Andrea Bajcsy

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I am an Assistant Professor in the Robotics Institute at Carnegie Mellon University. I work at the intersection of robotics, machine learning, and human-AI interaction. My research develops theoretical frameworks and practical algorithms for embodied agents to safely and intelligently interact with people. I draw upon a variety of tools from dynamic game theory to deep learning, and ground my work through applications such as personal robotic manipulators, quadrotors, quadrupedal robots, and autonomous vehicles.

Current Position

Assistant Professor **2023 - *present***

Robotics Institute, Carnegie Mellon University
Director, Interactive and Trustworthy Robotics Laboratory

Education

University of California, Berkeley **2022**

Ph.D. in Electrical Engineering and Computer Science
Advisors: Anca D. Dragan & Claire J. Tomlin
Thesis: *Bridging Safety and Learning in Human-Robot Interaction*

University of Maryland, College Park **2016**

B.S. in Computer Science, Minor in Mathematics

Past Positions

Postdoctoral Scholar **2022 - 2023**

with Jitendra Malik, University of California, Berkeley

Research Intern **Spring 2021**

NVIDIA Research, Autonomous Vehicles Research Group

Research Intern **Summer 2016**

Max Planck Institute for Intelligent Systems, Autonomous Motion Group

Peer-Reviewed Conference Publications

[C22] **A General Calibrated Regret Metric for Detecting and Mitigating Human-Robot Interaction Failures**.
K. Nakamura, R. Tian, A. Bajcsy
Robotics: Science & Systems (RSS), 2024.
(submitted)

[C21] **Conformalized Teleoperation: Confidently Mapping Human Inputs to High-Dimensional Robot Actions**.
M. Zhao, R. Simmons, H. Admoni, A. Bajcsy
Robotics: Science & Systems (RSS), 2024.
(submitted)

[C20] **Human–AI Safety:**

A Descendant of Generative AI and Control Systems Safety.
A. Bajcsy and J. Fisac
International Conference on Machine Learning (ICML), 2024.
(submitted)

[C19] **Adaptive Human Trajectory Prediction via Latent Corridors**.
N. Thakkar, K. Mangalam, A. Bajcsy, J. Malik
European Conference on Computer Vision (ECCV), 2024.
(submitted)

[C18] **Conformal Decision Theory:**
Safe Autonomous Decisions Without Distributions.
J. Lekeufack*, A.N. Angelopoulos*, A. Bajcsy*, M.I. Jordan, J. Malik.
International Conference on Robotics and Automation (ICRA), 2024.

[C17] **Learning Vision-Based Pursuit-Evasion Robot Policies.**
A. Bajcsy*, A. Loquercio*, A. Kumar, J. Malik
International Conference on Robotics and Automation (ICRA), 2024.

[C16] **What Matters to *You*? Towards Visual**
Representation Alignment for Robot Learning.
R. Tian, C. Xu, M. Tomizuka, J. Malik, A. Bajcsy
International Conference on Learning Representations (ICLR), 2024.

[C15] **Deception Game: Closing the Safety-Learning Loop in Interactive Robot Autonomy.**
H. Hu*, Z. Zhang*, K. Nakamura, A. Bajcsy, J.F. Fisac
Conference on Robot Learning (CoRL), 2023.

[C14] **Towards Modeling and Influencing the Dynamics of Human Learning.**
R. Tian, M. Tomizuka, A.D. Dragan, A. Bajcsy.
International Conference on Human-Robot Interaction (HRI), 2023.

[C13] **Towards Robots that Influence Humans over Long-Term Interaction**.
S. Sagheb, Y. Mun, N. Ahmadian, B.A. Christie, A. Bajcsy, K. Driggs-Campbell, D.P. Losey.
International Conference on Robotics and Automation (ICRA), 2023.

[C12] **Safety Assurances for Human-Robot Interaction via Confidence-aware Game-theoretic Human Models.**
R. Tian*, L. Sun*, A. Bajcsy*, M. Tomizuka, A.D. Dragan.
International Conference on Robotics and Automation (ICRA), 2022.

[C11] **Analyzing Human Models that Adapt Online.**
A. Bajcsy, A. Siththaranjan, C.J. Tomlin, A.D. Dragan.
International Conference on Robotics and Automation (ICRA), 2021.

[C10] **A Hamilton-Jacobi Reachability-Based Framework for Predicting and Analyzing Human Motion for Safe Planning**.
S. Bansal*, A. Bajcsy*, E. Ratner*, A.D. Dragan, C.J. Tomlin.
Conference on Robotics and Automation (ICRA), 2020.

