

Curriculum Vitae

Brian M. Scassellati

Associate Professor
Department of Computer Science
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Research Interests

My research focuses on building embodied computational models of human social behavior, especially the developmental progression of early social skills. Using computational modeling and socially interactive robots, we evaluate models of how infants acquire social skills and assist in the diagnosis and quantification of disorders of social development (such as autism). My other interests include humanoid robots, human-robot interaction, artificial intelligence, machine perception, and social learning.

Education

- May 2001 Ph.D., Computer Science, Massachusetts Institute of Technology
Dissertation: *Foundations for a Theory of Mind for a Humanoid Robot*
Committee: Rodney Brooks (chair), Leslie Pack Kaelbling, W. Eric L. Grimson
- May 1995 M.Eng., Computer Science and Electrical Engineering, Massachusetts Institute of Technology
Thesis: *High-Level Perceptual Contours from a Variety of Low-Level Sources*
- May 1995 Bachelor of Science, Computer Science, Massachusetts Institute of Technology
- May 1995 Bachelor of Science, Brain and Cognitive Science, Massachusetts Institute of Technology

Research Positions

- 6/06- Associate Professor, Department of Computer Science, Yale University
- 9/01-6/06 Assistant Professor, Department of Computer Science, Yale University
- 7/01-8/01 Postdoctoral associate, MIT Artificial Intelligence Laboratory
- 5/94-6/01 Research Assistant, MIT Artificial Intelligence Laboratory
- 6/93-8/93 Intern, IBM Almaden Research Center, San Jose, CA
- 6/92-8/92 Intern, IBM Almaden Research Center, San Jose, CA

Teaching

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|---|------------------|-----------------|
| <i>CS 201a : Introduction to Computer Science</i> | Fall, 2005, 2006 | Yale University |
| <i>CS 473b : Intelligent Robotics</i> | Spring 2002-8 | Yale University |
| <i>CS 470a : Artificial Intelligence</i> | Fall 2002, 2003 | Yale University |
| <i>CS 673a : Social Robotics</i> | Fall 2001 | Yale University |

Professional Activities

- Program Chair
 - 4th ACM/IEEE International Conference on Human-Robot Interaction, 2009
 - 7th IEEE International Conference on Development and Learning, 2008
 - 6th IEEE International Conference on Development and Learning, 2007
- Member, DARPA Computer Science Futures II panel. Met 3 times in 2007-8 to advise DARPA on future "grand challenges" that would attract students to computer science.
- Member, Governing Board of the International Conference on Development and Learning (ICDL), 2008-2012
- Organizer, Center for Talented Youth (CTY) Science and Technology day featuring robotics. To be held at Yale in the Fall of 2008.
- Co-organizer of the ICRA 2008 workshop "Unifying Characteristics of Research in Human-Robot Interaction"
- Co-organizer of the Cognitive Science 2008 tutorial "Embodied Intelligence"
- Chairman, *Autonomous Mental Development Technical Committee*, IEEE Computational Intelligence Society (formerly Neural Networks Society). 2006-2007
- Faculty Guide, Graduate student invitational research workshop on human-robot interaction. One of six faculty members for an NSF-sponsored training workshop. Carmel, CA. August 3-5, 2006.
- Guest Editor, *International Journal of Humanoid Robotics*, special issue on Autonomous Mental Development, with John Weng and Zhengyou Zhang, Vol. 4(2), Spring 2007.
- Organized the panel session "The Future of HRI", 3rd ACM/IEEE International Conference on Human-Robot Interaction, 2007.
- Associate Editor:
 - IEEE Transactions on Autonomous Mental Development (first issue: Spring, 2009)
 - International Journal of Social Robotics
 - International Journal of Humanoid Robotics
- Senior program committee member:
 - Human-Robot Interaction (HRI) 2007, 2008
 - IEEE/RAS International Conference on Humanoid Robots (Humanoids '08)
 - International Joint Conference on Artificial Intelligence (IJCAI) 2007
 - The 2nd International Conference on Development and Learning (ICDL'02)
 - First International Workshop on Epigenetic Robotics: Modeling Cognitive Development in Robotic Systems, Lund, Sweden, September 2001.
- Grant Review Panels (last 5 years)
 - NSF Engineering Research Center site visit review (2005, 2006, 2007, 2008)
 - NSF panels (2003, 2004, 2005, 2007, 2008) and ad-hoc reviews (2007, 2008)
 - U.S. Dept. of Education, National Institute on Disability and Rehabilitation Research panel (2007)
 - European Commission – IST Program (2006), Cognitive Systems (2008)
 - Natural Sciences and Engineering Research Council of Canada (NSERC 2006)
 - French National Research Agency, Agence Nationale de la Recherche (ANR 2006)
 - Netherlands Organization for Scientific Research (NOW, 2005)
 - Förderung der wissenschaftlichen Forschung (the Austrian national science council, 2003)
- Reviewer for:
 - Journals (last 5 years):
 - Adaptive Behavior
 - Artificial Intelligence Journal
 - Assistive Technology
 - Autonomous Robotics

