Elaine Schaertl Short

Contact

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Education

Ph.D., Computer Science, University of Southern California — August 2017
Thesis: Modeling Multi-Party Social Dynamics for Socially Assistive Robotics
Thesis Advisor: Dr. Maja Matarić

M.S., Computer Science, University of Southern California — December 2012

B.S., Computer Science, Yale University — May 2010
Senior Thesis: Using Attentional Models for Robot Gaze Patterns
Thesis Advisor: Dr. Brian Scassellati

Research Expertise

Developing algorithms that enable robust, computationally efficient human-robot interaction in human environments, especially in service of the needs of people with disabilities.

Honors and Awards

Microsoft Research AI Breakthroughs Workshop (2018)
USC Center for Robotics and Embedded Systems George Beckey Service Award (2017)
USC Order of Areté (2017)
USC Viterbi School of Engineering Undergraduate Research Mentoring Award (2017)
Rising Stars in EECS Program (2016)
USC Women in Science and Engineering (WISE) Award to Current Doctoral Students (2016)
USC Department of Computer Science Best Research Assistant Award (2016)
USC Department of Computer Science Best Teaching Assistant Award (2014)
USC Department of Computer Science Service Award (2012)
National Science Foundation Graduate Research Fellowship (2012-2015; awarded 2010)
University of Southern California Provost's Fellowship (2010-2012)
Viterbi School of Engineering Merit Award (2012; awarded 2010)
Saybrook College Mary Casner Prize (2010)
Google Anita Borg Scholarship (2009)

RESEARCH EXPERIENCE

University of Texas at Austin
Department of Electrical and Computer Engineering, Wireless Networking and Communications Group,
Socially Intelligent Machines Lab – Austin, TX
Postdoctoral Fellow – July 2017-Present
Supervising Faculty: Dr. Andrea Thomaz

- Developed approaches to verification of multimodal high-level controllers for mobile manipulation robots interacting with human users in unconstrained environments.
- Developed algorithms for sensing and interacting with human users in high-noise contexts, including detecting contingent behavior.
- Assisted in mentoring Ph.D. students, co-authoring 10 peer-reviewed conference and journal papers with students (7 accepted, 3 under review).

University of Southern California
Department of Computer Science, Interaction Lab – Los Angeles, CA
USC Provost's and NSF Graduate Research Fellow – Sept. 2010-May 2017
Ph.D. advisor: Dr. Maja Matarić

- Dissertation work developed a model of moderation for multi-party interactions, focusing on applications in education and intergenerational interactions.
- Modeled and analyzed patterns of engagement in child-robot interactions with children with autism and robots with varying levels of agency.
- Designed and built SPRITE, a socially engaging 6-degree-of-freedom tabletop robot.
- Collaborated on a project studying the effects of self- and social-comparative feedback on self-efficacy for patients in post-stroke rehabilitation.
- Served as lead graduate student on an interdisciplinary project studying in-home socially assistive robotics for older adults and their families, including a study of inter-generational interactions while playing games with a socially assistive robot.
- Served as lead graduate student at USC on a multi-university collaborative project "Expeditions in Computing: Socially Assistive Robotics", with applications in nutrition education for first-grade children and social skills training for children with autism.

Georgia Institute of Technology
Health Sciences Institute, Healthcare Robotics Laboratory – Atlanta, GA
USC Provost's and NSF Graduate Research Fellow – May-Aug. 2011
Supervising Faculty: Dr. Charles Kemp

- Contributed to an interdisciplinary collaborative research project between the Healthcare Robotics Laboratory and the Human Factors in Aging laboratory studying older adults' perception of robots in the home.

Yale University
Department of Computer Science, Social Robotics Lab – New Haven, CT
Undergraduate Research Assistant – Oct. 2008-May 2010
Supervising Faculty: Dr. Brian Scassellati

- Led a research project studying the effect of cheating behavior by a robot on social engagement and perceptions of robot agency.

