

# Andreea Bobu

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## Research Interests

I develop autonomous agents that learn to do tasks for, with, and around humans. My goal is to ensure that these agents align with people, whether expert designers or novice end users. My work looks at: 1) getting the right data to supervise the training of the robot, whether directly from people or via priors; 2) enabling agents and humans to efficiently and interactively arrive at shared task representations for reliable interaction; 3) quantifying and addressing misalignment caused by different human modeling choices. I ground my work in experiments and user studies with AI systems like assistive robot arms or LLM agents, and draw upon methods from deep learning, mathematical human modeling, inverse reinforcement learning, and Bayesian inference.

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## Professional Positions

- 2024–present **Boeing Assistant Professor**  
*Massachusetts Institute of Technology, Department of Aeronautics and Astronautics*
- 2023–2024 **Research Scientist**  
*The AI Institute*
- Summer 2021 **Research Intern**  
*NVIDIA Research, Robotics Group*

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## Education

- 2017–2023 **University of California, Berkeley**  
Ph.D. in Electrical Engineering and Computer Sciences  
Advisor: Anca Dragan  
Thesis: [Aligning Robot Representations with Humans](#)
- 2013–2017 **Massachusetts Institute of Technology**  
B.S. in Computer Science and Engineering, Minor in Mathematics  
Advisors: Adrian Dalca, Polina Golland, Stefanie Jegelka

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## Awards and Honors

- 2025 **MIT Social and Ethical Responsibilities of Computing (SERC) Award**  
For the proposal “Show, Tell, and Adapt: Aligning Robot Behavior via Multimodal Communication”.
- 2025 **MIT Generative AI Impact Consortium (MGAIC) Award**  
For the proposal “Efficient Robot Learning via Multimodal Feedback and VLM-Guided Augmentation”.
- 2025 **MIT Energy Initiative (MITEI) Award**  
For the proposal “Robot Learning From Human Operators for Efficient Renewable Energy Infrastructure Maintenance”.
- 2023 **Emerging Research Award at I. Conference on Mathematics of Neuroscience & AI**  
For the talk on “Aligning Robot and Human Representations”.
- 2022 **Rising Stars Academic Career Workshop in EECS**  
Chosen to participate in an intensive workshop for graduate students and postdocs who are interested in pursuing academic careers in EE, CS, and AI and decision-making.
- 2022 **Robotics: Science and Systems (RSS) Pioneers**  
Selected for workshop bringing together top early career researchers in robotics.
- 2021 **Apple PhD Scholars in Artificial Intelligence and Machine Learning Fellowship**  
Two-year fellowship with an annual stipend of \$45,000 for graduate students in AI/ML.
- 2021 **Best Paper Award Finalist at ACM/IEEE HRI**

For the paper “Feature Expansive Reward Learning: Rethinking Human Input”.

2021 **Best Paper Award Honorable Mention at IEEE T-RO**

For the paper “Quantifying Hypothesis Space Misspecification in Learning From Human-Robot Demonstrations and Physical Corrections”.

2020 **Best Paper Award Winner at ACM/IEEE HRI**

For the paper “LESS is More: Rethinking Probabilistic Models of Human Behavior”.

2020 **Human-Robot Interaction (HRI) Pioneers**

Chosen to participate in a highly selective workshop seeking to foster creativity, communication, and collaboration across Human-Robot Interaction.

2019 **Cadence Women in Technology Scholarship**

A \$5,000 scholarship for women in EECS demonstrating leadership and a strong academic record.

2016 **Best Paper Award Winner at MICCAI Patch-MI**

For the paper “Patch-Based Discrete Registration of Clinical Brain Images”.

2016 **Google Anita Borg Memorial Scholarship**

A \$10,000 scholarship for women in EECS demonstrating leadership and a strong academic record.

2015–present **Member of Tau Beta Pi (TBP) National Honor Society for Engineering**

Honors society for engineering students with the strongest academic records at their university.

2015–present **Member of Eta Kappa Nu (HKN) National Honor Society for EECS**

Honors society for EECS students with the strongest academic records at their university.

