James Zhu

james.zhu@laas.fr   •   jameswzhu.github.io

Education

Doctor of Philosophy, Mechanical Engineering
Carnegie Mellon University *September 2024*
Thesis: Navigating a Complex World: Improving Robot Outcomes Through Social, Regulatory, and Control Theoretic Approaches

Master of Science, Mechanical Engineering
Carnegie Mellon University *December 2022*

Bachelor of Engineering, Mechanical Engineering and Mathematics
Vanderbilt University *May 2020*
Cum Laude

Work Experience

Technical

Postdoctoral Researcher Toulouse, France
French National Centre for Scientific Research *January 2025 – Current*
Supervisor: Thierry Simeon

Graduate Research Assistant Pittsburgh, Pennsylvania
Carnegie Mellon University *May 2020 – September 2024*
Advisor: Aaron Johnson

Robots, Ethics, & Society Research Intern Boston, Massachusetts
The AI Institute *January 2024 – June 2024*
Supervisor: Kate Darling

Undergraduate Research Assistant Nashville,Tennessee
Vanderbilt University *September 2017 – May 2020*
Advisors: Nilanjan Sarkar & Robert Webster

High Contrast Imaging Intern Pasadena, California
Jet Propulsion Laboratory *May 2019 – July 2019*
Supervisor: Stuart Shaklan

Engineering and Operations Intern Atlanta, Georgia
AT&T *May 2018 – August 2018*

Non-Technical

Co-Founder & Chief Flavor Architect Pittsburgh, Pennsylvania
Cup of Wontons *February 2023 – December 2023*

Attraction Operations Specialist Cincinnati, Ohio
EnterTRAINment Junction *June 2017 – January 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, Honors, and Additional Experience

Equity Researcher: Equitable and Just Greater Pittsburgh	*December 2022 – December 2023*
Tech Stewardship Practice Program Certificate	*December 2022*
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*
Adult Literacy Program Volunteer: Nashville Public Library	*January 2017 – May 2017*

Publications

Journal Papers

The Effect of Gait Parameters on Safe Quadrupedal Robot Locomotion
James Zhu, David Ologan, 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

h-iLQE: Optimal State Estimation for Hybrid Systems
*J Joe Payne, **James Zhu**, Nathan J Kong, and Aaron M Johnson*
Under Review: 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

Safe Kinodynamic RRT* for Navigating Friction Transitions
*Joshua Ramos, **James Zhu**, Paul Nadan, and Aaron M Johnson*
In Preparation

Robot Behaviors Inspired by Human-Horse Interaction: A User Study
*Arihant Yadav, Pedro Reynolds-Cuéllar, Nozomi Nakajima, **James Zhu**, Eakta Jain, and Kate Darling*
In Preparation

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 Rassle: 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

Improving Equity in Robot Deployment: A Study of Food Pantry Patrons
James Zhu
2024 Thesis Chapter

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

Presentations

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*
Session Organizer

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
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