Isabella Pu

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RESEARCH OVERVIEW

My research explores how **social robots and AI systems** can support **K–12 learning** through **playful, creative, and interactive experiences that blend AI with the arts**—including visual art, storytelling, music, and games. I design, build, and evaluate these systems to empower the next generation to tackle issues they care about using AI and robots, while ensuring that these technologies are also **accessible** and **understandable** to *all* learners. My work lies at the intersection of human-computer interaction (HCI), human-robot interaction (HRI), artificial intelligence (AI), and learning sciences.

EDUCATION

2025– **Ph.D.** in **Media Arts & Sciences**, Massachusetts Institute of Technology
Advised by Cynthia Breazeal

2023–25 **M.S.** in **Media Arts & Sciences**, Massachusetts Institute of Technology
Advised by Cynthia Breazeal
Thesis: *Interactive Storybooks for Early AI Literacy*
Committee Members: Cynthia Breazeal, Scot Osterweil, Joe Blatt

2019–23 **B.S.E** in **Computer Science**, Princeton University, *magna cum laude*
Certificate in **Robots & Intelligent Systems**
Advised by Naomi Leonard, Jeffrey Snyder, and Radhika Nagpal
Thesis: *A Robotic Generative Percussion Quartet*

PUBLICATIONS

Conference Proceedings

2025 "How can we learn and use AI at the same time?": Participatory Design of GenAI with High School Students
Isabella Pu, Prerna Ravi, Linh Dieu Dinh, Chelsea Joe, Caitlin Ogoe, Zixuan Li, Cynthia Breazeal, Anastasia K. Ostrowski.
ACM IDC 2025

2025 The *Beatbots*: A Musician-Informed Multi-Robot Percussion Quartet
Isabella Pu, Jeff Snyder, Naomi Ehrich Leonard.
ACM/IEEE HRI 2025

2024 A HeARTfelt Robot: Social Robot-Driven Deep Emotional Art Reflection with Children
Isabella Pu, Golda Nguyen, Lama Alsultan, Rosalind Picard, Cynthia Breazeal, Sharifa Alghowinem.
IEEE RO-MAN 2024
Winner of *RSJ Pioneering Research Award in Robot and Human Interactive Communication*

FELLOWSHIPS

2025 MIT Presidential Graduate Fellowship

AWARDS AND HONORS

2025 IEEE Robots & Automation Society Travel Grant, ACM/IEEE HRI 2025

2024 RSJ Pioneering Research Award in Robot and Human Interactive Communication, IEEE RO-MAN 2024

2023 Outstanding Undergraduate Thesis in Computer Science, Princeton University

2023 Sigma Xi Membership, Princeton University

2022 Center on Science and Technology Research Grant, Princeton University

INVITED TALKS

2025 **AI and Robots for Fun and Engaging K-12 Education**
Invited talk at Robert A. Van Wyck M.S. 217Q (NYC Public Schools)

2025 **Intro to Child-AI and Child-Robot Research**
Invited talk at Expedition AI: Demystify Artificial Intelligence (American Museum of Natural History)

2025 **Child-Centered AI and Robots for Effective + Engaging Education**
Guest lecture for *Designing and Producing Media for Learning*, Joe Blatt (Harvard Graduate School of Education)

2025 **Robots, AI, and the Future of Education**
Guest lecture for *How the Future of Work is Shaping the Future of Education*, Prof. Peter Quartermaine Blair (Harvard Graduate School of Education)

2023 **Multi-Robot Generative Percussion Music**
Guest lecture for *COS IW Seminar — Swarm Intelligence: Ants, Bees, Fish, and Humans*, Prof. Radhika Nagpal (Princeton University)

ART

2022 Featured animations on Generative Adversarial Networks (GANs) in *The Imitation Game: Visual Culture in the Age of Artificial Intelligence*, Vancouver Art Gallery

RESEARCH EXPERIENCE

2024– **Emotional Storytelling with Social Robots for Social-Emotional Learning**

Advisors: Cynthia Breazeal, Sharifa Alghowinem

Developing a new social robot-driven platform for children age 5-8 that facilitates an emotional storytelling activity guided by a social robot and using physical props. We aim to explore the effects of emotional storytelling and embodiment (in the robot guide and props used) for social-emotional practice.

2023– **Interactive Storybooks for Early AI Literacy**

Advisor: Cynthia Breazeal

Leading engineers, designers, and education specialists to build a series of interactive storybooks that teach children in grades K-3 about artificial intelligence and robotics, particularly in creative AI contexts. They combine storytelling, games, and AI character interactions to teach concepts like machine learning models, affective computing, generative AI, and AI ethics in an engaging way. A pilot study with 42 K-2 participants found students are particularly engaged by the game aspects, the storybooks successfully help students grasp basic AI concepts, and students are emotionally affected by the story and characters. A follow-up home deployment study with 57 participants aged 6-9 was run as part of my Master's thesis (completed May 2025) to investigate the specific effects of the inclusion of narrative versus games.

In submission.

2023– ***Doodlebot:*** **Educational Robotics Curricula for Creative AI Education**

Advisor: Cynthia Breazeal

Working with designers and engineers on the development of Doodlebot, an affordable social robot for the classroom. Doodlebot can be easily programmed using drag-and-drop coding blocks to move around, draw, interact socially, and utilize AI models for applications like line following and computer vision. Pilot testing began in Spring 2025, including a novel curriculum utilizing Doodlebot to teach middle schoolers about basic programming skills and AI concepts such as model training and bias. Doodlebot has also been tested with K–2 students in a summer camp setting to examine children's perceptions of robots with respect to power, physical expression, and social opposition.