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## Teaching

Spring 2025	<b>16.S948: Algorithmic Human-Robot Interaction</b>	MIT
	Instructor	
Fall 2024–2025	<b>16.410/16.413: Principles of Autonomy and Decision Making</b>	MIT
	Instructor	
Spring 2021	<b>CS 287H: Algorithmic Human-Robot Interaction</b>	UC Berkeley
	Graduate Student Instructor	
Fall 2019	<b>CS 188: Introduction to Artificial Intelligence</b>	UC Berkeley
	Graduate Student Instructor	
January 2016	<b>6.178: Introduction to Software Engineering in Java</b>	MIT
	Instructor and Lecturer	
2015–2017	<b>6.046: Design and Analysis of Algorithms</b>	MIT
	Tutor	
Spring 2014	<b>6.01: Introduction to Electrical Engineering and Computer Science</b>	MIT
	Student Lab Assistant	

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## Advising & Mentoring

### Current Ph.D. Students

Minyoung Hwang, Michal Lewkowicz, Yiran Tao

### Current M.S. Students

Audrey Lee, Helena Merker, Jordan Abi Nader

### Current Undergraduate Students

George Cao, David Lee, Megan Tian, Min Khant Zaw

### Past M.S. Students

Yi Liu (→ ML Research Engineer at Scale AI), Arjun Sripathy (→ Senior ML Scientist at Tesla Autopilot)

### Past Undergraduate Students

Ananya Kulshrestha (→ Rox), Regina Wang (→ M.S. at Stanford), David Zhang (→ Codepoint Fellow), Matthew Zurek (→ Ph.D. at UW-Madison), Sampada Deglurkar (→ Ph.D. at UC Berkeley)

## Ph.D. Committees

Sean Ye (Georgia Tech), Simon Holk (KTH Royal Institute of Technology), Erdi Sayar (Technische Universität München), Alex Forsey-Smerek (MIT), Alex Cuellar (MIT).

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## Outreach

Summer 2025	<b>Discover Aerospace</b> <b>Co-Organizer</b> I co-organized MIT's Discover Aerospace Freshman Pre-Orientation Program (FPOP), guiding students through a glider design challenge and exploring aerospace in practice and in industry company visits.	MIT
Summer 2024	<b>RoboLaunch</b> <b>Speaker</b> I gave a talk at the CMU RI RoboLaunch Speaker Series, an outreach program for promoting robotics & AI research and education.	CMU
Summer 2019	<b>Girls in Engineering Camp</b> <b>Lecturer and Mentor</b> I co-organized a Self-Driving Cars workshop, teaching the girls about sensing, planning, and control in autonomous driving, and experimenting with an Evo robot.	UC Berkeley
August 2018	<b>AI4ALL</b> <b>Teaching Assistant</b> I mentored a team of underrepresented high school students as they learned to train a deep reinforcement learning agent in MuJoCo.	UC Berkeley
2018–2022	<b>Berkeley Artificial Intelligence Research</b> <b>Mentor</b> I mentored underrepresented undergraduate students in research and career planning.	UC Berkeley
2018–2019	<b>Women in Computer Science and Engineering</b> <b>Mentor</b> I mentored early-stage female PhD students in career planning and navigating life at UC Berkeley.	UC Berkeley
2016	<b>Women in Science and Engineering</b> <b>Mentor</b> I mentored high school girls from the Greater Boston area during monthly sessions designed to introduce them to engineering at MIT.	MIT
2013–2015	<b>Educational Studies Program</b> <b>Lecturer</b> I taught courses on “Water Security in Asia”, “Introduction to Probability”, and “Group Theory” to middle school students in the New England region.	MIT

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## Professional Activities

### Conference Area Chair

2024–2025	CoRL: Conference on Robot Learning
2024–2025	ICLR: International Conference on Learning Representations

### Workshops & Seminars Co-organized

2025	Workshop on Generative Modeling Meets Human-Robot Interaction	RSS
2025	Workshop on Human-Centered Robot Learning in the Era of Big Data & Large Models	ICRA
2025	7th Workshop on Long-term Human Motion Prediction	ICRA
2024	Workshop on Task Specification for General-Purpose Intelligent Robots	R:SS
2024	Workshop on Mechanisms for Mapping Human Input to Robots	R:SS
2024	6th Workshop on Long-term Human Motion Prediction	ICRA
2024	6th Workshop on Lifelong Learning and Personalization in Long-Term HRI	HRI
2023	Workshop on Interactive Learning with Implicit Human Feedback	ICML
2022	Workshop on Aligning Robot Representations with Humans	CoRL
2022–2023	Dream/CPAR Seminar	UC Berkeley