[C9] **An Efficient Reachability-Based Framework for Provably Safe Autonomous Navigation in Unknown Environments**.

A. Bajcsy*, S. Bansal*, E. Bronstein, V. Tolani, C.J. Tomlin.
Conference on Decision and Control (CDC), 2019.

[C8] **A Scalable Framework For Real-Time Multi-Robot, Multi-Human Collision Avoidance**.
A. Bajcsy*, S.L. Herbert*, D. Fridovich-Keil, J.F. Fisac, S. Deglurkar, A.D. Dragan, C.J. Tomlin.
International Conference on Robotics and Automation (ICRA), 2019.

[C7] **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)

[C6] **Probabilistically Safe Robot Planning with Confidence-Based Human Predictions**.
J.F. Fisac*, A. Bajcsy*, S.L. Herbert, D. Fridovich-Keil, S. Wang, C.J. Tomlin, A.D. Dragan.
Robotics: Science and Systems (RSS), 2018.
(invited to special issue)

[C5] **Learning from Physical Human Corrections, One Feature at a Time**.
A. Bajcsy, D.P. Losey, M.K. O'Malley, A.D. Dragan.
International Confernece on Human-Robot Interaction (HRI), 2018.

[C4] **Learning Robot Objectives from Physical Human Robot Interaction**.
A. Bajcsy*, D.P. Losey*, M.K. O'Malley, A.D. Dragan.
Conference on Robot Learning (CoRL), 2017.
(oral, acceptance rate 10%)

[C3] **A Review of Principles in Design and Usability Testing of Tactile Technology for Individuals with Visual Impairments**.
E.L. Horton, R. Renganathan, B.N. Toth, A.J. Cohen, A.V. Bajcsy, A. Bateman, M.C. Jennings, A. Khattar, R.S. Kuo, F.A. Lee, M.K. Lim, L.W, Migasiuk, A. Zhang, O.K. Zhao, M.A. Oliveira.
Assistive Technology, 2016.

[C2] **Systematic Measurement of Marginal Mark Types on Voting Ballots**.
A. Bajcsy, Y.S. Li-Baboud, M. Brady.
NIST IR 8069, 2015.

[C1] **Depicting Web Images for the Blind and Visually Impaired**.
A. Bajcsy, Y.S. Li-Baboud, M. Brady.
SPIE Newsroom, 2013.

Journal Articles

[J8] **Contingency Games for Multi-Agent Interaction**.
L. Peters, A. Bajcsy, C.Y Chiu, D. Fridovich-Keil, F. Laine, L. Ferranti, J. Alonso-Mora.
Robotics and Automation Letters (RA-L), 2024.

[J7] **StROL: Stabilized and Robust Online Learning from Humans.**
S.A. Mehta, F. Meng, A. Bajcsy, D.P. Losey
Robotics and Automation Letters (RA-L), 2024.

[J6] **Physical Interaction as Communication: Learning Robot Objectives Online from Human Corrections**.
D.P. Losey, A. Bajcsy, M.K. O'Malley, A.D. Dragan.
International Journal of Robotics Research (IJRR), 2021.

[J5] **Efficient Dynamics Estimation with Adaptive Model Sets**.
E. Ratner, A. Bajcsy, C.J. Tomlin, A.D. Dragan.
IEEE Robotics and Automation Letters (RA-L), 2021.

[J4] **A Robust Control Framework for Human Motion Prediction**.
A. Bajcsy, S. Bansal, E. Ratner, C.J. Tomlin, A.D. Dragan.
IEEE Robotics and Automation Letters (RA-L), 2020.

[J3] **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), 2020.
(Honorable Mention for the 2020 IEEE T-RO Best Paper Award)

[J2] **Confidence-Aware Motion Prediction for Real-Time Collision Avoidance.**
D. Fridovich-Keil*, A. Bajcsy*, J.F. Fisac, S.L. Herbert, S. Wang, A.D. Dragan, C.J. Tomlin.
International Journal of Robotics Research (IJRR), 2019.

[J1] **A User-Centered Design and Analysis of an Electrostatic Haptic Touchscreen System for Students with Visual Impairments.**
A. Bateman, O. Zhao, A. Bajcsy, M. Jennings, B. Toth, A. Cohen, E. Horton, A. Khattar, R. Kuo, F. Lee, M.K. Lim, L. Migasiuk, R. Renganathan, A. Zhang, M.A. Oliveira.
International Journal of Human-Computer Studies, 2017.

Pre-Prints

[P2] **Towards the Unification and Data-Driven Synthesis of Autonomous Vehicle Safety Concepts**.
K. Leung*, A. Bajcsy*, E. Schmerling, M. Pavone.
arXiv: https://arxiv.org/abs/2107.14412, 2022.