Cognitive Science
Cognitive Systems Research Behavioral and Brain Sciences
Computers and Industrial Engineering
IEEE Transactions on Robotics and Automation
IEEE Transactions on Systems, Man, and Cybernetics
IEEE Transactions on Neural Networks
IEEE Transactions on Evolutionary Computation
IEEE Transactions on Pattern Analysis and Machine Intelligence
IEEE Transactions on Robotics and Automation
International Journal of Human-Computer Studies
International Journal of Humanoid Robotics
International Journal of Social Robotics
Journal of Autism and Developmental Disorders
Journal of Infant and Child Development
Neural Networks
Neurocomputing
Robotics and Autonomous Systems
Trends in Cognitive Science

Conferences (last 5 years):

Association for the Advancement of Artificial Intelligence (AAAI) 2007-2005
Robotics: Systems and Science 2007-2005
IEEE-RAS International Conference on Humanoid Robotics 2008-2004
International Joint Conference on Artificial Intelligence (IJCAI) 2007, 2005, 2003
Epigenetic Robotics (EpiRob) 2007-2003
IEEE International Conference on Intelligent Robots and Systems (IROS) 2007, 2004
IEEE International Conference on Robotics and Automation (ICRA) 2005
IEEE Conference on Evolutionary Computation (CEC) 2007
International Joint Conference on Neural Networks (IJCNN) 2006, 2003
Cognitive Science (CogSci) 2008-2007
IEEE International Conference on Development and Learning (ICDL) 2006-2003
International Conference on Intelligent User Interfaces (IUI) 2008-2007
International Conference on Multi-Modal Interfaces (ICMI) 2007
IEEE Int. Symp. on Robot and Human Interactive Communication (Ro-MAN) 2008-7

- Co-organizer of the special session “Autonomous mental development” at the IEEE World Congress on Computational Intelligence (WCCI-2006)
- 2001 Workshop Chair for the American Association of Artificial Intelligence (AAAI) Mobile Robot Workshop and Competition. Also served as the editor for a collection of papers from this workshop which was published by AAAI Press.
- 2001: Planning committee member for the MIT Initiative on Technology and Identity.
- 2001: Organizing committee member for AAAI Fall Symposium "Parallel Cognition for Embodied Agents".
- 1999-2000: Planning committee member for the MIT Museum exhibit on Artificial Intelligence.
- 1998-1999: Co-organizer for the seminar series "Brains and Machines" jointly hosted by the MIT Artificial Intelligence Laboratory and the MIT Center for Biological and Computational Learning.

Yale University Activities

- Executive Committee, Cognitive Science Program 2007-2008
- Graduate admissions committee, Department of Computer Science, 2002-2008
- Departmental computing committee, 2006-2008
- Coordinator for first year graduate students, Department of Computer Science, 2002-2005.
- Freshman Advisor, Morse College, 2001-2008.

Honors and Awards

- 2008: A. Richard Newton Breakthrough Research Award from Microsoft
- 2008: Keynote speaker, HRI Young Researchers Workshop, an NSF-sponsored tutorial at the 2008 ACM/IEEE International Conference on Human-Robot Interaction
- 2007: Alfred P. Sloan Research Fellowship
- 2007: Best Paper Award, 6th International Conference on Development and Learning (ICDL)
- 2006: Best Applied Computational Modeling Paper, 28th Annual Meeting of the Cognitive Science Society
- 2006: Guest speaker at the Annual Meeting of the National Academy of Sciences
- 2005: Keynote Speaker, 5th International workshop on Epigenetic Robotics
- 2004: Best Paper Award at the 3rd International Conference on Development and Learning (ICDL)
- 2004: Part of an NSF Science and Technology Center proposal that has entered the final phase of competition. From an initial field of more than 150 proposals, only 10 reached this final stage.
- 2003: NSF CAREER Award
- 2002: Selected as one of two nominees from Yale for the Packard Foundation Fellowship
- 2000: Best Paper Award at the First International IEEE/RSJ Conference on Humanoid Robotics
- 1995-8 National Defense Science and Engineering Graduate Fellowship
- 1995 Morris Joseph Levin Memorial Award for Best Oral Thesis Presentation
- 1994-5 Bose Foundation Fellowship
- 1993 Cray Research Scholarship
- Member of Phi Beta Kappa, Eta Kappa Nu, Tau Beta Pi, Sigma Xi

Recent Media Coverage

For seven years, we have been routinely declining media interviews due to the nature of our clinical research. We have made only a few exceptions to this policy.

- New York Times Magazine, "It Understands," July 29, 2007.
<http://www.nytimes.com/indexes/2007/07/29/magazine/index.html>
- SEED magazine, "Rise of Roboethics," July 2007.
http://www.seedmagazine.com/news/2007/07/rise_of_roboethics.php
- New Scientist, "Self-aware robot turns mirror on humankind," May 16, 2007.
<http://tinyurl.com/ysfwxz>
- APA Monitor on Psychology, "R2-D2's Social Lessons," Vol. 38(3), March 2007.
<http://www.apa.org/monitor/mar07/r2d2.html>
- Popular Science, "Today's 5 most mind-blowing 'bots,'" September 2006.
<http://tinyurl.com/yvqcqu>
- Wall Street Journal, "Smart robotic toys may one day diagnose autism at early age", Page B-1, October 26, 2005. Reprinted here: <http://www.post-gazette.com/pg/05299/595326.stm>