2022	2nd <a href="#">Workshop on Social Intelligence in Humans and Robots</a>	<i>R:SS</i>
2021	1st <a href="#">Workshop on Social Intelligence in Humans and Robots</a>	<i>ICRA</i>
2020	<a href="#">Workshop on Advances and Challenges in Imitation Learning for Robotics</a>	<i>R:SS</i>
2020–2021	<a href="#">SemiAutonomous Vehicles Seminar</a>	<i>UC Berkeley</i>

### **External Reviewer for Workshops, Conferences, Journals, and Grant Panels**

*Robotics:* CoRL, ICRA, R:SS, HRI, IROS, L4DC, RA-L, T-RO, T-MECH, T-HRI

*Machine Learning:* NeurIPS, ICML, ICLR, AAAI, Nature: Machine Intelligence

*Grant Panels:* NSF CISE and FRR

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## **Selected Invited Talks**

### **Reading Between the Lines: Using LMs to Amplify Human Data in Robot Learning**

2025	<a href="#">Workshop on Human-in-the-Loop Robot Learning</a>	<i>RSS</i>
2025	Air Force Test Pilot Training Program	<i>MIT</i>

### **Four Pillars of Human-Aligned Robot Representations**

2025	<a href="#">Workshop on Learned Robot Representations (RoboReps)</a>	<i>RSS</i>
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### **How Structure Enables Efficient and Human-Aligned Robot Learning**

2024	<a href="#">Workshop on Behavioral Machine Learning</a>	<i>NeurIPS</i>
2024	<a href="#">Global Summit on Open Problems for AI</a> Keynote	<i>AE</i>

### **Why Robots Aren't Superhuman in Our Human World**

2024	<a href="#">TEDx</a>	<i>MIT</i>
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### **Aligning Robot and Human Representations**

2024	<a href="#">Autonomy Talks</a>	<i>ETH</i>
2024	<a href="#">6.161: Robotics Science &amp; Systems</a>	<i>MIT</i>
2024	<a href="#">16-886: Models &amp; Algorithms for Interactive Robotics</a>	<i>CMU</i>
2023	<a href="#">International Symposium on the Mathematics of Neuroscience</a>	<i>ISMOn</i>
2023	<a href="#">Center for Human-Compatible AI Workshop</a>	<i>CHAI</i>
2023	<a href="#">Stanford Robotics Seminar</a>	<i>Stanford</i>
2023	Department Seminar	<i>MIT, Princeton, Georgia Tech, Cornell, Brown, NYU, UIUC, UCSD</i>
2022	<a href="#">UW Robotics Colloquium</a>	<i>UW</i>
2022	<a href="#">New Trends in Aerospace Seminar Series</a>	<i>MIT</i>
2022	<a href="#">CS 6960: Human-AI Alignment</a>	<i>U of Utah</i>

### **Inducing Structure in Robot Learning via Human-Guided Representations**

2022	<a href="#">SemiAutonomous Vehicles Seminar</a>	<i>UC Berkeley</i>
2021	<a href="#">Workshop on Aware Learning: How to Benefit from Priors</a>	<i>CDC</i>
2021	<a href="#">Workshop on Human-AI Collaboration in Sequential Decision-Making</a>	<i>ICML</i>
2021	<a href="#">Human And Robot Partners (HARP) Lab Reading Group</a>	<i>CMU</i>
2021	<a href="#">CS287H: Algorithmic Foundations of Human-Robot Interaction</a>	<i>UC Berkeley</i>

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## **Journal Articles**

- [J3] **Learning Perceptual Concepts by Bootstrapping from Human Queries**  
**A. Bobu**, C. Paxton, W. Yang, B. Sundaralingam, Y.W. Chao, M. Cakmak, D. Fox.  
*IEEE Robotics and Automation Letters (RA-L)*, 2022.
- [J2] **Inducing Structure in Reward Learning via Feature Learning**  
**A. Bobu**, M. Wiggert, C. Tomlin, A. D. Dragan.  
*The International Journal of Robotics Research (IJRR)*, 2022.