- Involved in experimental design and implementation for a study comparing the effect on social behavior of children with autism when playing with a robot, video game, and human adult.
- Assisted in experimental design, experimentation, and data coding for a project analyzing the prosody of children with autism-spectrum disorders when interacting with robots.
- Completed senior thesis, "Attentional Models for Robot Gaze Control", which used machine learning to develop a controller for robot gaze behavior based on the gaze behavior of either typically developing children or children with autism.

University of Southern California
Department of Computer Science, Interaction Lab – Los Angeles, CA
NSF Research Experience for Undergraduates Program – May-August 2009
Supervising Faculty Member: Dr. Maja Matarić

- Developed a system for tracking participants in a study from an overhead camera using Kalman filtering.

Heidelberg University
German Cancer Research Center – Heidelberg, Germany
Research Internships in Science and Engineering (RISE) Program – May-August 2008
Supervising Faculty Member: Dr. Hans-Peter Meinzer

- Contributed to a project developing a 3-D image-guidance system for endoscopic esophageal surgery, taking into account patient respiration.
- Observed and assisted with experiments using the Da Vinci robotic surgical system as a mechanical tracking system.

Pennsylvania State University
Department of Kinesiology, Biomechanics Lab - State College, PA
Adjunct Assistant – June-August 2007
Supervising Faculty Member: Dr. Neil Sharkey

- Assisted in data processing and experimental procedures for a research project studying the differences between soft tissue and bone movement in the human foot.

Journal Publications

[1] **E. Short** and A. L. Thomaz. "Timed Petri Nets for Multimodal Coordination and Control of Human-Robot Interaction Systems". *International Journal of Robotics Research (IJRR)*. 2018. *In preparation.*

[2] A. Allevato, **E. Short**, M. Pryor, and A. L. Thomaz. "Learning Labeled Robot Affordance Models by using Simulations and Crowdsourcing". *International Journal of Robotics Research (IJRR)*. 2018. *Under review.*

[3] **E. Short**, K. Swift-Spong, J. Greczek, A. Ramachandran, A. Litoiu, E. C. Grigore, D. Feil-Seifer, S. Shuster, J. J. Lee, S. Huang, S. Levonisova, S. Litz, J. Li, G. Ragusa, D. Spruijt-Metz, M. J. Matarić, and B. Scassellati. "Socially Assistive Robots for Learning about Nutrition through Play". *IEEE Transactions on Human-Robot Interaction (THRI)*. 2018. *In preparation.*

[4] **E. Short** and M. J. Matarić. "Socially Assistive Robot Moderation of Collaborative Goal-Directed Interactions". *International Journal of Robotics Research (IJRR)*. 2018. *Under review.*

[5] **E. Short**, E. C. Deng, D. Feil-Seifer and M. J. Matarić. "Understanding Agency in Interactions Between Children With Autism and Socially Assistive Robots". *Journal of Human-Robot Interaction (JHRI)*, vol. 6, no. 3, p. 21, 2017.

Conference Publications

[6] R. A. Gutierrez, **E. Short**, S. Niekum, and A. L. Thomaz. "Inferring Task Decomposition from End-User Keyframe Demonstrations". *IEEE International Conference on Robotics and Automation (ICRA)*, Montreal, Canada, 2019. *Under review.*

[7] T. Fitzgerald, **E. Short**, A. Goel, and A. L. Thomaz. "Human-guided Trajectory Adaptation for Tool Transfer". *International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, Montreal, Canada, 2019. *Under review.*

[8] T. Kessler Faulkner, R. A. Gutierrez, **E. Short**, G. Hoffman, and A. L. Thomaz. "Active Attention-Modified Policy Shaping". *International Conference on Autonomous Agents and Multiagent Systems (AAMAS)*, Montreal, Canada, 2019. *Under review.*

[9] **E. Short**, A. Allevato, and A. L. Thomaz. "SAIL: Simulation-Informed Active In-the-Wild Learning". *ACM/IEEE Conference on Human-Robot Interaction (HRI)*, Daegu, South Korea, 2019.

