

James Zhu

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Education

PhD, Mechanical Engineering

Carnegie Mellon University

September 2024

Thesis: Navigating a Complex World: Improving Robot Outcomes Through Social, Regulatory, and Control Theoretic Approaches

MS, Mechanical Engineering

Carnegie Mellon University

December 2022

BE, Mechanical Engineering and Mathematics

Vanderbilt University

May 2020

Cum Laude

Work Experience

Postdoctoral Researcher

French National Centre for Scientific Research

Toulouse, France

January 2025 – Current

Supervisors: Thierry Simeon & Marco Cagnetti

Graduate Research Assistant

Carnegie Mellon University

Pittsburgh, Pennsylvania

May 2020 – September 2024

Advisor: Aaron Johnson

Robots, Ethics, & Society Research Intern

RAI Institute

Boston, Massachusetts

January 2024 – June 2024

Supervisor: Kate Darling

Undergraduate Research Assistant

Vanderbilt University

Nashville, Tennessee

September 2017 – May 2020

Advisors: Nilanjan Sarkar & Robert Webster

High Contrast Imaging Intern

Jet Propulsion Laboratory

Pasadena, California

May 2019 – July 2019

Supervisor: Stuart Shaklan

Engineering and Operations Intern

AT&T

Atlanta, Georgia

May 2018 – August 2018

Teaching

Teaching Consultant Fellow: CMU Eberly Center

September 2022 – December 2023

Advisory Board Member: CMU Teaching & Learning Summit

September 2023

Teaching Assistant: Dynamics

Spring 2022 and Spring 2023

Teaching Assistant: Intro to Robotics

Spring 2019

Teaching Assistant: Probability and Statistical Inference

Spring 2019

Certifications & Training

Inclusive STEM Teaching Certificate

April 2023

Tech Stewardship Practice Program Certificate

December 2022

Publications

Journal Papers

Planning Under Certain Uncertainties: Robust Sensitivity-Aware Chance-Constrained MPC

James Zhu, Marco Cagnetti, and Thierry Simeon

Under Review: 2025 IEEE Robotics and Automation Letters

Hybrid Iterative Linear Quadratic Estimation: Optimal Estimation for Hybrid Systems

J Joe Payne, James Zhu, Nathan J Kong, and Aaron M Johnson

2025 IEEE Robotics and Automation Letters

Saltation Matrices: The Essential Tool for Linearizing Hybrid Dynamical Systems

Nathan J Kong, J Joe Payne, **James Zhu**, and Aaron M Johnson

2024 Proceedings of the IEEE

Conference Papers

Convergent iLQR for Safe Trajectory Planning and Control of Legged Robots

James Zhu, J Joe Payne, and Aaron M Johnson

2024 IEEE International Conference on Robotics and Automation

Grounding Robot Navigation in Self-Defense Law

James Zhu, Anoushka Shrivastava, and Aaron M Johnson

2023 IEEE International Conference on Robot and Human Interactive Communication

Hybrid Event Shaping to Stabilize Periodic Hybrid Orbits

James Zhu, Nathan J Kong, George Council, and Aaron M Johnson

2022 IEEE International Conference on Robotics and Automation

Design and System Validation of Rassel: A Novel Active Social Assistive Robot with a User Interface for Elderly with Dementia

Zhaobo K Zheng, **James Zhu**, Jing Fan, and Nilanjan Sarkar

2018 IEEE International Symposium on Robot and Human Interactive Communication

Other Papers

Double-Anonymous Review for Robotics

Justin K Yim, Paul Nadan, **James Zhu**, Alexandra Stutt, J Joe Payne, Catherine Pavlov, Aaron M Johnson

2022 Technical Report: arXiv:2406.10059

By Air or by Land: How Locomotion Methods Dictate Drone Ethics

James Zhu and Aaron M Johnson

2022 ICRA Workshop on Addressing Ethical and Technical Challenges in the Development, Use and Governance of Lethal Autonomous Weapons Systems

Conferences, Workshops, & Seminars

Presentations

What Can a PhD Student Learn About Robots That an AI Can't?

Laboratory for Analysis and Architecture of Systems Robotics and Interactions Seminar

February 2025

Invited Talk

Improving Equity in Robot Deployment

University of Tennessee Center for Biomedical Informatics Seminar

September 2024

Invited Talk

Designing Safe Quadrupedal Gaits

ICRA Advancements in Trajectory Optimization and MPC for Legged Systems Workshop

May 2024

Invited Talk

Navigating a Complex World: How to Bring Robots Into the Wild

New York University Dynamical Systems Lab Seminar

April 2024

Invited Talk

An Engineering Perspective on Legislation Challenges for Autonomous Delivery Robots

Georgia Tech Solving for X Workshop

February 2024

Invited Talk

Grounding Robot Navigation in Self-Defense Law

WeRobot

October 2023

Poster

Convergent Planning and Control of Legged Robots

IEEE RAS TC on Model-Based Optimization for Robotics Poster Session

July 2023

Poster

Convergent Planning and Control of Legged Robots

Carnegie Mellon Mechanical Engineering PhD Symposium

March 2023

Poster

Convergent iLQR for Underactuated Hybrid Dynamical Systems

RSS Risk Aware Decision Making Workshop

June 2022

Lightning Talk

Hybrid Event Shaping to Generate Stable Robotic Gaits

Carnegie Mellon Locomotion Seminar

March 2022

Invited Talk

Organization

Georgia Tech Solving for X Workshop

2024

Session Organizer

Editorial

IEEE International Conference on Intelligent Robots and Systems

2025

Associate Editor

Additional Conferences

Ethical and Legal Dilemmas of Autonomous Weapons in War and National Security Conference

April 2024

Invited Participant

WeRobot

September 2022

Participant

Leadership, Honors, and Additional Experience

Co-Founder & Chief Flavor Architect: Cup of Wontons

February 2023 – December 2023

Equity Researcher: Equitable and Just Greater Pittsburgh

December 2022 – December 2023

Organizer: Gwen's Girls Robotics Outreach Program

Fall 2020 – Fall 2022

Featured in CMU Engineering Magazine article

Co-Chair: Mechanical Engineering DEI Outreach Subcommittee

January 2021 – May 2022

Carolyn Commer Graduate Student Involvement Award

May 2021

Student Mentor: Carnegie Mellon Tartan Scholars Program

August 2020 – May 2021

Schiff Family Scholarship

2018–2020

Attraction Operations Specialist: EnterTRAINment Junction

June 2017 – January 2018

Adult Literacy Program Volunteer: Nashville Public Library

January 2017 – May 2017