Invited talks

- Brigham Young University, Computer Science colloquium, 11/07/08.
- Barcelona Cognition, Brain and Technology summer school, funded by euCognition, 9/9/08.
- Cognitive Science 2008 workshop, *Embodied Cognition and Robotics*, 7/23/08.
- Child Study Center Associates dinner, Yale Club, New York City, 5/29/08.
- ICRA 2008 workshop, *Social Interaction with Intelligent Indoor Robots*, 5/20/08.
- Georgia Institute of Technology, *Robotics and Intelligent Machines* (RIM) seminar series, 4/23/08.
- **Keynote speaker**, Social Robotics Workshop, hosted jointly by the Schenectady Museum and RPI, sponsored by an NSF CISE CPATH grant, 3/20/08.
- **Keynote speaker**, HRI Young Researchers Workshop, an NSF-sponsored tutorial at the 2008 *ACM/IEEE International Conference on Human-Robot Interaction*, 3/12/08.
- Tufts University, computer science colloquium, 2/14/08.
- Rensselaer Polytechnic Institute (RPI), computer science colloquium, 11/08/07.
- IROS 2007 workshop, *Assistive Technologies: Rehabilitation and Assistive Robotics*, 10/29/07.
- Wesleyan University, computer science colloquium, 10/23/07.
- Gadgetoff (an invitation-only technology summit), 09/28/07.
- Society for Research in Child Development (SRCD) Biennial Meeting, 3/30/07.
- **Keynote speaker**, AAAI Spring Symposium on Multidisciplinary Collaboration for Socially Assistive Robotics, 03/27/07.
- Harvard University, Electrical Engineering Seminar series, 03/16/07.
- University of Missouri, CS Departmental Seminar, 02/27/07.
- Chicago Humanities Festival, 11/11/06.
- Robotics: Systems and Science workshop, *Socially Assistive Robotics*. 8/19/06.
- University of Massachusetts Lowell, CS Departmental seminar, 4/19/06.
- **National Academy of Sciences**, Annual Meeting, 4/24/06.
- Massachusetts Institute of Technology, CSAIL Robotics Seminar, 11/29/05
- Doing Likewise: A Day-Long Symposium exploring issues surrounding imitation, emulation and mimesis presented by the New York Institute for the Humanities at NYU, and moderated by Jonathan Miller, 11/19/05
- Carnegie Mellon University, Robotics Institute Colloquium, 11/11/05
- **National Academy of Sciences** Frontiers of Science Symposium, 10/26/05. (This was one of three talks in a session on robot learning. This session was selected out of all others for presentation t the Annual meeting on 4/24/06).
- Psychology Lunch, Department of Psychology, Yale University, 9/7/05
- **Keynote Speaker**, 5th International workshop on Epigenetic Robotics, 7/23/05
- Yale Systems Science Seminar Series, 2/11/05
- Central Connecticut University Computer Science Seminar Series, 2/9/05
- International Conference on Infant Studies (ICIS), 5/5/2004
- Yale High Performance Computing Initiative, 4/30/2004
- Washington University, Computer Science Colloquium, 4/9/2004
- Lecture and laboratory tour as part of the International Festival of Arts and Ideas. Approximately 120 people toured the Social Robotics lab in AK Watson Hall during this event. 06/2003
- NSF Neuromorphic Engineering Conference, Telluride, Colorado, 07/17/2003.
- International Joint Conference on Neural Networks (invited), 07/15/2003.
- Artificial Intelligence and Trans-humanism working group, Yale Bioethics project, 09/12/03.

- Yale-New Haven Community open house. Lecture accompanied by a lab tour that was open to the public. Approximately 150 people toured our laboratory in AK Watson during this event. 11/08/2003.
- Cognitive Science Colloquium, Southern Illinois University, Carbondale, 11/15/02.
- The festival Le Reve de Vaucanson (The Dream of Vaucanson), Musee de Arts et Metries, Paris, 10/17/02.
- 2nd workshop on Robotic and Virtual Interactive systems in the Therapy of Autism and other psychopathological disorders, Hopital La Salpetriere, Paris, 9/27/02.
- Morse College Fellows meeting, 9/23/02.
- Yale Alumni weekend, 6/02/02.
- Pierce Laboratory weekly seminar, Yale School of Medicine, 5/20/02.
- Yale Entrepreneurial Society Panel Discussion, 4/19/02.
- Artificial Intelligence and Transhumanism working group, Yale Bioethics project, 2/11/02.
- Psychology Lunch, Department of Psychology, Yale University, 1/23/02.
- Fourteenth Annual Government Technology Conference in Albany, NY, 11/01.
- Plenary talk at "Computation for Metaphors, Analogy and Agents" workshop at the University of Aizu, Aizu-Wakamatsu, Japan. 6/98.

Funding Workshop Participation

- NSF/ JST US-Japan Robotics Workshop on Safety, Security, and Society, San Francisco, CA, 08/15/08 (invited participant)
- CCC / CRA Roadmap for Robotics Workshop: A Research Roadmap for Medical and Healthcare Robotics, Washington, DC, 07/15/08 (invited participant)
- ONR workshop on Social Robotics, Boston, MA, 2/29/08 (speaker)
- NSF Workshop on Physical Robot Appearance and Design for Next Generation Human-Robot Interaction Systems, University of Southern California, 11/16/05 (speaker)
- United States Army Logistics Transformation Agency, Telerobotics and Energy Conference, Washington, DC, 8/11/2004 (speaker)
- DARPA Human-Machine Interface workshop, San Luis Obispo, California, 9/01 (speaker)
- Japanese Ministry of Science and Technology workshop on development and cognition of humans and artifacts in Kyoto, Japan, 10/01 (speaker)
- NSF/DARPA Workshop on Development and Learning, Michigan State University, Lansing, MI, 9/2000 (speaker)

