

James Zhu

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Education

Carnegie Mellon University

PhD in Mechanical Engineering

September 2024

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

Carnegie Mellon University

Master of Science in Mechanical Engineering

December 2022

Vanderbilt University

Bachelor of Engineering in Mechanical Engineering and Mathematics

May 2020

Cum Laude

Experience

Robomechanics Lab at CMU

Graduate Research Assistant

Advisor: Aaron Johnson

Pittsburgh, PA

May 2020 – September 2024

The AI Institute

Robots, Ethics, & Society Research Intern

Supervisor: Kate Darling

Boston, MA

January 2024 – June 2024

Medical Engineering and Discovery Lab at Vanderbilt

Undergraduate Research Assistant

Advisor: Robert Webster

Nashville, TN

August 2018 – May 2020

Jet Propulsion Laboratory

High Contrast Imaging Intern

Supervisor: Stuart Shaklan

Pasadena, CA

May 2019 – July 2019

Robotics and Autonomous Systems Lab at Vanderbilt

Undergraduate Research Assistant

Advisor: Nilanjan Sarkar

Nashville, TN

September 2017 – May 2018

Teaching

Teaching Consultant Fellow: CMU Eberly Center

September 2022 – December 2023

Advisory Board Member: CMU Teaching & Learning Summit

September 2023

Inclusive STEM Teaching Certificate

April 2023

Teaching Assistant: Dynamics

Spring 2022 and Spring 2023

Teaching Assistant: Intro to Robotics

Spring 2019

Teaching Assistant: Probability and Statistical Inference

Spring 2019

Leadership and Honors

Co-Founder: Cup of Wontons

February 2023 – December 2023

Equity Researcher: Equitable and Just Greater Pittsburgh

December 2022 – December 2023

Tech Stewardship Practice Program Certificate

December 2022

Organizer: Robotics Outreach for Gwen's Girls after-school 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

Publications

Journal Papers

The Effect of Gait Parameters on Safe Quadrupedal Robot Locomotion

James Zhu, Selvin Garcia Gonzalez, Ardalan Tajbakhsh, and Aaron M Johnson

In Preparation: IEEE Robotics and Automation Letters

Scalable and Safe Motion Planning in Presence of Uncertain Multi-Modal Agents

Ardalan Tajbakhsh, Siddarth Nair, David Ologan, Amey Shah, **James Zhu**, Lorenz T Biegler, and Aaron M Johnson

In Preparation: 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

Under Review: Proceedings of the IEEE

Conference Papers

Safe Kinodynamic RRT* for Navigating Friction Transitions

Joshua Ramos, **James Zhu**, Paul Nadan, and Aaron M Johnson

In Preparation: 2025 IEEE International Conference on Robotics and Automation

Improving Equity in Robot Deployment: A Study of Food Pantry Patrons

James Zhu, Arihant Yadav, Luis Sentis, Aaron M Johnson, and Kate Darling

In Preparation: 2025 International Conference on Human-Robot Interaction

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

Workshop Papers

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

Presentations

Designing Safe Quadrupedal Gaits

ICRA Advancements in Trajectory Optimization and MPC for Legged Systems Workshop

Poster

May 2024

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

NYU Dynamical Systems Lab Seminar

Invited Talk

April 2024

An Engineering Perspective on Legislation Challenges for Autonomous Delivery Robots

Solving for X

Session Organizer

February 2024

Grounding Robot Navigation in Self-Defense Law

WeRobot

Poster

October 2023

Convergent Planning and Control of Legged Robots

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

Poster

July 2023

Convergent Planning and Control of Legged Robots

CMU MechE 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

Additional Conferences

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

April 2024

Invited Participant

WeRobot

September 2022

Participant

Students Mentored

Joshua Ramos

February 2022 - September 2024

BS in Electrical Engineering, CMU

Selvin Garcia Gonzalez

February 2024 - July 2024

MS in Mechanical Engineering, CMU

Karla Soto Cuevas

September 2023 - December 2023

MS in Mechanical Engineering, CMU

Sasha Kroman

September 2023 - December 2023

BS in Mechanical Engineering, CMU

Nikhil Chinnalapatti Gopinath

June 2023 - December 2023

MS in Mechanical Engineering, CMU

Anoushka Srivastava

January 2023 - May 2023

BS in Artificial Intelligence, CMU