Samuel Spaulding

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Advisor: Cynthia Breazeal

Research Interests

I work on applications of Artificial Intelligence for Human-Robot Interaction, with particular emphases on designing algorithms for embodied agents to construct models of other agents throughout an interaction, take actions based on these models, and reason about and refine their actions and models to support engaging and educational experiences.

Education

2017–present **Ph.D. Media Arts & Sciences (currently enrolled)**, *MIT Media Lab*, Cambridge, MA, USA.
Advisor: Cynthia Breazeal

2013–2015 **S.M. Media Arts & Sciences**, *MIT Media Lab*, Cambridge, MA, USA.
Advisor: Cynthia Breazeal. Thesis: "Developing Affect-Aware Robot Tutors."

2009–2013 **B.S. Computer Science**, *Yale University*, New Haven, CT, USA.
Graduated with Distinction in the Major. Senior thesis advised by Brian Scassellati.

Research Experience

2017-present, 2013-2015 **Graduate Research Assistant, Personal Robots Group**, *MIT Media Lab*, Cambridge, MA.
Developing interactive social robots and novel computational models to enable fluent social interaction and collaboration between humans and robots, particularly through the use of multi-modal, affective user data

Summer 2012 **Research Associate, Disney Research - Boston**, *Walt Disney Imagineering*, Boston, MA.
Worked with Jonathan Yedidia on a novel sentiment analysis system for Walt Disney Imagineering. Our project, **"Making Sense of the Blogosphere: Semantic Analysis of Text Mined from the Web"** won the **Judges' Special Distinction Award for Methodology** in company-wide Business Intelligence and Data Analytics Competition

2010 - 2013 **Research Assistant, Yale Social Robotics Lab**, *Yale University*, New Haven, CT.
Worked with Dan Leyzberg and Brian Scassellati to develop and evaluate robot tutors capable of personalizing to individual learning differences.

Industry Experience

2015-2017 **Robot Skills & Character AI Engineer**, *Jibo, Inc.*, Boston, MA.
Worked with Design and Hardware teams to developed innovative applications and developer tools for a consumer home robot that delivers an intelligent, rich, and cohesive character experience.

Summer 2011 **Software Development Engineering Intern**, *Amazon, Inc.*, Seattle, WA.
Built internal bug analysis tool and received return offer. Member of four-person team whose submission, an Android app called "SmileIKnow" was a finalist at the 2011 Amazon Mobile Security Hackathon

Awards and Honors

- **(2013-present) National Science Foundation Graduate Research Fellowship**, 3 year fellowship to support graduate education in AI and Robotics
- **(2015) HRI Pioneers Travel Award**, Awarded funding support to attend the Human-Robot Interaction (HRI) Pioneers workshop, a selective workshop that seeks to foster creativity and collaboration across the disciplines of HRI researchers.
- **(2013) Mellon Undergraduate Research Grant**, Awarded funding support to attend HRI 2013 in Tokyo, Japan
- **(2012) Sigma Xi Undergraduate Research Award**, Awarded funding support and membership in Sigma Xi Scientific Society
- **(2011) First Place, Academic Competition Federation (ACF) National Championship**, As part of Yale's Quiz Bowl team, won the premier national event for collegiate academic quiz competition.
- **(2010) First Runner-up, Jeopardy! College Championship**, Won 3 of 4 games and second place overall in the Season 27 Jeopardy! College Championship.

Highly-Refereed Conference Publications

[C6] **Samuel Spaulding**, Huili Chen, Safinah Ali, Mike Kulinski, and Cynthia Breazeal. **A Social Robot System for Modeling Children's Word Pronunciation**. In *Proceedings of the 17th International Conference on Autonomous Agents and Multiagent Systems* (AAMAS 2018, **30% acceptance rate**).

