

Aaron L. Edsinger

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I am interested in building robots that can assist people in everyday tasks within everyday environments. These robots are designed to exploit their physical embodiment, to safely work alongside people, and to benefit from human strategies for accomplishing tasks. My other interests include the design of interactive, robot companions as well as sculptural and architectural robot installations.

Education

- 2007 MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Doctor of Philosophy in Computer Science, February 2007
Thesis topic: Robot Manipulation in Human Environments
Advisor: Rodney A. Brooks
Committee: Daniela Rus and Roderic Grupen
- 2000 MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Master of Science in Computer Science, June 2000
Advisor: Rodney A. Brooks
- 1994 STANFORD UNIVERSITY
Bachelor of Science in Computer Systems Engineering, June 1994
Advisor: Tom Binford

Research and Teaching Experience

- 2006 Design Consultant
Gehry Partners, Santa Monica, CA.
Worked with architecture team on conceptual designs for robot architecture and creatures for a \$3.4 billion project proposal in Singapore.
- 2003-06 Research Assistant
Living Breathing Robots Group, MIT CSAIL.
Developed a 29 degree-of-freedom bimanual robot, Domo, to investigate compliant and force-controlled manipulation. Developed a 4 degree-of-freedom arm for the Segway RMP based robot Cardea.
- 2005 Teaching Assistant
6.188: Robotics, Science, and Systems (Spring), MIT EECS.
Co-head TA for the first year of the course. Co-developed lab curriculum and prototype robots used by the students.
- 2003 Teaching Assistant
6.836: Embodied Intelligence (Spring), MIT EECS.
Co-head TA. Responsible for tutorials and grading.
- 2002 Research Assistant
Living Machines Group, MIT AI Lab.
Developed methods for building and controlling deformable, tensegrity-based robots.
- 1999-01 Research Assistant
Humanoid Robotics Group, MIT AI Lab.
Developed composable language of motor-primitives for the humanoid robot COG.

Refereed Journal Articles

- 2007 Challenges for Robot Manipulation in Human Environments
Charles Kemp, Aaron Edsinger, and Eduardo Torres-Jara, *IEEE Robotics & Automation Magazine*, 2007 (To Appear).
- 2004 Sensing and Manipulating Built-for-Human Environments
Rodney Brooks, Lijin Aryananda, Aaron Edsinger, Paul Fitzpatrick, Charles Kemp, Una-May O'Reilly, Eduardo Torres-Jara, Paulina Varshavskaya, and Jeff Weber. *International Journal of Humanoid Robotics*, Vol 1, No. 1, 2004.
- 2001 Active Vision for Sociable Robots
Cynthia Breazeal, Aaron Edsinger, P. Fitzpatrick, B. Scassellati. *Socially Intelligent Agents - The Human in the Loop, Special Issue IEEE Transactions on Man, Cybernetics, and Systems, Part A: Systems and Humans*. Volume 31, number 5, pp. 443-453, September 2001.
- 2000 Social Constraints on Animate Vision
Cynthia Breazeal, Aaron Edsinger, Paul Fitzpatrick, Brian Scassellati and Paulina Varchavskaia. *IEEE Intelligent Systems*, July-August 2000.