[10] T. Kessler Faulkner, **E. Short**, and A. L. Thomaz. "Policy Shaping with Supervisory Attention Driven Exploration". *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Madrid, Spain, 2018.

[11] A. Saran, S. Majumdar, **E. Short**, A. L. Thomaz, and S. Niekum. "Human Gaze Following for Human-Robot Interaction". *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Madrid, Spain, 2018.

[12] M. L. Chang, R. A. Gutierrez, P. Khante, **E. Short**, and A. L. Thomaz. "Effects of Integrated Intent Recognition and Communication on Human-Robot Collaboration". *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, Madrid, Spain, 2018.

[13] **E. Short**, M. L. Chang, and A. L. Thomaz. "Detecting Contingency for HRI in Open-World Environments". *ACM/IEEE Conference on Human-Robot Interaction (HRI)*, Chicago, USA, 2018.

[14] **E. Short** and M. J. Matarić. "Robot Moderation of a Collaborative Game: Towards Socially Assistive Robotics in Group Interactions". *IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN)*, Lisbon, Portugal, 2017.

[15] **E. Short**, K. Swift-Spong, S. Hyunju, K. M. Wisniewski, Z. Deanah Kim, W. Shinyi, E. Zelinski, and M. J. Matarić. "Understanding Social Interactions with Socially Assistive Robotics in Intergenerational Family Groups". *IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN)*, Lisbon, Portugal, 2017.

[16] K. Swift-Spong, **E. Short**, E. Wade, and M. J. Matarić. "Effects of Comparative Feedback from a Socially Assistive Robot on Self-Efficacy in Post-Stroke Rehabilitation". *IEEE International Conference on Rehabilitation Robotics*, Singapore, 2015.

[17] **E. Short**, K. Swift-Spong, J. Greczek, A. Ramachandran, A. Litoiu, E. C. Grigore, D. Feil-Seifer, S. Shuster, J. J. Lee, S. Huang, S. Levonisova, S. Litz, J. Li, G. Ragusa, D. Spruijt-Metz, M. J. Matarić, and B. Scassellati. "How to Train Your DragonBot: Socially Assistive Robots for Teaching Children about Nutrition through Play". *IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN)*, Edinburgh, Scotland, 2014.

[18] **E. Short**, J. Hart, M. Vu, and B. Scassellati. "No fair!! An Interaction with a Cheating Robot". *ACM/IEEE Conference on Human-Robot Interaction (HRI)*, Osaka, Japan, 2010.

[19] J. Kast, J. Neuhaus, F. Nickel, H. Kenngott, M. Engel, **E. Short**, M. Reiter, H.-P. Meinzer, and L.

Maier-Hein. "Der Telemanipulator daVinci als mechanisches Trackingsystem Bestimmung von Präzision und Genauigkeit". *Bild. für die Medizin: Algorithmen-Systeme-Anwendungen*, Heidelberg, Germany, 2009.

Refereed Workshops, Poster Papers, and Abstracts

[20] T. Kessler Faulkner, **E. Short**, and A. L. Thomaz. "Towards Active Attention-Modified Policy Shaping". *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), Workshop on Human/Robot in-the-loop Machine Learning*, Madrid, Spain, 2018.

[21] R. A. Gutierrez, **E. Short**, S. Niekum, and A. L. Thomaz. "Towards Online Learning from Corrective Demonstrations". *AAAI Fall Symposium, Learning in Artificial Intelligence for Human-Robot Interaction*, Arlington, USA, 2018.

[22] R. A. Gutierrez, V. Chu, **E. Short**, S. Niekum, and A. L. Thomaz. "Understanding Task Decomposition of Keyframe Demonstrations". *ACM/IEEE Conference on Human-Robot Interaction (HRI), Workshop on Explainable Robotics Systems*, Chicago, USA, 2018.