Guest lectures

- Yale CogSci 110, *Introduction to Cognitive Science*, Fall 2001-2007
- Yale CS 470, *Artificial Intelligence*, October, 2001

Publications

Refereed Journal Publications

- J1) K. Gold, M. Doniec, C. Crick, and B. Scassellati. Robotic Vocabulary Building Using Extension Inference and Implicit Contrast. To appear, *Artificial Intelligence Journal*. Vol. 173(1), p. 145-166. 2009.
- J2) F. Shic & B. Scassellati. Pitfalls in the modeling of developmental systems. *International Journal of Humanoid Robotics*, Vol. 4(2), p. 435-454. 2007.
- J3) A. Tapus, M. Mataric, & B. Scassellati. The grand challenges in socially assistive robotics. *IEEE Robotics and Automation Magazine*. Vol. 4, No. 1. p. 35-42, March 2007.
- J4) F. Shic & B. Scassellati. A behavioral analysis of robotic models of visual attention. *International Journal of Computer Vision*, Vol. 73(2), p. 159-177, 2007.
- J5) K. Gold & B. Scassellati. Learning acceptable windows of contingency. *Connection Science, special issue on developmental learning*, Vol. 18(2), p. 217-228, June 2006.
- J6) C. Crick, K. Gold, E. Kim, F. Shic, G. Sun & B. Scassellati. Social Development. *IEEE Computational Intelligence Magazine*, Vol. 1(3), p. 41-47, August 2006.
- J7) G. Sun & B. Scassellati. A fast and efficient model for learning to reach. *International Journal of Humanoid Robotics*, Vol. 2, No. 4, p.391-413, 2005.
- J8) C. Breazeal & B. Scassellati. Robots that imitate humans. *Trends in Cognitive Science*, vol. 6, pp. 481-487, 2002.
- J9) C. Breazeal, A. Edsinger, P. Fitzpatrick & B. Scassellati. Active vision for sociable robots. *IEEE Transactions on Systems, Man, and Cybernetics, Part A: Systems and Humans*, Volume 31, Number 5, p. 443-453, 2002.
- J10) B. Scassellati. Theory of mind for a humanoid robot. *Autonomous Robots*, vol. 12, p. 13-24, 2002.
- J11) B. Adams, C. Breazeal, R. Brooks & B. Scassellati. Humanoid robots: A new kind of tool. *IEEE Intelligent Systems*, Vol. 15, No. 4, p. 25-31, July/August 2000.
- J12) C. Breazeal, A. Edsinger, P. Fitzpatrick, B. Scassellati & P. Varchavskaia. Social constraints on animate vision, with. *IEEE Intelligent Systems*, Vol. 15, No. 4, p. 32-37, July/August 2000.
- J13) C. Breazeal & B. Scassellati. Infant-like social interactions between a robot and a human caretaker. Accepted for publication in *Adaptive Behavior* in 2000, available from <http://www.cs.yale.edu/~scaz/>.

In press (accepted):

- J14) K. Gold & B. Scassellati (in press). Using Probabilistic Reasoning over Time to Self-Recognize. To appear, *Robotics and Autonomous Systems*.

Submitted:

- J15) W. Bainbridge, J. Hart, E. Kim & B. Scassellati. The Effect of Presence on Human-Robot Interaction. *International Journal of Social Robotics*.
- J16) C. Crick & B. Scassellati. Identifying Intention from Motion through Narrative. *IEEE Transactions on Autonomous Mental Development*.

In preparation:

- J17) M. Doniec, G. Sun & B. Scassellati. A Demonstration of the Efficiency of Developmental Learning. *International Journal of Humanoid Robotics*.

Refereed Conference Proceedings

- C1) E. Kim, D. Leyzberg, K. Tsui & B. Scassellati. How People Talk When Teaching a Robot. 4th *ACM/IEEE International Conference on Human-Robot Interaction*. Accepted.
- C2) A. Steinfeld, O.C. Jenkins & B. Scassellati. The Oz of Wizard: Simulating the Human in Interaction Research. 4th *ACM/IEEE International Conference on Human-Robot Interaction*. Accepted.

