James Zhu

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Education

Carnegie Mellon University
PhD in Mechanical Engineering *Spring 2025*
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*
3.89/4.00 GPA

Vanderbilt University
Bachelor of Engineering in Mechanical Engineering and Mathematics – Cum Laude *May 2020*
3.79/4.00 GPA

Experience

Robomechanics Lab at CMU **Pittsburgh, PA**
Graduate Research Assistant *May 2020 – Current*
Advisor: Aaron Johnson

Medical Engineering and Discovery Lab at Vanderbilt **Nashville,TN**
Undergraduate Research Assistant *August 2018 – May 2020*
Advisor: Robert Webster

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

Robotics and Autonomous Systems Lab at Vanderbilt **Nashville,TN**
Undergraduate Research Assistant *September 2017 – May 2018*
Advisor: Nilanjan Sarkar

Publications

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

Convergent iLQR for Safe Trajectory Planning and Control of Legged Robots
***James Zhu**, J Joe Payne, and Aaron M Johnson*
Under Review: 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

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

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

Additional Presentations and Conferences

WeRobot

Poster: Grounding Robot Navigation in Self-Defense Law — *October 2023*

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

Poster: Convergent Planning and Control of Legged Robots — *July 2023*

CMU MechE PhD Symposium

Poster: Convergent Planning and Control of Legged Robots — *March 2023*

Robotics: Science and Systems (RSS) Risk Aware Decision Making Workshop

Lightning Talk: Convergent iLQR for Underactuated Hybrid Dynamical Systems — *June 2022*

Carnegie Mellon Locomotion Seminar

Talk: Hybrid Event Shaping to Generate Stable Robotic Gaits — *March 2022*

Teaching

Advisory Board Member: CMU Teaching & Learning Summit — *September 2023*

Inclusive STEM Teaching Certificate — *April 2023*

Teaching Assistant: Dynamics — *Spring 2022 and Spring 2023*

Graduate Teaching Fellow: CMU Eberly Center — *Fall 2022 – Present*

Teaching Assistant: Intro to Robotics — *Spring 2019*

Teaching Assistant: Probability and Statistical Inference — *Spring 2019*

Leadership and Honors

Co-founder and Chef de Cuisine: Cup of Wontons — *August 2023 – Present*

Equity Researcher: Equitable and Just Greater Pittsburgh — *December 2022 – Present*

Tech Stewardship Practice Program Certificate — *December 2022*

Organizer: Robotics Outreach for Gwen's Girls after-school program — *Fall 2020 – Present*
Featured in CMU Engineering Magazine article

Carolyn Commer Graduate Student Involvement Award — *May 2021*

Co-chair: Mechanical Engineering DEI Outreach Subcommittee — *January 2021 – May 2022*

Student Mentor: Carnegie Mellon Tartan Scholars Program — *August 2020 – May 2021*

Schiff Family Scholarship — *2018–2020*

Students Mentored

Karla Soto Cuevas — *September 2023 - Present*
MS in Mechanical Engineering, Carnegie Mellon

Sasha Kroman — *July 2023 - September 2023*
BS in Mechanical Engineering, Carnegie Mellon

Nikhil Chinnalapatti Gopinath — *June 2023 - August 2023*
MS in Mechanical Engineering, Carnegie Mellon

Anoushka Srivastava — *January 2023 - September 2023*
BS in Artificial Intelligence, Carnegie Mellon

Joshua Ramos — *February 2022 - Present*
BS in Electrical Enegineering, Carnegie Mellon

Memberships

IEEE Control Systems Society — *2023 - Present*

ASME Graduate Student Member — *2022 - Present*

IEEE Robotics and Automation Society — *2022 - Present*

IEEE Student Member — *2022 - Present*