[23] M. L. Chang, **E. Short**, and A. L. Thomaz. "Inference of Human Policies for Ad Hoc Human-Robot Teams". *ACM/IEEE Conference on Human-Robot Interaction (HRI), Workshop on Longitudinal Human-Robot Teaming*, Chicago, USA, 2018.

[24] **E. Short** and M. J. Matarić. "Towards Socially Assistive Robotics for Inter-Generational Family Groups". *ACM Conference on Computer-Supported Cooperative Work (CSCW), Workshop on Robots in Groups and Teams*, Portland, USA, 2017.

[25] **E. Short** and M. J. Matarić. "Towards Autonomous Moderation of an Assembly Game". *IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN), Workshop on Group Human-Robot Interaction*, New York, NY, 2016.

[26] **E. Short** and M. J. Matarić. "Socially Assistive Robot Moderators: Validation and Future Directions". *International Joint Conference on Artificial Intelligence (IJCAI), Doctoral Consortium*, New York, USA, 2016.

[27] **E. Short**, K. Sitting-Boyd, and M. J. Matarić. "Modeling Moderation for Multi-Party Socially Assistive Robotics". *IEEE International Symposium on Robot and Human Interactive Communication (RO-MAN), Poster Abstract*, New York, USA, 2016.

[28] **E. Short** and M. J. Matarić. "Multi-Party Socially Assistive Robotics: Defining the Moderator Role". *Robotics Science and Systems (RSS), Women in Robotics Workshop*, Rome, Italy, 2015.

[29] **E. Short** and M. J. Matarić. "Towards Robot Moderators: Understanding Goal-Directed Multi-Party Interactions". *AAAI Fall Symposium, Human-Robot Interaction*, Arlington, USA, 2015.

[30] **E. Short** and M. J. Matarić. "Understanding Interaction Dynamics in Socially Assistive Robotics with Children with ASD". *International Meeting for Autism Research (IMFAR), Poster Abstract*, Salt Lake City, USA, 2015.

[31] K. Swift-Spong, **E. Short**, and M. J. Matarić. "Effects of Comparative Feedback from a Socially Assistive Robot on Self-Efficacy in Post-Stroke Rehabilitation". *IEEE International Conference on Robotics and Automation (ICRA), Workshop on Rehabilitation Robotics and Human-Robot Interaction*, Seattle, USA, 2015.

[32] **E. Short** and M. J. Matarić. "Interaction Between Children with ASDs and a Socially Assistive Robot: A Preliminary Analysis". *IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS),*

Workshop on Assistive Robotics for Individuals with Disabilities: HRI Issues & Beyond, Chicago, USA, 2014.

[33] **E. Short**, K. Swift-Spong, J. Greczek, M. J. Matarić., G. Ragusa, and D. Spruijt-Metz. "How to Train Your DragonBot: Socially Assistive Robots for Teaching Children About Nutrition Through Play". *International Society for Behavioral Nutrition and Physical Activity (ISBNPA)*, *Short Oral Presentation*, San Diego, USA, 2014.

[34] J. Greczek, **E. Short**, C. E. Clabaugh, K. Swift-Spong, and M. J. Matarić. "Socially Assistive Robotics for Personalized Education for Children". *AAAI Fall Symposium*, *Human-Robot Interaction*, Arlington, USA, 2014.

[35] **E. Short**, D. Feil-Seifer, and M. J. Matarić. "A Comparison of Machine Learning Techniques for Modeling Human-Robot Interaction with Children with Autism". *ACM/IEEE Conference on Human-Robot Interaction (HRI)*, *Poster abstract*, Osaka, Japan, 2010.

[36] E. S. Kim, D. Leyzberg, **E. Short**, R. Paul, and B. Scassellati. "Rich Spontaneous, Social Engagement with a Dinosaur Robot". *International Meeting for Autism Research (IMFAR)*, *Poster abstract*, Chicago, USA, 2009.