- C3) F. Shic, K. Chawarska & B. Scassellati. The Amorphous Fixation Measure Revisited: with Applications to Autism. *30th Annual Meeting of the Cognitive Science Society (CogSci 2008)*. Washington, DC, July 2008.
- C4) E. Kim, K. Gold & B. Scassellati. What Prosody Tells Infants to Believe. In *Proceedings of the 7th IEEE International Conference on Development and Learning (ICDL 2008)*, Monterrey, California, August 2008.
- C5) F. Shic, K. Chawarska, J. Bradshaw & B. Scassellati. Autism, Eye-Tracking, Entropy. In *Proceedings of the 7th IEEE International Conference on Development and Learning (ICDL 2008)*, Monterrey, California, August 2008.
- C6) C. Crick & B. Scassellati. Inferring Narrative and Intention from Playground Games. In *Proceedings of the 7th IEEE International Conference on Development and Learning (ICDL 2008)*, Monterrey, California, August 2008.
- C7) F. Shic, K. Chawarska, D. Lin & B. Scassellati. The Computational Modeling of Perceptual Biases of Children with ASD in Naturalistic Settings. *2008 International Meeting for Autism Research (IMFAR)*, London, UK, 2008.
- C8) E. Kim, E. Newland, R. Paul & B. Scassellati. Robotic tools for prosodic training for children with ASD: A case study. *2008 International Meeting for Autism Research (IMFAR)*, London, UK, 2008.
- C9) W. Bainbridge, J. Hart, E. Kim & B. Scassellati. The effect of presence on human-robot interaction. *IEEE International Symposium on Robot and Human Interactive Communication*, Munich, Germany, 2008.
- C10) J. Hart, B. Scassellati & S. Zucker. Epipolar geometry for humanoid robotic heads. *4th International Cognitive Vision Workshop (ICVW 2008)*. Santorini, Greece, 2008.
- C11) F. Shic, K. Chawarska & B. Scassellati. The Incomplete Fixation Measure. In *Proceedings of the Eye Tracking Research & Applications Symposium (ETRA)*, Savannah, GA, 2008.
- C12) K. Gold & B. Scassellati. A Bayesian Robot that Distinguishes “Self” from “Other”. In *Proceedings of the 29th Annual Meeting of the Cognitive Science Society (CogSci2007)*. Nashville, Tennessee.
- C13) K. Gold & B. Scassellati. A robot that uses existing vocabulary to infer non-visual word meanings from observation. In *Proceedings of the Twenty-Second Annual Meeting of the Association for the Advancement of Artificial Intelligence (AAAI-2007)*. Vancouver, BC, Canada. August, 2007. **(Recognized as within the top 20% of accepted papers and slated for both oral and poster presentation).**
- C14) K. Gold, M. Doniec & B. Scassellati. Learning Grounded Semantics with Word Trees: Prepositions and Pronouns. In *Proceedings of the 6th IEEE International Conference on Development and Learning (ICDL 2007)*, London, England, July 2007. **BEST PAPER AWARD.**
- C15) C. Crick, M. Doniec & B. Scassellati. Who is IT? Inferring Role and Intent from Agent Motion. In *Proceedings of the 6th IEEE International Conference on Development and Learning (ICDL 2007)*, London, England, July 2007.
- C16) F. Shic, K. Chawarska, D. Lin & B. Scassellati. Measuring context: The gaze patterns of children with autism evaluated from the bottom-up. In *Proceedings of the 6th IEEE International Conference on Development and Learning (ICDL 2007)*, London, England, July 2007.
- C17) E. Kim & B. Scassellati. Learning to refine behavior using prosodic feedback. In *Proceedings of the 6th IEEE International Conference on Development and Learning (ICDL 2007)*, London, England, July 2007.
- C18) M. Doniec, W. L. Miranker & B. Scassellati. Emergence of Language-Specific Phoneme Classifiers in Self-Organized Maps. In *Proceedings of the 2007 International Joint Conference on Neural Networks (IJCNN-07)*. Orlando, Florida, August 2007.
- C19) M. Doniec, G. Sun & B. Scassellati. Active Learning of Joint Attention. *IEEE/RSJ International Conference on Humanoid Robotics (Humanoids 2006)*, Genoa, Italy, 2006.
- C20) K. Gold & B. Scassellati. Deictic Pronoun Learning and mirror self-identification. *6th International Conference on Epigenetic Robotics (EpiRob)*, Paris, 2006.

- C21) C. Crick & B. Scassellati. Synchronization in social tasks: Robotic drumming. 15th IEEE International Symposium on Robot and Human Interactive Communication, (RO-MAN). Reading, UK. 2006.
- C22) F. Shic, W. Jones, A. Klin & B. Scassellati. Swimming in the Underlying Stream: Computational Models of Gaze in a Comparative Behavioral Analysis of Autism. *Cognitive Science*, Vancouver, 2006. **BEST PAPER AWARD: Best Applied Computational Modeling Paper**
- C23) K. Gold & B. Scassellati. Audio Speech Segmentation Without Language-Specific Knowledge. *Cognitive Science*, Vancouver, 2006.
- C24) F. Shic & B. Scassellati. How Not to Evaluate a Developmental System. *International Joint Conference on Neural Networks (IJCNN)*, Vancouver, 2006.
- C25) M. Doniec, G. Sun & B. Scassellati. A Demonstration of the Efficiency of Developmental Learning. *International Joint Conference on Neural Networks (IJCNN)*, Vancouver, 2006.
- C26) K. Gold & B. Scassellati. Grounded Pronoun Learning and Pronoun Reversal. *5th International Conference on Development and Learning (ICDL-06)*, Bloomington, IN. 2006.
- C27) V. Gaur & B. Scassellati. A Learning System for the Perception of Animacy. *5th International Conference on Development and Learning (ICDL-06)*. Bloomington, IN. 2006.
- C28) K. Gold & B. Scassellati. Using context and sensory data to learn first and second person pronouns. *1st Annual Conference on Human-Robot Interaction (HRI-06)*. Salt Lake City, Utah. 2006.
- C29) E. Wang, C. Lignos, A. Vatsal & B. Scassellati. Effects of head movement on perceptions of humanoid robot behavior. *1st Annual Conference on Human-Robot Interaction (HRI-06)*.
- C30) B. Scassellati. Using robots to study abnormal social development. *Fifth International Workshop on Epigenetic Robotics (EpiRob)*. Nara, Japan. July 2005.
- C31) B. Scassellati. How social robots will help us to diagnose, treat, and understand autism. *12th International Symposium of Robotics Research (ISRR)*. San Francisco, CA. Oct. 2005.
- C32) B. Scassellati. Quantitative metrics of social response for autism diagnosis, *14th International Workshop on Robot and Human Interactive Communication (ROMAN)*. Nashville, TN. Aug. 2005.
- C33) G. Sun & B. Scassellati. Exploiting vestibular output during learning results in naturally curved reaching trajectories. *5th International Workshop on Epigenetic Robotics (EpiRob)*. Nara, Japan. July 2005.
- C34) G. Sun & B. Scassellati. Reaching through learned forward models. *2004 IEEE-RAS/RSJ International Conference on Humanoid Robots (Humanoids 2004)*. Los Angeles, CA. Nov. 2004.
- C35) S. Turkle, O. Daste, C. Breazeal & B. Scassellati. Encounters with Kismet and Cog. *2004 IEEE-RAS/RSJ International Conference on Humanoid Robots (Humanoids 2004)*. Los Angeles, CA. Nov. 2004.
- C36) B. Scassellati. How to use anthropomorphic robots to study social development. *14th Biennial International Conference on Infant Studies (ICIS)*. Chicago, IL. Aug. 2004.
- C37) A. Lovett & B. Scassellati. Using a robot to reexamine looking time experiments. *4th International Conference on Development and Learning (ICDL)*. San Diego, CA. Aug. 2004. **BEST PAPER AWARD.**
- C38) P. Michel, K. Gold & B. Scassellati. Robotic self-recognition. *2004 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. Sendai, Japan. Sept. 2004.
- C39) A. Robinson-Mosher & B. Scassellati. Prosody recognition in male infant-directed speech. *2004 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*. Sendai, Japan. Sept. 2004.
- C40) B. Scassellati. Investigating models of social development using a humanoid robot. *2003 International Joint Conference on Neural Networks (IJCNN)*. Portland, OR. July 2003.
- C41) B. Scassellati. Theory of mind for a humanoid robot. *1st IEEE/RSJ International Conference on Humanoid Robotics (Humanoids 2000)*. Cambridge, MA. Sept. 2000. **BEST PAPER AWARD.**

