

# Jin Joo Lee

Social Robot Interaction Engineer, Artificial Intelligence

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U.S. Citizen

## Career Objective

Full-time position designing & developing social interactions between users and an intelligent agent.

## Education

**Massachusetts Institute of Technology**, Cambridge, MA, USA, 5.0/5.0.

Ph.D. in Media Arts & Sciences (MIT Media Lab), 2017

**Massachusetts Institute of Technology**, Cambridge, MA, USA, 4.8/5.0.

M.S. in Media Arts & Sciences (MIT Media Lab), 2011

**Georgia Institute of Technology**, Atlanta, GA, USA, 3.8/4.0.

B.S. / M.S. in Electrical Engineering, 2009

## Skills

<b>Programming &amp; OS:</b>	Java, Typescript, Javascript, Python, Matlab   Mac, Linux
<b>Process &amp; Tools:</b>	Git, Github, SVN, Jira
<b>Machine Learning:</b>	Graphical Models, Reinforcement Learning, Supervised Learning
<b>Design &amp; Fabrication:</b>	Solidworks, Maya, EagleCAD, Arduino   Lasercutting, PCB fab. & assembly, CNC milling, Basic manufacturing operations & supply chain networks
<b>Robotic Platforms:</b>	Desktop social robots with 3-5 DOFs (Jibo, Tega, DragonBot) Humanoid robots with 56+ DOFs (Nexi, Maddox, Simon)
<b>Software Packages:</b>	ROS, Android SDK, BayesNet Toolbox, LIBSVM, APPL POMDP Toolkit, OpenCV, ARToolKit, OpenNI for Kinect, Affectiva's Affdex, openSMILE, faceAPI, CMUSphinx Speech Recognition, Cereproc TTS, Annosoft Lipsync SDK

## Experience

**Software Development Engineer**, Amazon, Cambridge, MA 2018 - Present.

► Developing intelligent interactive experiences on Android-based Alexa devices: Echo Show and Echo Spot.

**Character AI Engineer**, Jibo, Boston, MA 2017 - 2018.

- Designed a new UX paradigm to increase user engagement through expected agency of robotic characters.
- Developed a sensor fusion model to detect social opportunities for a robot to initiate interactions with users.
- Developed a data record & playback system to simulate a virtual home environment to test & improve model accuracy.
- Solution successfully re-engages users at a rate of 55% compared to push notification reaction rates at 9%.

**Keywords:** Proactive Personal Assistant, Human-Robot Interaction Design, Human Activity Tracking

**Research Assistant**, MIT Media Lab, Cambridge, MA 2009 - 2017.

Advisor: Dr. Cynthia Breazeal in the Personal Robots Group

- Research focus in socially intelligent robots that learn from real-world human interaction data.
- Collected database of natural human emotional expression through face, voice, body language, and gaze patterns.
- Developed novel machine learning technique that learns how a social robot can recognize users' emotional states and also communicate its own internal state back.
- Applied to a personal robot companion that engages children in storytelling through active listening.

**Keywords:** Social Intelligence, Emotion AI, Data-Driven Behaviors, (PO)MDP

**Tech Lead Robotician**, MIT Media Lab, Cambridge, MA 2013 - 2015.

- Technical lead on the design and development of an android-based robot platform Tega.
- Coordinated a team of designers, animators, and engineers to develop five robot prototypes.
- Developed electrical system for power & communication to motor controllers, battery, sensors, and smart phone.
- Architected and implemented an autonomous perception-to-action pipeline using ROS (robot operating system).

**Keywords:** Rapid Robot Prototyping, Lifelike Expressions, Full Stack Robotician, ROS

**Head Teaching Assistant, MIT Media Lab, Cambridge, MA** 2014.  
 ▶ Head TA to “Build Your Own Robot Workshop” on assembling the EE/ME systems of a 5-DOF robot.  
 ▶ Deployed as robot platforms to research labs at MIT, Yale, Stanford, and USC.  
 ▶ Created instructional and troubleshooting documentation and online forums for continuous developer support.

**Keywords:** Robots as a Platform, Documentation and Support

**Research Assistant, Georgia Tech, Atlanta, GA** 2009.  
 Advisor: Dr. Andrea Thomaz in the Socially Intelligent Machines Lab

- ▶ Research focus in enabling everyday people to teach a humanoid robot new skills without programming.
- ▶ Developed a learning from demonstration (LfD) algorithm that incorporates interactive dialog with users.
- ▶ Learns the generalized task representation by observing human demonstrators build a toy structure.