TECHNICAL REPORTS

[37] **E. Short**, D. Short, Y. Fu, and M. J. Matarić. "SPRITE: Stewart Platform Robot for Interactive Tabletop Engagement". *USC Department of Computer Science Technical Report*, 2017.

INVITED TALKS

"Robust Assistive Human-Robot Interaction". Seminar talk for the *NVIDIA Robotics Research Laboratory*. Seattle, WA, September 2018.

"Robust Assistive Human-Robot Interaction". Seminar talk for the *University of Washington Department of Computer Science*. Seattle, WA, September 2018.

"Sensing for Human-Robot Interaction". Guest lecture for the *UT Austin Department of Electrical and Computer Engineering Human Activity Sensing and Recognition class*. Austin, TX, October 2018.

"Socially Assistive Robotics". Guest lecture for the *UT Austin Department of Electrical and Computer Engineering Human-Robot Interaction class*. Austin, TX, November 2017.

"Socially Assistive Robotics: Hands-Off Human-Robot Interaction for Health, Wellness, and Education". Guest lecture for the *USC Department of Gerontology Technology Design for Older Adults class*. Los Angeles, CA, April 2016.

"Socially Assistive Robotics: Hands-Off Human-Robot Interaction for Health, Wellness, and Education". Guest lecture for the *Harvey Mudd Department of Computer Science Interaction Design class*. Claremont, CA, February 2016.

"Socially Assistive Robotics: Hands-Off Human-Robot Interaction for Health, Wellness, and Education". Seminar talk for the *Rochester University Computer Science Department*. Rochester, NY, October 2015.

"Socially Assistive Robotics: Hands-Off Human-Robot Interaction for Health, Wellness, and Education". Seminar talk for the *Washington State University Gerontechnology Program*. Pullman, WA, March 2014.

"Socially Assistive Robotics". Guest lecture for the *USC Department of Computer Science Introduction to Robotics class*. Los Angeles, CA, October 2013.

Media and Outreach

UTCS Robotics Camp Presentation and Demonstration, July 2018.

BBC Newshour Interview, March 2018, available: https://www.bbc.co.uk/programmes/w172vr1nhlqf174 (36:40-42:25)

Women in Robotics Interview, Linkedin Pulse, Dec. 2016. Available: https://www.linkedin.com/pulse/women-robotics-challenges-progress-holly-b-martin

Interactive demonstration for *The USC Morton Kesten Summit; Aging in Homes and Neighborhoods Today: The State of the Art on Research, Programs, and Future Directions*, October 2016.

Psychiatric News Interview, September 2015, available: https://psychnews.psychiatryonline.org/doi/full/10.1176/appi.pn.2015.9b20

Interactive demonstration for *What's Hot in Aging Research at USC* conference, April 2016.

STAY WITH IT project interview, July 2013, available: https://staywithit.org/files/stay-it-visits-usc-robotics-lab-elaine-short.

Presentation to USC Chapter Psi Chi International Honor Society in Psychology, November 2015.

Monterey Hills Elementary Robotics Demonstration, April 2013.

Lab Tours, 2-4 per year, 2010-present.

USC Robotics Open House, Yearly, 2010-2017.

Professional Service and Memberships

Professional Society Memberships

Association for Computing Machinery (ACM)

Institute of Electrical and Electronics Engineers (IEEE)

Association for the Advancement of Artificial Intelligence (AAAI)

Reviewer for Professional Conferences and Journals

Journals

International Journal of Robotics Research (IJRR)

Autonomous Robots (AURO)

Journal of Human-Robot Interaction (JHRI)

Human-Computer Interaction (HCI)

Journal of Social Robotics (SORO)

IEEE Journal of Biomedical and Health Informatics (J-BHI)

Reviews in Biomedical Engineering (RBME)

Transactions on Affective Computing (TAFFC)

Cognitive Systems (CogSys)

Conferences

IEEE/RSJ Int. Conference on Intelligent Robots and Systems (IROS)