- [J1] **Quantifying Hypothesis Space Misspecification in Learning from Human-Robot Demonstrations and Physical Corrections**  
A. Bobu, A. Bajcsy, J. F. Fisac, S. Deglurkar, A. D. Dragan.  
*IEEE Transactions on Robotics (T-RO)*, 2019.  
**Best paper award honorable mention.**

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## Conference Publications

- [16] **QuickLAP: Quick Language-Action Preference Learning for Autonomous Driving**  
J. Abi Nader, D. Lee, A. Bobu  
(in submission) *Conference on Neural Information Processing Systems (NeurIPS)*, 2025.
- [15] **Context Matters: Learning Generalizable Rewards via Calibrated Features**  
A. Forsey-Smerek, J. Shah, A. Bobu  
(in submission) *Conference on Neural Information Processing Systems (NeurIPS)*, 2025.
- [14] **Goal Inference from Open-Ended Dialog**  
R. Ma, J. Qu, A. Bobu, D. Hadfield-Menell  
(in submission) *Conference on Neural Information Processing Systems (NeurIPS)*, 2025.
- [13] **Learning How Hard to Think: Input-Adaptive Allocation of LM Computation**  
M. Damani, I. Shenfeld, A. Peng, A. Bobu, J. Andreas  
*International Conference on Learning Representations (ICLR)*, 2025.
- [12] **Adaptive Language-Guided Abstraction from Contrastive Explanations**  
A. Peng, B. Z. Li, I. Sucholutsky, N. Kumar, J. A. Shah, J. Andreas, A. Bobu  
*Conference on Robot Learning (CoRL)*, 2024.
- [11] **Preference-Conditioned Language-Guided Abstraction**  
A. Peng, A. Bobu, B. Z. Li, T. R. Summers, I. Sucholutsky, N. Kumar, T. L. Griffiths, J. A. Shah  
*ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, 2024.
- [10] **Aligning Robot and Human Representations**  
A. Bobu\*, A. Peng\*, P. Agrawal, J. A. Shah, and A. D. Dragan.  
*ACM/IEEE International Conference on Human-Robot Interaction (HRI)*, 2024.
- [9] **Diagnosing and Repairing Feature Representations Under Distribution Shifts**  
I. Lourenço, A. Bobu, C. R. Rojas, B. Wahlberg.  
*IEEE Conference on Decision and Control (CDC)*, 2023.
- [8] **Diagnosis, Feedback, Adaptation: A Human-in-the-Loop Framework for Test-Time Policy Adaptation**  
A. Peng, A. Netanyahu, M. K. Ho, T. Shu, A. Bobu, J. A. Shah, P. Agrawal.  
*International Conference on Machine Learning (ICML)*, 2023.
- [7] **SIRL: Similarity-based Implicit Representation Learning**  
A. Bobu\*, Y. Liu\*, R. Shah, D. S. Brown, and A. D. Dragan.  
*ACM/IEEE International Conference on Human Robot Interaction (HRI)*, 2023.
- [6] **Teaching Robots to Span the Space of Functional Expressive Motion**  
A. Sripathy, A. Bobu, Z. Li, K. Sreenath, D. S. Brown, and A. D. Dragan.  
*IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS)*, 2022.
- [5] **Dynamically Switching Human Prediction Models for Efficient Planning**  
A. Sripathy\*, A. Bobu\*, D. S. Brown, A. D. Dragan.  
*IEEE International Conference on Robotics and Automation (ICRA)*, 2021.
- [4] **Situational Confidence Assistance for Lifelong Shared Autonomy**  
M. Zurek\*, A. Bobu\*, D. S. Brown, A. D. Dragan.  
*IEEE International Conference on Robotics and Automation (ICRA)*, 2021.