- C42) C. Breazeal, A. Edsinger, P. Fitzpatrick, B. Scassellati & P. Varchavskaia. Social constraints on animate vision. *1st IEEE/RSJ International Conference on Humanoid Robotics (Humanoids 2000)*. Cambridge, MA. Sept. 2000.
- C43) C. Breazeal & B. Scassellati. How to build robots that make friends and influence people. *1999 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS-99)*. Kyongju, Korea. Aug. 1999.
- C44) C. Breazeal & B. Scassellati. A context-dependent attention system for a social robot. *1999 International Joint Conference on Artificial Intelligence (IJCAI-99)*, Stockholm, Sweden. July 1999.
- C45) B. Scassellati. Knowing what to imitate and knowing when you succeed. Annual meeting of the Society for the Study of Artificial Intelligence and Simulation of Behaviour (AISB). Edinburgh, Scotland. June 1999.
- C46) R. Brooks, C. Breazeal, R. Irie, C. C. Kemp, M. Marjanovic, B. Scassellati & M. Williamson. Alternate essences of intelligence. *15th National Conference on Artificial Intelligence (AAAI-98)*. Madison, WI. Aug. 1998.
- C47) B. Scassellati. Eye finding via face detection for a foveated, active vision system. *15th National Conference on Artificial Intelligence (AAAI-98)*. Madison, WI. Aug. 1998.
- C48) M. Marjanovic, B. Scassellati & M. Williamson. Self-taught visually-guided pointing for a humanoid robot, with. *4th International Conference on Simulation of Adaptive Behavior (SAB-96)*, Cape Cod, MA. June 1996.
- C49) B. Scassellati, S. Alexopoulos & M. Flickner. Retrieving images by 2D shape: a comparison of computation methods with perceptual judgments, with. In *Storage and Retrieval for Image and Video Databases II*, SPIE Conference Proceedings, Volume 2185, San Jose, CA, pp. 2-14, 1994.

Refereed Workshop Proceedings

- W1) K. Gold & B. Scassellati. Learning about the self and others through contingency. *2005 AAAI Spring Symposium "Developmental Robotics."* Stanford, CA. Mar. 2005.
- W2) B. Scassellati. How robotics and developmental psychology complement each other. *NSF/DARPA Workshop on Development and Learning*. Michigan State University, Lansing, MI. June 2000.
- W3) B. Scassellati. Investigating models of social development using a humanoid robot. *1998 AAAI Fall Symposium "Robots and Biology: Developing Connections."* Orlando, FL. Oct. 1998.
- W4) B. Scassellati. Imitation and mechanisms of shared attention: A developmental structure for building social skills. *Autonomous Agents 1998 workshop "Agents in Interaction - Acquiring Competence through Imitation"*. Minneapolis, MO. Aug. 1998.
- W5) B. Scassellati. Building behaviors developmentally: A new formalism. *1998 AAAI Spring Symposium "Integrating Robotics Research"*. Stanford, CA. Mar. 1998.
- W6) B. Scassellati. Mechanisms of shared attention for a humanoid robot. *1996 AAAI Fall Symposium "Embodied Intelligence."* Cambridge, MA. Oct. 1996.