[C5] **Samuel Spaulding**, Goren Gordon, and Cynthia Breazeal. **Affect-aware Student Models for Robot Tutors**. In *Proceedings of the 15th International Conference on Autonomous Agents and Multiagent Systems* (AAMAS 2016, **25% acceptance rate**).

[C4] Jacqueline Kory Westlund, Goren Gordon, **Samuel Spaulding**, Jin Joo Lee, Luke Plummer, Marayna Martinez, Madhurima Das, and Cynthia Breazeal. **Lessons From Teachers on Performing HRI Studies with Young Children in Schools**. In *Proceedings of the 11th ACM/IEEE International Conference on Human-Robot Interaction: alt.HRI* (alt.HRI 2016)

[C3] Goren Gordon, **Samuel Spaulding**, Jacqueline Kory Westlund, Jin Joo Lee, Luke Plummer, Marayna Martinez, Madhurima Das, and Cynthia Breazeal. **Affective Personalization of a Social Robot Tutor for Children's Second Language Skills**. In *Proceedings of the 30th AAAI Conference on Artificial Intelligence* (AAAI 2016, **26% acceptance rate**).

[C2] Dan Leyzberg, **Samuel Spaulding**, and Brian Scassellati. **Personalizing Robot Tutors to Individuals' Learning Differences**. In *Proceedings of the 9th ACM/IEEE International Conference on Human-Robot Interaction* (HRI 2014, **24% acceptance rate**)

[C1] Dan Leyzberg, **Samuel Spaulding**, Mariya Toneva, and Brian Scassellati. **"The Physical Presence of a Robot Tutor Increases Cognitive Learning Gains**. In *Proceedings of the 34th Annual Conference of the Cognitive Science Society* (COGSCI 2012, **40% acceptance rate**).

Lightly-Refereed Publications

[W6] Kory Westlund, J. M., Lee, J., Plummer, L., Faridi, F., Gray, J., Berlin, M., Quintus-Bosz, H., Harmann, R., Hess, M., Dyer, S., dos Santos, K., Adalgeirsson, S., Gordon, G., **Spaulding, S.**, Martinez, M., Das, M., Archie, M., Jeong, S., & Breazeal, C. **Tega: A Social Robot.** In *Proceedings of the 11th ACM/IEEE International Conference on Human-Robot Interaction: Video Presentations* (HRI 2016 Video Track) Best Video Nominee.

[W5] **Samuel Spaulding** and Cynthia Breazeal. **Towards Affect-Awareness for Social Robots**. In *AAAI 2015 Fall Symposium Series: Artificial Intelligence for Human-Robot Interaction* (AI-HRI 2015)

[W4] Jacqueline Kory Westlund*, Goren Gordon*, Samuel Spaulding, Jin Joo Lee, Luke Plummer, Marayna Martinez, Madhurima Das, and Cynthia Breazeal, **Learning a Second Language with a Socially Assistive Robot.** In *Proceedings of New Friends: The 1st International Conference on Social Robots in Therapy and Education* (New Friends 2015)

[W3] **Samuel Spaulding** and Cynthia Breazeal. **Affect and Inference in Bayesian Knowledge Tracing with a Robot Tutor**. In *Proceedings of the 10th ACM/IEEE International Conference on Human-Robot Interaction: HRI Pioneers* (HRI Pioneers 2015)

[W2] **Samuel Spaulding** and Cynthia Breazeal. **Exploring Child-Robot Tutoring Interactions with Bayesian Knowledge Tracing**. In *AAAI 2014 Fall Symposium Series: Artificial Intelligence for Human-Robot Interaction* (AI-HRI 2014)

[W1] W. Bradley Knox, **Samuel Spaulding** and Cynthia Breazeal. **learning Social Interaction from the Wizard: A Proposal**. In *Proceedings of the 3rd Workshop on Machine Learning for Interactive Systems* held at AAAI 2014

Conference Presentations

AAMAS 2016 Presented publication [C4] **"Affect-aware Student Models for Robot Tutors"** in Singapore

