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.

Positions

Assistant Professor **2023 - *present***

Robotics Institute, Carnegie Mellon University

Postdoctoral Scholar **2022 - 2023**

With Jitendra Malik, University of California, Berkeley

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

Internships

NVIDIA Research **Spring 2021**

Autonomous Vehicles Research Scientist Intern

Max Planck Institute for Intelligent Systems **Summer 2016**

Autonomous Motion Group Research Intern

Conference Publications

[C23] **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)

[C22] **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)

[C21] **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)

[C20] **Intent Demonstration in General-Sum Dynamic Games via Iterative Linear-Quadratic Approximations**.
J. Li, A. Siththaranjan, S. Sojoudi, C. Tomlin, A. Bajcsy
Learning for Dynamics & Control (L4DC), 2024.
(submitted)

[C19] **Adaptive Human Trajectory Prediction via Latent Corridors**.
N. Thakkar, K. Mangalam, A. Bajcsy, J. Malik
Computer Vision and Pattern Recognition Conference (CVPR), 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

[P1] **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.

Honors & Awards

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
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

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

* indicates equal contribution.

Teaching Assistant: Object-Oriented Programming (UMD) Spring 2014

Invited Talks

Towards Human–AI Safety

Robotics Seminar, University of Utah 2024

DeepMind, Google 2024

16-467: Human-Robot Interaction, CMU 2024

Practical Safety Assurances for Dynamic Human-Robot Interactions

EE:599 Safety-Critical Robotic Systems, University of Southern California 2023

Multi-Agent RL Reading Group, University of Maryland College Park 2023

ELE 539: Safety-Critical Robotic Systems, Princeton University 2022

Nuro, Mountain View 2022

Workshop on Safe Learning for Autonomous Driving (SL4AD), ICML 2022

Bridging Safety and Learning in Human-Robot Interaction

ME 5824 - Human-Robot Interaction, Virginia Tech 2023

Robotics Seminar, University of Illinois Champaign-Urbana 2023

Robotics Seminar, University of Wisconsin-Madison 2023

Department Seminar, CMU 2022

Department Seminar, Northwestern University 2022

Department Seminar, Brown University 2022

Department Seminar, Georgia Tech 2022

Department Seminar, University of Washington 2022

Department Seminar, University of Pennsylvania 2022

Department Seminar, Harvard 2022

Department Seminar, MIT 2022

Department Seminar, UC Santa Barbara 2022

Department Seminar, University of Michigan 2022

Department Seminar, Cornell 2022

Department Seminar, UC Los Angeles 2022

Frontiers in CMS Symposium, Caltech 2022

Multi-Agent Reinforcement Learning Seminar, UC Berkeley 2022

Robotics Colloquium, University of Washington 2021

MAE 207: Safety for Autonomous Systems, UC San Diego 2021

Analyzing Human Models that Adapt Online

Intelligent Control Lab, CMU 2021

George Pappas Laboratory, University of Pennsylvania 2021

Introspective Human Motion Prediction for Safe Robot Autonomy

CS188: Introduction to Artificial Intelligence, UC Berkeley 2020

Autonomy Talks, ETH Zurich 2020

Sam Burden Laboratory, University of Washington 2020

Robotics Seminar, Stanford University 2020

Safe Robots Which Learn From (and About) Humans

16-311: Introduction to Robotics, CMU 2023

AI4ALL, UC Berkeley 2021

BAIR / Transfer-to-Excellence REU, UC Berkeley 2021

Innovative Robotics Symposium, University of Chicago Laboratory School 2020

An Efficient Reachability-Based Framework for Provably Safe Autonomous Navigation in Unknown Environments

ELE 539: Safety-Critical Robotic Systems Class, Princeton University 2020

A Robust Control Framework for Human Motion Prediction

Berkeley DeepDrive, UC Berkeley 2020

Confidence-Aware Motion Prediction for Real-time Collision Avoidance

Robotics Seminar, Northwestern University 2019

Intelligent Systems Division, NIST 2019

Long-Term Human Motion Prediction Workshop, ICRA 2019

Probabilistically Safe Robot Planning with Confidence-Based Human Predictions

Berkeley Artificial Intelligence Research Seminar Series, UC Berkeley 2018

Learning Robot Objectives from Physical Human-Robot Interaction

CS287H: Algorithmic Foundations of HRI, UC Berkeley 2021

Bay Area Robotics Symposium (BARS), UC Berkeley 2017

Berkeley DeepDrive, UC Berkeley 2017

Ph.D. Students

Kensuke (Ken) Nakamura (CMU) 2023 - *present*

Ran (Thomas) Tian (UC Berkeley) 2021 - *present*

Ravi Pandya (CMU) 2023 - *present*

Students Mentored

Graduate Students

Jay Patrikar (CMU) 2023 - *present*

Michelle Zhao (CMU) 2023 - *present*

Saumya Saxena (CMU) 2024 - *present*

Neerja Thakkar (UC Berkeley) 2022 - *present*

Jingqi Li (UC Berkeley) 2022 - *present*

Master's Students

Vibhakar Mohta (CMU) 2024 - *present*

Regina Wang (UC Berkeley) 2021 - 2022

	Charles Tang (UC Berkeley)	2019 - 2021
	Undergraduate Students	
	Abigail Defranco (CMU)	2024 - *present*
	Dylan Goetting (UC Berkeley)	2023 - *present*
	Anand Siththaranjan (UC Berkeley)	2019 - 2022
	Sampada Deglurkar (UC Berkeley)	2018 - 2020
	Eli Bronstein (UC Berkeley)	2019
	Interns	
	Sandeep Reddy Badam (CMU)	F 2023
Ph.D Thesis Committees	Shaunak Mehta (Virgina Tech)	2023
	Jay Patrikar (CMU)	2023
	Katherine Shih (CMU)	2023
	Benjamin Newman (CMU)	2023
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