Refereed Conference and Workshop Proceedings Publications

- 2006 Manipulation in Human Environments
Aaron Edsinger and Charles Kemp, *Proceedings of the IEEE/RSJ International Conference on Humanoid Robotics*, 2006. **(Best Paper Award)**
- 2006 What Can I Control?: The Development of Visual Categories for a Robot's Body and the World that it Influences
Charles Kemp and Aaron Edsinger, *Proceedings of the Fifth International Conference on Development and Learning, Special Session on Autonomous Mental Development*, 2006.
- 2006 Robot Manipulation of Human Tools: Autonomous Detection and Control of Task Relevant Features
Charles Kemp and Aaron Edsinger, *Proceedings of the Fifth International Conference on Development and Learning, Special Session on Classifying Activities in Manual Tasks*, 2006.
- 2006 What Can I Control? A Framework for Robot Self-Discovery
Aaron Edsinger and Charles Kemp, *Proceedings of the Sixth International Workshop on Epigenetic Robotics*, Paris, France, 2006.
- 2005 Developmentally Guided Ego-Exo Force Discrimination for a Humanoid Robot
Aaron Edsinger-Gonzales, *Proceedings of the Fifth International Workshop on Epigenetic Robotics*, Nara, Japan, 2005.
- 2004 Domo: A Force Sensing Humanoid Robot for Manipulation Research
Edsinger-Gonzales, Aaron and Jeff Weber. *Proceedings of the IEEE/RSJ International Conference on Humanoid Robotics*, 2004.
- 2000 Social Constraints on Animate Vision
Cynthia Breazeal, Aaron Edsinger, Paul Fitzpatrick and Brian Scassellati, *Proceedings of the IEEE-RAS International Conference on Humanoid Robots*, 2000.
- 2000 Designing a Humanoid Robot Face to Fulfill Social Contracts
Aaron Edsinger and Una-May O'Reilly, *Proceedings of the 9th IEEE International Workshop on Robot and Human Interaction*, Osaka, Japan.

Technical Reports and In Submission

- 2007 Robot Manipulation in Human Environments
Aaron Edsinger, Massachusetts Institute of Technology, Department of Electrical Engineering and Computer Science, Doctoral Thesis (In submission), Cambridge, MA, 2007.

- 2007 Toward Robot Learning of Tool Manipulation from Human Demonstration
Aaron Edsinger and Charles Kemp, Massachusetts Institute of Technology, CSAIL, Tech. Report (In submission).
- 2006 Visual Tool Tip Detection and Position Estimation for Robotic Manipulation of Unknown Human Tools
Charles Kemp and Aaron Edsinger, Massachusetts Institute of Technology, CSAIL, Tech. Report AIM-2005-037.
- 2005 Manipulating Machines: Designing Robots to Grasp Our World
Aaron Edsinger-Gonzales, Massachusetts Institute of Technology, Department of Electrical Engineering and Computer Science, Doctoral Thesis Proposal, Cambridge, MA, 2005.
- 2004 A Behavior Based Approach to Humanoid Robot Manipulation
Aaron Edsinger-Gonzales, Massachusetts Institute of Technology, Department of Electrical Engineering and Computer Science, Research Qualifying Exam, Cambridge, MA, 2004.
- 2001 Natural Tasking of Robots Based on Human Cues
Brian Scassellati, Bryan Adams, Aaron Edsinger and Matthew Marjanovic. DARPA Mobile Autonomous Robot Software '01 PI Meeting, San Diego, CA, Poster Presentation, March 22, 2001.
- 2000 A Gestural Language for a Humanoid Robot
Aaron Edsinger, Massachusetts Institute of Technology, Department of Electrical Engineering and Computer Science, Master's Thesis, Cambridge, MA, 2000.

Professional Activities

- 2006 Organizer for special session of *Robotics: Science and Systems: Workshop on Manipulation for Human Environments*, Cambridge, Ma.
- 2006 Reviewer for special issue of *International Journal of Computer Vision/International Journal of Robotics Research*.
- 2005 Organizer for special session of *Robotics: Science and Systems: Workshop on Humanoid Manipulation*, Cambridge, Ma.