ACM CHI Conference on Human Factors in Computing Systems (CHI)

ACM/IEEE Conference on Human-Robot Interaction (HRI)

IEEE Int. Conference on Robotics and Automation (ICRA)

IEEE Int. Symposium on Robot and Human Interactive Communication (RO-MAN)

Int. Conference on Rehabilitation Robotics (ICORR)

AAAI Conference on Artificial Intelligence (AAAI)

Int. Conference on Autonomous Agents and Multiagent Systems (AAMAS)

Department Service and Leadership

    Introduction to Computing – Teaching Assistant – Fall 2013-Spring 2014

    USC Dept. of Computer Science PhD Student Committee – Member – Sept. 2012-Fall 2013

    PhD Women in Computer Science Coffee Group – Co-Founder – Spring 2010-Spring 2012

Mentorship

UT Austin SIM Lab PhD Students:

Jul. 2017-May 2018	Priyanka Khante
Jul. 2017-	Adam Allevato
Jul. 2017-	Taylor Kessler Faulkner
Jul. 2017-	Alex Gutierrez
Jul. 2017-	Tesca Fitzgerald
Jul. 2017-	Mai Lee Chang
Jul. 2017-	Akanksha Saran
Aug. 2018-	Shih-Yun Lo

USC Post-Graduate Students:

Spring 2011	Farva Jafri	USC MPH Student
Fall 2012	Tarun Atrey	USC Computer Science MS Student
Oct. 2012-Dec. 2013	Samuel Shuster	USC Computer Science MS Student
2014-2017	Rhianna Lee	UCLA Post-Baccalaureate Pre-Med Student

CRA-W Distributed Research Experience for Undergraduates (DREU) Program:

Summer 2012	Linde Liu
Summer 2013	Callie Clement
Summer 2015	Katherine Sitting-Boyd
Summer 2016	Priscilla Tai

USC Summer Undergraduate Research Experience (SURE) Program:

Summer 2016	Kara Douville
Summer 2016	Katya Borgos Rodriguez

USC Computer Science Capstone Project Groups:

Spring 2016	Jonathan Grant
Spring 2016	Chen Jin
Spring 2016	William McNichols
Spring 2016	Alex Wang
Fall 2016	Lea Moret
Fall 2016	Justin Laveroni
Fall 2016	Claudio Landeros
Fall 2016	Cindy Tran
Fall 2016	Harshul Mulchandani
Fall 2016	Brian Tam
Fall 2016	Chris Lee

Other Undergraduate Researchers:

Spring 2012-Fall 2013	Ani Misirian	USC Research Assistant
Fall 2011-Spring 2012	Andrea Lawler	WiSE Undergraduate Research Fellow
Fall 2013	Christine Nagy	Research Assistant
Fall 2013-Spring 2014	Andres Engels	USC Merit Research Scholar
Fall 2012-Spring 2013	Emerick Varga	USC Research Assistant
Spring 2014-Fall 2014	Renuka Fernandes	USC Research Assistant
Fall 2014-Spring 2015	Sharon Cohen	USC Research Assistant
Fall 2015-Spring 2016	Ben Lee	USC Research Assistant
Fall 2015-Spring 2016	Shayna Goldberger	USC URAP
Fall 2015-Spring 2017	Eric Deng	USC Research Assistant
Summer 2016	Yifeng Fu	USC Research Assistant
Fall 2017-Spring 2018	Carson Graf	UT Research Assistant
Fall 2017-	Zach Pope	UT Research Assistant
Fall 2017-	Srinjoy Majumdar	UT Research Assistant

Engineering Health Academy Program at Bravo Medical Magnet High School:

Fall 2011-Spring 2012	Josefina Duran
Summer 2012-Spring 2013	Rogelio Quintana

Marlborough School Honors Research in Science Program (High School):

Summer 2013	Clara Collier
Summer 2015-Spring 2016	Soojung Choi

Other High School Researchers:

Summer 2014	Walter Schaertl	Visiting Student