HRI 2014 Presented publication [C2] **"Personalizing Robot Tutors to Individuals' Learning Differences"** in Bielefeld, Germany

Invited Talks

2018 Invited Speaker **Learning Affective and Cognitive Models for Robot Tutoring**, IBM T.J. Watson Research Center

2017 Guest Lecturer **MAS.111 - Media Arts & Sciences Freshman Symposium**

2016 Invited Speaker **Affect-aware Social Robot Tutors**, Affectiva Inc.

2015 Invited Speaker **Personal Robots Research Overview**, MIT Media Lab Spring Member Event.

2014 Invited Speaker **"Fascinating Alumni: Short Talks"**. Jonathan Edwards College Reunion

2013 Invited Speaker **Yale Undergraduate Science Symposium**

2013 Invited Speaker **Yale Engineering and Science Weekend Symposium**

2013 TEDx Speaker **"TEDxYale: Solve for Y"** Conference

2012 Invited Speaker **Yale Undergraduate Science Symposium**

2012 Invited Speaker **Yale Engineering and Science Weekend Symposium**

2010 Invited Panelist, Yale Computer Science Department **IBM Jeopardy! Challenge Discussion**

Teaching

Fall 2012 **Course Assistant, CS 201: Introduction to Computer Science**, *Yale University*.
Assisted students with core course concepts. Covered basic topics like recursion through more concepts including formal language theory, logic, and computability theory

Mentoring + Outreach

Students Supervised

- Katherine Xiao (MIT UROP, Spring 2016)
- Wei Low (MIT UROP, Fall 2015, Spring 2016)
  Recognized with NCWIT Collegiate Award Runner-up for supervised project
- Christina Wettersten (MIT UROP, Spring 2014)

Public Outreach

Featured Researcher **2016** *I Am A Scientist: Youth-focused STEM Diversity Campaign*, The People's Science. Volunteered for public interview and meet-and-greet event to promote STEM diversity and awareness among 9-13 year-old students.

MIT Booth Coordinator **2014** *World Science Festival: Robotics Showcase*, World Science Festival. Coordinated, developed, and demonstrated innovative robotics projects from the Personal Robots Group.

Professional Service and Leadership

Reviewer
- AAAI 2014.
- HRI 2015, 2016, 2017, 2018.

Comittee Member **2016-present** *Affectiva, Inc. Emotion AI Think Tank Council*. Invited to serve on industry-academic bridge committee focused on future directions and applications of Emotion AI research.

Panel Chair **2016** *HRI Pioneers Workshop*. Responsible for organizing the Pioneers workshop panel, determining topics, soliciting panel members, and hosting/moderating.

Workshop Organizer **2014** *Student Technical Workshop*, NSF Expedition on Socially Assistive Robotics. With students at partner institutions, drafted budget, solicited and curated submissions, and coordinated program.

Technical Skills and Training

Software Extensive experience with Java/C/C++, Python, MATLAB and R. Strong Web Development and Design skills including HTML/CSS/Javascript, Ruby on Rails, and Node.js. Significant Android mobile development experience.

Hardware Significant fabrication training and experience with: Laser Cutter, Vinyl Cutter, CNC Mill, Molding/Casting, Composite Materials, and 3D Printing. Significant electronics experience, including PCB design and fabrication, and circuit design for radio, motor, and sensing applications for mobile robots.

Robots Extensive experience developing and maintaining hardware and software for multiple commercial and in-house robotic platforms, including extensive development experience with ROS and OpenCV.

- Commercial Robot Platforms: iRobot Create, Aldebaran Nao, Beatbots Keepon, and Jibo
- In-house robots: 57 DOF Mobile-Dexterous-Social (MDS) Humanoid, 6 DOF Dragonbot platform, 5 DOF Tega Platform, and 5 DOF Affective Intelligent Driving Agent (AIDA)