Refereed Book Chapters

- B1) C. Breazeal & B. Scassellati. Challenges in building robots that imitate people. In K. Dautenhahn and C. Nehaniv, eds., *Imitation in Animals and Artifacts*, MIT Press, 2002.
- B2) B. Scassellati. Investigating models of social development using a humanoid robot. In B. Webb and T. Consi, eds., *Biorobotics*, MIT Press, 2001.
- B3) R. Brooks, C. Breazeal, M. Marjanovic, B. Scassellati & M. Williamson. The Cog Project: Building a humanoid robot. In C. Nehaniv, ed., *Computation for Metaphors, Analogy and Agents, Vol. 1562 of Springer Lecture Notes in Artificial Intelligence*, Springer-Verlag, p. 52-87, 1998.
- B4) B. Scassellati. Imitation and mechanisms of joint attention: A developmental structure for building social skills on a humanoid robot. In C. Nehaniv, ed., *Computation for Metaphors, Analogy and Agents, Vol. 1562 of Springer Lecture Notes in Artificial Intelligence*, Springer-Verlag, p. 176-195, 1998.

Technical Reports

- T1) B. Scassellati. Foundations of a theory of mind for a humanoid robot. Ph.D. dissertation, MIT Department of Computer Science and Electrical Engineering. May, 2001.
- T2) B. Scassellati. A binocular, foveated, active vision system. MIT AI Memo 1628, March 1998.
- T3) B. Scassellati. High-level perceptual contours from a variety of low-level physical features. Master's Thesis, MIT. 1995.

Student Supervision

Graduated Ph.D. students

1. Fred Shic. *Computational Methods for Eye-Tracking Analysis: with Applications to Autism*. Defended on 8/20/2008. Most recent position: NIH T32 Postdoctoral Scholar, Yale Child Study Center.
2. Kevin Gold. *Using Sentence Context and Implicit Contrast to Learn Sensor-Grounded Meanings for Relational and Deictic Words: The TWIG System*. Defended on 3/7/08. Most recent position: Assistant professor, Wellesley College.
3. Ganghua Sun. *From Motor Learning to Social Learning: A Study of Development on a Humanoid Robot*. Degree awarded in December, 2006. Most recent position: Analyst, Goldman Sachs.

Current graduate students

1. Christopher Crick (5th year Ph.D.) – Recognition of Intent from Motion Trajectories
2. Elizabeth Kim (5th year Ph.D.) – Biologically-motivated algorithms for Prosody Recognition
3. Justin Hart (3rd year Ph.D.) – Robotic Models of Self
4. Dan Leyzberg (2nd year Ph.D.) – Long-term personality models for human-robot interaction

Dissertation committee member for:

1. Yinghua Wu (advisor: Paul Hudak), defended Feb, 2008.
2. Chen Xu (advisors: Julie Dorsey and Holly Rushmeier)
3. Jianye Lu (advisors: Julie Dorsey and Holly Rushmeier)

Current undergraduate research assistants

1. Wilma Bainbridge – Effects of Embodiment on Human-Robot Interaction
2. Justin Kosslyn – Effect of Deictic Gestures in Human-Robot Interactions
3. David Golub – Prosodic feedback during machine learning
4. Eleanor Avrunin – Automatic recognition of kinematic chains
5. Emily Bernier – Visual tracking systems
6. Michelle Vu – Robots as therapeutic devices for children with ASD

Master of Science students supervised

1. Marek Doniec (2006-2007) – Joint Attention and Declarative Pointing
2. Viksit Gaur (2005-2006) – Discrimination of Animacy from Visual Cues
3. Jim Logan (2004-2005) – PlayTest: A Diagnostic Audio-Preference Recorder for Home Use
4. Ryan Gehl (2002-2003) – Models of Vocal Prosody
5. Marek Michalowski (2002-2003) – Methods for Modifying Visual Scanning Patterns
6. Shawn Walker (2001-2002) – Construction of an Active Vision System (Mechanical Engineering)

Special Registration students supervised

1. Marek Doniec (2005-2006) – DAAD scholarship winner (German Academic Exchange Service)

2. Philipp Michel (2003-2004) – DAAD scholarship winner (German Academic Exchange Service)

Completed undergraduate thesis projects (CS 490 unless noted)

- 2007-2008
 1. Laura Gehring, *Gender recognition from activity and vocal profiles*
 2. Erica Newland, *New Approaches to Classifying Speech Utterances for Prosodic Content* (Applied Mathematics senior essay)
 3. Lance Cai, *A Model for Learning Verb Context and Meaning Based on Dynamics Information*
- 2006-2007
 4. Jordan Winnick, *The Design and Construction of a Robot for Use in the Study of Autism* (EECS senior project)
 5. Chris Crane, *The Design and Construction of a Robot for Use in the Study of Autism.*
- 2005-2006
 6. Erica Baller, *The Art of Manipulation.*
 7. Emily Pitler, *Robotic Perception of Causality.*
 8. Emily Wang, *A Model for Learning the Meaning and Usage of Numbers.*
- 2004-2005
 9. Jian Yuan, *Looming and Visual depth perception*
 10. Elizabeth Darbie, *Multi-modal tracking based on isometric views*
 11. Timothy Condon, *The Pirate's Code: Social Choice and Aggregation Methods.*
 12. James Kim, *Pressure-Sensitive Flexible Robotic Skin.*
 13. Reuben Grinberg, *Autistic Spectrum Classification of Gaze Tracking Data.*
 14. Xin Tong, *Gender Recognition in Adult Male and Female Speech.*
- 2003-2004
 15. Vincent Panzano, *Deriving Parameters for a Visual Attention Models from Human Gaze Patterns*, (Cognitive Science senior essay).
 16. Andrew Lovett, *Using a robot to re-examine human looking time experiments*, (Cognitive Science senior essay).
 17. Adam Cushner, *ViSITAR: Visual Surveillance and Interaction Tracking for Autism Research.*
 18. Byron Igoe, *The Bigger Picture: Relating Visual and Auditory Cues to Develop the Beginnings of a Mind's Eye.*
 19. Bertrand Maher, *Building a Device for Testing Listening Preferences of Autistic Children.*
- 2002-2003
 20. Jeffrey Kinsey, *Automating Word Segmentation of Phonemic Transcriptions*, co-advised with Charles Yang.
 21. Andrew Lovett, *ILAB: Infant-Like Attentional Behavior.*
 22. Avi Robinson-Mosher, *Prosody Recognition in Male Infant-Directed Speech.*
 23. Joseph Dvorkin, *Deducing Intent of Unidentified Objects.*

