at Carnegie Mellon University, and a recipient of an NSF GRFP Fellowship.

**Wilma Bainbridge** Performed a study on social presence in Human-Robot Interaction resulting in conference publication [C5] and journal article [J1]. Wilma is currently a PhD student at the Massachusetts Institute of Technology, and a recipient of an NSF GRFP Fellowship.

**Kenny Castaneda & Gabriel Fernandez** Performed a senior project in which they designed and constructed new arms for the humanoid robot, Nico.

**David Golub & Eleanor Avrunin** Performed a research project in which we programmed a robot to learn a model of how cameras on its head move, resulting in poster [P2].

**Justin Kosslyn** Performed a study on reaching and pointing gestures.

**Graham Radman** Performed a senior project in which he reprogrammed the low-level motor drivers controlling the humanoid robot, Nico's motors.

**Elaine Short & Michelle Vu** Performed a study on attributions of agency to a humanoid robot when a robot cheats in a game, resulting in conference publication [C4], which was nominated for best paper. Elaine Short is currently a PhD student at University of Southern California, and a recipient of an NSF GRFP Fellowship.

## Selected Media Coverage

- M1** New Scientist, "Robot learns to recognise itself in the mirror," August 22, 2012.  
<http://www.newscientist.com/article/mg21528785.900-robot-learns-to-recognise-itself-in-the-mirror.html>
- M2** BBC News, "Robot learns to recognise itself in mirror," August 23, 2012.  
<http://www.bbc.com/news/technology-19354994>
- M3** NBC News, "Robot learns to track itself and the world through a mirror," August 25, 2012.  
<http://www.nbcnews.com/technology/futureoftech/robot-learns-track-itself-world-through-mirror-961379>
- M4** Business Standard, "Now, a 'Self-aware' robot that recognises itself in the mirror," August 23, 2012.  
<http://tinyurl.com/9txnky7>
- M5** CBS SmartPlanet, "Robot passes one milestone in tests of self-awareness," August 31, 2012.  
<http://www.smartplanet.com/blog/science-scope/robot-passes-one-milestone-in-tests-of-self-awareness/13600>
- M6** El Mundo, "Nico, el robot que est aprendiendo a mirarse al espejo," August 29, 2012.  
<http://www.elmundo.es/elmundo/2012/08/29/navegante/1346229933.html>
- M7** Yale Graduate School of Arts & Sciences: Graduate School News and Events, "Using Robots to Study Self Awareness," April, 2012.  
<http://www.yale.edu/graduateschool/publications/news/201205/computer-science-robots-self-awareness.html>
- M8** GE Focus Forward Films, "Robot," June, 2012.  
<http://focusforwardfilms.com/films/41/robot> (Also featured in Google Solve for X.)