**Keywords:** Learning from Demonstration (LfD), Interactive Dialog, Task Representation

**Research Assistant, Georgia Tech, Atlanta, GA** 2008.  
 Advisor: Dr. Ayanna Howard in the Human-Automation Systems Lab

- ▶ Research focus in engaging K-12 students, especially underrepresented minorities, to learn how to code.
- ▶ Developed a robot adventure game that embeds high-level programming concepts as part of the gameplay.

**Keywords:** STEM Education, Teach Kids to Code

## Select Publications and Media

### Thesis Publications.

- 2017 **JJ Lee**. [A Bayesian Theory of Mind Approach to Nonverbal Communication for Human-Robot Interactions](#). *Doctoral Thesis*.
- 2011 **JJ Lee**. [Modeling the Dynamics of Nonverbal Behavior on Interpersonal Trust for Human-Robot Interactions](#). *Masters Thesis*.

### Journal Publications.

- 2017 **JJ Lee**, C Breazeal, D DeSteno. [Role of Speaker Cues in Attention Inference](#). *Frontiers in Robotics and AI*.
- 2013 **JJ Lee**, WB Knox, JB Wormwood, C Breazeal, D DeSteno. [Computationally Modeling Interpersonal Trust](#). *Frontiers in Psychology*.
- 2012 D DeSteno, C Breazeal, R Frank, D Pizarro, J Baumann, L Dickens, **JJ Lee**. [Detecting the Trustworthiness of Novel Partners in Economic Exchange](#). *Psychological Science*.

### Conference Publications.

- 2019 **JJ Lee**, F Sha, and C Breazeal. [A Bayesian Theory of Mind Approach to Nonverbal Communication](#). In *Proceedings of the International Conference on Human-Robot Interaction (HRI)*.
- 2018 N Singh, **JJ Lee**, et. al. [P2PSTORY: Dataset of Children Storytelling and Listening in Peer-to-Peer Interactions](#). In *Proceedings of the Conference on Human Factors in Computing Systems (CHI)*.
- 2017 HW Park, M Gelsomini, **JJ Lee**, and C Breazeal. [Telling Stories to Robots: The Effect of Backchanneling On A Child’s Storytelling](#). In *Proceedings of the International Conference on Human-Robot Interaction (HRI)*.
- 2014 **JJ Lee** and C Breazeal. [Interactively Learning Nonverbal Behavior for Inference and Production: A Machine Learning Approach](#). In *Proceedings of the International Conference on Human-Robot Interaction (HRI) Workshop on Algorithmic HRI*.
- 2013 MF Jung, **JJ Lee**, N DePalma, S Adalgeirsson, et al. [Engaging Robots: Easing Complex Human-Robot Teamwork using Backchanneling](#). In *Proceedings of the Conference on Computer Supported Cooperative Work and Social (CSCW)*.
- 2013 **JJ Lee**, WB Knox, and C Breazeal. [Modeling the Dynamics of Nonverbal Behavior on Interpersonal Trust for Human-Robot Interactions](#). In *Proceedings of the Association for the Advancement of Artificial Intelligence (AAAI) Spring Symposium on Trust and Autonomous Systems*.

### Media.

MIT Spectrum	“The New Robot in School: Tega, the fuzzy friend who tells stories to kids”	Nov 2017
IEEE Spectrum	“Kids Love MIT’s Latest Squishable Social Robot (Mostly)”	Mar 2016
NY Times Blog	“Who’s Trustworthy? A Robot Can Help Teach Us”	Sept 2012
Boston Globe	“Robots may Furnish Lesson in Human Trust”	July 2010

## Speaking Events

OpenAI Robotics Symposium	April 2019
Affectiva's Emotion AI Summit	Sept 2018
21st Century Fox's Global Data Summit	June 2018
The Robot Report and WTWH Media's Robotics Summit & Showcase	May 2018
Vecna Technologies' Learning Lunch Series	July 2013

## Awards and Achievements

Alexa Devices Hackathon Winner	2019
Jibo named #1 in Time Magazine's "25 Best Inventions"	2017
Dolores Zohrab Liebmann Fellowship	2016, 2015
William Asbjornsen Albert Memorial Fellowship	2015
Microsoft Research Graduate Women's Scholarship	2008
Women in Engineering Scholarship Award	2008, 2007, 2006
Society of Women Engineers (SWE) Scholarship	2008, 2007
Outstanding Graduate Teaching Assistant Award	2008
M&M Mentoring Program's Mentor of the Year Award	2007

## Certificates

Mediation Skills and Negotiation Training	MIT	2017
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