In submission.

2023–24 ***A HeARTfelt Robot:*** **Social Robot-Driven Deep Emotional Art Reflection with Children**

Advisors: Rosalind Picard, Cynthia Breazeal, Sharifa Alghowinem

Designed and developed a child-robot interaction with Jibo where children age 7-11 discuss art with the robot to practice social-emotional skills like emotion recognition and empathy. Children were highly engaged in robot-driven social-emotional learning, even when sharing vulnerably or feeling discomfort, and the robot's AI-generated responses helped alleviate their discomfort when sharing vulnerably.

Published at RO-MAN 2024 and winner of RSJ Pioneering Research Award.

2023–24 **Empowering High School Students in GenAI for Education: A Participatory Design Approach Informed by Teacher Insights**

Advisors: Cynthia Breazeal, Anastasia K. Ostrowski

Through the SERC (Social and Ethical Responsibilities of Computing) program at MIT, led a Design Justice sub-group focused on participatory design of generative AI in education addressing the lack of high school student involvement in participatory design of GenAI technology. Conducted teacher interviews to inform a design workshop with 17 high schoolers, yielding novel perspectives on teacher and student values surrounding GenAI in education, along with student-created GenAI tools and school policy proposals. These findings informed a set of actionable guidelines for AI EdTech developers.

Published at IDC 2025.

2023–24 **Drawing the Line: Where AI Guidance and Human Creativity Meet in Emotion-Driven Comic Storyboarding**

Advisors: Cynthia Breazeal, Sharifa Alghowinem, Hae Won Park

Designed and built a human-AI co-creative tool for empowering nonexpert artists to create emotional comic storyboards using generative AI. We intentionally limited visual realism, generating sketch-like, low-detail outputs to guide users while preserving their creative agency. Participants perceived emotional expression, aesthetic quality, freedom of exploration, and self-confidence to be improved when using our tool versus drawing freehand.

In submission.

2023–24 **Collaborative Storybook Creation with AI for Elementary School**

Advisors: Safinah Ali, Cynthia Breazeal

Designed and built a collaborative child-robot storybook creating experience using generative AI. The experience is scaffolded to help children improve divergent thinking and encourage complex stories. Used Unity to develop a tablet app from scratch for children to easily participate in the co-creation experience.

2023–24 **Climate Data Exploration & Visualization Curriculum for High School**

Advisors: Matt Taylor, Cynthia Breazeal

Developed high school curriculum and educator guide to teach how Python can be used to explore and visualize climate data. This also includes a guide to using linear regressions and SVMs as predictive climate models as well as modules on how to communicate data stories using data theatre. Curriculum was published online for free during Day of AI 2024 to students in 114 countries and all 50 U.S. states.

2022–23 **Generating Percussion Music with a Multi-Agent Robotic System**

Advisors: Naomi Leonard, Jeffrey Snyder, Radhika Nagpal

Designed and developed a robotic percussion quartet using Sphero BOLT robots in a musician-informed design process. Robots performed by rolling through an arena and colliding with drums and tambourines to play coordinated generative percussion music. Audience members interacted with robots by picking them up, adding obstacles, and playing a MIDI keyboard to change robots' colors and movements.

This work was sponsored by the Princeton School of Engineering and Applied Science and the Princeton Council on Science and Technology. Published at HRI 2025.

2021–22 **Educational GANs Animation for Vancouver Art Gallery**

Advisor: Adam Finkelstein

Designed and coded two five-minute animations targeting non-technical audiences, teaching viewers about training GANs and demonstrating it in an easily understandable manner. Trained and optimized GANs to generate handwritten digits and photographs of cat faces to create assets for the animations. Animations displayed in *The Imitation Game* exhibit at the Vancouver Art Gallery from 03/05/2022 - 10/23/2022.

PROFESSIONAL EXPERIENCE

2021–23 **Software Engineering Summer Intern**, Blizzard Entertainment (Player Interactions & Trust). Irvine, CA.

Projects included developing neural networks to predict player churn based on disruptive behavior and building data pipelines for an industry-first positive player behavior analysis platform—implemented in multiplayer online games with millions of players (Overwatch, World of Warcraft)

2020–23 **Undergraduate Course Assistant/Grader**, Princeton University. Princeton, NJ.

Fall 2020: *Introduction to Programming Systems*

Spring 2021: *Introduction to Machine Learning*

Fall 2021: *Computer Vision*

Spring 2022 and 2023: *Economics and Computation*

2016–19 **Kid Code Teacher**, The Westminster Schools. Atlanta, GA.

Taught Scratch and basic Python coding to 2nd through 5th graders at after-school program.

SERVICE

Service to the University

2024– MIT Graduate Residence Advisor, Fairborz Maseeh Hall

Reviewer

2025 ACM Conference on Human Factors in Computing Systems (CHI)

2025 ACM Conference on Designing Interactive Systems (DIS)

Mentorship

2024– Linh Dieu Dinh, *Wellesley College*

2023– Jimmy Kuhlman, *MIT*

2025 Megan Yi, *Wellesley College*

2024-25 Si Liang Lei, *MIT*

2024-25 Adwa Alghihab, *Prince Sultan University*

2024-25 Sara Al Mogren, *Prince Sultan University*

2024 Hyun Kim, *MIT*

2024 Joanne Hong, *MIT*

2024 Alessandro Briseño-Tapia, *MIT*

2023 Laura Morris, *MIT*

Leadership

2020–23 *President*, Princeton Women in Computer Science. Princeton, NJ.

2020–22 *FIRST Robotics Competition Mentor*, Robbinsville High School. Robbinsville, NJ.

Updated July 2025