Honors and Awards

- 2006 Recipient of the Best paper award: Manipulation in Human Environments
IEEE-RAS International Conference on Humanoid Robots, Genoa, Italy, December, 2006.
- 2000 Recipient of the MIT Council for the Arts Grant
Funding for the Las Absurdas Maquinas installation. Cambridge, MA
- 1998 Recipient of the California Arts Council Grant
Funding for work with the Omnicircus Robotic Performance Group. San Francisco, CA
- 1992-94 Recipient of the General Electric Minority Engineering Scholarship
Tuition scholarship, Stanford University

Select Media Coverage

- 2007 Featured in *Poetic Science*. A film by Max Kestner, Zentropa Studios, Denmark, Release 2007
- 2007 Included in "Robots of MIT", DTM Magazine (Japan), January 2007.
- 2007 Included in "Under-Actuated Robot Hands", Text book, eds. L. Birglen, T. Laliberte, and C. Gosselin, Springer, 2007.
- 2007 Included in "Modern Control Systems", Text book, eds. R. Dorf, Prentice Hall, 2007.
- 2007 Included in "Robots and Robotics: How Robots Work", Children's Book, MacMillan Education Australia.
- 2006 Featured in "The Truth Behind the New Movie Meet the Robinsons", *National Geographic KIDS Magazine*, September, 2006.

- 2006 Featured in “Shwer Auf Draht”, GEO Wissen Magazine (Germany), Nr. 38, September, 2006. (Two page photo-spread)
- 2006 Featured in “Today’s Five Most Mind Blowing Bots”, *Popular Science*, August, 2006. (Two page photo-spread)
- 2006 Included in “The Future of Robotics”, CNBC News, August, 2006.
- 2006 Featured in "Boston at the Crossroads: Boston’s Talent Pool", WBUR and National Public Radio, May, 2006.
- 2006 Featured in *Pia Lindman: Embodiments*, Drawings and video at MIT Compton Gallery, Cambridge, Ma, April-June, 2006.
- 2006 Included in “Robots: The future is now”, CNN Future Summit technology profile, April 2006.
- 2006 Featured in “Robot Special: Get a grip”, *New Scientist*, Issue 2537, February 2006.
- 2006 Featured in “Robonauts: The next generation of space explorers”, *Boston Globe*, January 9, 2006.
- 2006 Featured in *Pia Lindman: Embodiments*, Drawings and video at Luxe Gallery, New York, NY, January, 2006.
- 2005 Included in *This Old House: The Cambridge House*, PBS Program 2513, November, 2005.
- 2005 Included in “US teams join hands to build dexterous robots”, *Nature News*, June 14, 2005.
- 2004 Quoted in “Advances could hasten era of household robots”, *Christian Science Monitor*, February 23, 2004
- 2003 Featured in “With an Urban Scooter, a Humanoid Robot Hits Its Stride”, *New York Times*, December 18,2003.
- 2003 Featured in United States: Works and Progress, Published in *Plays and Playwrights*, 2004, Staged New York, NY, 2003.

Select Shows and Exhibits

- 2004 COLLISIONfive
Robotic installation at the MIT Compton Gallery, Cambridge, MA.
- 2003 HyperCollision
Robotic installation at the MIT Museum, Cambridge, MA.
- 2002 Las Absurdas Maquinas
Robotic installation at the MIT Stratton Center, Cambridge, MA.
- 1999 Art and Technology Series
Lecture and robotic performance at Cell Space, San Francisco, CA.
- 1999 Rustlust
Multimedia play and robotic performances at Omnicircus, San Francisco, CA.
- 1998 Sermon on the Mound
Multimedia play and robotic performances at Omnicircus, San Francisco, CA.
- 1998 California Arts Council Grant Recipient Conference
Robotic performance at with the Omnicircus Robotic Performance Group. Asilomar, Monterey, CA.
- 1997 San Francisco Fringe Festival
Robotic street performance in various locations, San Francisco, CA.
- 1997 Social Surrealist Painting and Sculpture Show
Paintings and robotic sculpture at the 111 Minna Street Gallery, San Francisco, CA.

Skills

Computer C, C++, Python, Java, Assembly, Unix, Linux, Matlab, L^AT_EX, Linux administration, real-time distributed systems.

Hardware Embedded systems design, assembly, and testing including DSP, PIC, CANBus, real-time bus protocols, acuator and power systems

Mechanical Design and build most anything. Solidworks, CAD/CAM, CNC Mill, lathe, Mig, mold-making and casting