24. Ross Eaton, *ViSIT: Visual Surveillance and Interaction Tracking*.
25. Stephen Elliott, *Toward a Visual Attention Memory System (VAMS)*.
26. Daniel Grollman, *Glwys, the robotic rat*.
27. Manfred Lau, *A System for Auditory Localization*.
28. Hanlin Qian, *Computational Modeling of Human Attention in Multiple Object Tracking*.
- 2001-2002
 29. Kushal Dave, *Using cluster analysis to automatically thread discussion board messages*, co-advised with Charles Yang.
 30. Adam Ecker, *Models of the Motor Theory of Speech Recognition*, Psychology.
 31. Matthew Herberg, *Development of a Vision System for a Humanoid Robot*.
 32. Max Kushner, *Making Robots More Human(e)*.
 33. James Stuart, *GWTSim: Grey Walter Tortoises in Complex Environs*.
 34. Marek P. Michalowski, *A Machine Learning System for Identifying Animate Motion*.

Funding

Current:

- F1) **NSF # 0534610: Quantitative measures of social response for autism diagnosis**
PI: Brian Scassellati. Co-PIs: Ami Klin, Fred Volkmar
12/2005-12/2008, total funding **\$758,371**
- F2) **NSF # 0534610: REU/Quantitative measures of social response for autism diagnosis**
PI: Brian Scassellati
6/2008-12/2008, total funding **\$12,000**
- F3) **Microsoft: A. Richard Newton Breakthrough Research Award for Prosody Recognition for Human-Robot Interaction**
PI: Brian Scassellati
7/2008-6/2009, total funding **\$69,956**
- F4) **DARPA: Computer Science Futures II – Engaging Young Scholars in Computer Science**
PI: Brian Scassellati, subcontract from University of Maryland
05/01/08-04/30/11, first year funding **\$180,000, renewable for 2 additional years**
- F5) **NSF # 0812387: CDI-Type I: Understanding Regulation of Visual Attention in Autism through Computational and Robotic Modeling**
PI: Brian Scassellati. Co-PI: Katarzyna Chawarska
09/01/08-07/31/13, total funding **\$700,000**

Completed:

- F6) **NSF # 0238334: CAREER: Social Robots and Human Social Development**
PI: Brian Scassellati
03/2003-02/2008, total funding **\$432,286**
- F7) **National Alliance on Autism Research (NAAR) 2004 Research Award: Listening Preferences in Toddlers with Autism: The Playtest as an Early Screening Device**
PI: Ami Klin
6/2004-6/2007, total funding **\$120,000**
- F8) **NSF # 0205542: ITR: A Framework for Rapid Development of Reliable Robotics Software**
PIs: Paul Hudak, Brian Scassellati, Walid Taha
09/2002-09/2005, total funding: **\$510,000**
- F9) **NSF # 0209122: ITR: A Programming Language for the Control of Humanoid Robots**
PIs: Paul Hudak and Brian Scassellati
09/2003-08/2005, total funding **\$240,000**

F10) **Doris Duke Charitable Foundation Clinical Interfaces Award: A Humanoid Robot as an Interactive Diagnostic Device in Autism**

PIs: Brian Scassellati, Ami Klin, and Fred Volkmar

10/2003-03/2005, total funding **\$80,000**

F11) **DARPA BAA 02-21: An Embodied Personal Cognitive Assistant.**

PI: Brian Scassellati (one of 32 subcontracts from SRI, International.)

05/2003-04/2005, total funding **\$316,000**

Pending:

F12) **NSF: Collaborative Research: Socially Assistive Robots (Expeditions Program)**

PI: Brian Scassellati. Co-PIs: Maja Mataric (USC), Cynthia Breazeal (MIT), Cliff Nass (Stanford)

07/15/09-07/14/11, total requested funding **\$3,250,000**

F13) **NSF: Child-Centered C3Bridges Engineering Research Center**

PI: Brian Scassellati, subcontract from University of Southern California

08/01/08-07/31/13, total requested funding **\$125,000**

F14) **NSF: HCC: Medium: Collaborative Research: Modeling Real-World Social Interaction and Goal-Directed Behavior**

PI: Brian Scassellati, co-PIs: Brian Scholl (Yale), Cynthia Breazeal (MIT)

06/01/09-06/01/13, total requested funding **\$750,000**