[P1] **Intent Demonstration in General-Sum Dynamic Games via Iterative Linear-Quadratic Approximations**.
J. Li, A. Siththaranjan, S. Sojoudi, C. Tomlin, A. Bajcsy
arXiv, 2024.

Honors & Awards

Google Research Scholar Award	2024
Rising Stars Academic Career Workshop in EECS	2021
Honorable Mention for the 2020 IEEE T-RO Best Paper Award	2020
Robotics: Science and Systems (RSS) Pioneers	2020
National Science Foundation Graduate Research Fellowship	2016
Berkeley EECS Excellence Award	2016

* indicates equal contribution.

	Student Researchers of the Year Award, University of Maryland	2016
	CRA Undergraduate Research Award Honorable Mention	2015
	Brendan Iribe Scholar, University of Maryland	2015

Teaching

Human–Robot Interaction (CMU)	Fall 2024
Models & Algorithms for Interactive Robotics (CMU)	Spring 2024
Teaching Assistant: Introduction to Artificial Intelligence (Berkeley)	Fall 2020
Teaching Assistant: Linear Systems Theory (Berkeley)	Fall 2019
Teaching Assistant: Object-Oriented Programming (UMD)	Spring 2014

Selected Invited Talks

DeepMind | Princeton | University of Utah | RSS '24 Workshops 2024
Towards Human–AI Safety

MIT | UW | Georgia Tech | Caltech | Upenn | Cornell | UMichigan 2023
Bridging Safety and Learning in Human-Robot Interaction

Nuro | ICML Autonomous Driving Workshop 2022
Practical Safety Assurances for Dynamic Human-Robot Interactions

ETH: Autonomy Talks | Stanford: Robotics Seminar 2020
Introspective Human Motion Prediction for Safe Robot Autonomy

UChicago Laboratory School: Innovative Robotics Symposium 2020
Safe Robots Which Learn From and About Humans

NIST | ICRA: Long-Term Human Motion Prediction Workshop 2019
Confidence-Aware Motion Prediction for Real-time Collision Avoidance

Advising & Mentorship

Current Ph.D. Students

Kensuke Nakamura, Ran Tian, Ravi Pandya

Current MS Students

Vibhakar Mohta

Current Undergraduate Students

Abigail Defranco, Dylan Goetting

Past MS Students

Regina Wang (MS at Stanford), Charles Tang (Software engineer at Mosaic ML)

Past Undergraduate Students

Anand Siththaranjan (PhD at Berkeley), Sampada Deglurkar (PhD at Berkeley), Eli Bronstein (PhD at Berkeley)

Ph.D Thesis Committees

Shaunak Mehta (Virgina Tech), Jay Patrikar (CMU), Katherine Shih (CMU), Benjamin Newman (CMU), Ananya Rao (CMU), Itamar Mishani (CMU)

Outreach

Machine Learning @ Berkeley (invited talk)	2021
creAItivity (invited talk)	2021
BAIR & Tranfer-To-Excellence REU (mentoring and invited talks)	2021 - 2022

	AI4ALL (mentor and speaker)	2020 - 2022
	Berkeley AI Research (mentor)	2019
	Girls in Engineering Camp (instructor)	2018 - 2019
	Girl Scouts Engineering Fun Day (demos)	2018

Professional Activities

Conference Associate Editor / Area Chair

ICLR: International Conference on Learning Representations (AC)	2024
IROS: International Conference on Robotics and Automation (AE)	2024
ICRA: International Conference on Robotics and Automation (AE)	2023
L4DC: Learning for Decision and Control (AC)	2023

Organizing Committee

RSS: Robotics Science & Systems	2023

External Reviewer

CoRL, RSS, RA-L, T-RO, IROS, ICRA, HRI, AuRo, ICCPS, ACC, AAAI, PNAS Nexus

Workshops Co-Organized

4th Workshop on Long-term Human Motion Prediction	2022
Robotics for People: Perspectives on Interaction, Learning, and Safety	2021
Robotics: Science and Systems Pioneers	2021
3rd Workshop on Long-term Human Motion Prediction	2021
2nd Workshop on Robust Autonomy	2020
Safe Robot Learning and Control in Uncertain Real-World Environments	2019

Press & Media

NBC news *"Robots at UC Berkeley Take a Step Forward"*	2018
WIRED *"How to Interact With Robots Without Embarrassing Yourself"*	2018
Robohub *"Learning Robot Objectives from Physical Human Interaction"*	2018