- [3] **Feature Expansive Reward Learning: Rethinking Human Input**  
**A. Bobu\***, M. Wiggert\*, C. Tomlin, A. D. Dragan.  
*ACM/IEEE International Conference on Human Robot Interaction (HRI)*, 2021.  
**Best paper award finalist.**
- [2] **LESS is More: Rethinking Probabilistic Models of Human Behavior**  
**A. Bobu\***, D. Scobee\*, J. F. Fisac, S. Sastry, A. D. Dragan.  
*ACM/IEEE International Conference on Human Robot Interaction (HRI)*, 2020.  
**Best paper award winner.**
- [1] **Learning Under Misspecified Objective Spaces**  
**A. Bobu**, A. Bajcsy, J. F. Fisac, A. D. Dragan.  
*Conference on Robot Learning (CoRL)*, 2018.  
**Invited to special issue.**

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## Workshop Publications

- [W9] **Interpretable Human-in-the-Loop In-Context Preference Learning Via Preference Boundaries**  
V. K. Chen, J. Shah, **A. Bobu**  
*Workshop on Human-in-the-Loop Robot Learning: Teaching, Correcting, and Adapting, RSS 2025.*
- [W8] **Masked Inverse Reinforcement Learning for Language Conditioned Reward Learning**  
M. Hwang, A. Forsey, **A. Bobu**  
*Workshop on Human-in-the-Loop Robot Learning: Teaching, Correcting, and Adapting, RSS 2025.*
- [W7] **Getting Aligned on Representational Alignment**  
I. Sucholutsky, L. Muttenthaler, A. Weller, A. Peng, **A. Bobu**, B. Kim, B. C. Love, E. Grant, I. Groen, J. Achterberg, J. B. Tenenbaum, K. M. Collins, K. L. Hermann, K. Oktar, K. Greff, M. N. Hebart, N. Jacoby, Q. Zhang, R. Marjeh, R. Geirhos, S. Chen, S. Kornblith, S. Rane, T. Konkle, T. P. O'Connell, T. Unterthiner, A. K. Lampinen, K. Muller, M. Toneva, T. L. Griffiths  
*Workshop on Representational Alignment (Re-Align), ICLR 2024.*
- [W6] **Time-Efficient Reward Learning via Visually Assisted Cluster Ranking**  
D. Zhang, M. Carroll, **A. Bobu**, A. D. Dragan.  
*Workshop on Human-in-the-Loop Learning, NeurIPS 2022.*
- [W5] **Efficient Robot Teaching by Learning Intermediate Human-Guided Representations**  
**A. Bobu.**  
*Companion of the Robotics: Science and Systems (RSS), 2022.*
- [W4] **Aligning Robot Representations with Humans**  
**A. Bobu**, A. Peng.  
*Workshop on Collaborative Robots and the Work of the Future, ICRA 2022.*
- [W3] **Detecting Hypothesis Space Misspecification in Robot Learning from Human Input**  
**A. Bobu**, A. D. Dragan.  
*Companion of the ACM/IEEE International Conference on Human-Robot Interaction, 2020.*
- [W2] **Adapting to Continuously Shifting Domains**  
**A. Bobu**, E. Tzeng, J. Hoffman, T. Darrell.  
*Workshop at the International Conference on Learning Representations (ICLR), 2018.*
- [W1] **Patch-Based Discrete Registration of Clinical Brain Images**  
A. V. Dalca, **A. Bobu**, N. S. Rost, P. Golland.  
*Patch-based Techniques in Medical Imaging (MICCAI Patch-MI)*, 2016.  
**Best paper award winner.**

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## Patents

### Concept Training Technique for Machine Learning

**A. Bobu**, B. Sundaralingam, C. Paxton, M. Cakmak, W. Yang, Y. Chao, D. Fox.  
*U.S. Patent 17982401.*

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## Press & Media

2025	<a href="#">Meet the Mind: MIT Professor Andreea Bobu</a>	<i>MIT CSAIL</i>
2025	<a href="#">Human Centric Robot Learning Faculty Spotlight</a>	<i>CSAIL Alliances</i>
2024	<a href="#">Robot Conversations Podcast</a>	<i>CSAIL Alliances</i>
2023	<a href="#">A Faster Way to Teach a Robot</a>	<i>MIT News</i>