Yicheng Zeng

Email: zeng95@wisc.edu Phone: +1 (608) 772-8944 Personal Website

EDUCATION

University of Wisconsin - Madison, the United States — Sep 2023 — May 2025 (expected)
Master of Science in Mechanical Engineering — Cumulative GPA: 3.875/4.00
Selcected Courses: Optimal Control & Variational Methods, Advanced Robotics

Zhejiang University - Hangzhou, China — Sep 2018 — Jun 2022
Bachelor of Science in Automation, Chu-Kochen Honored Academy — Cumulative GPA: 3.90/4.00
Selcected Courses: Principles of Automatic Control, Robotics

RESEARCH INTERESTS

Legged robot locomotion, Robot design and control, Optimal control and planning, Predictive control

PUBLICATIONS

- (Submitted to ICRA 2025) **Y. Zeng***, Y. Huang*, and X. Xiong, "Reference-Steering via Data-Driven Predictive Control for Hyper-Accurate Robotic Flying-Hopping Locomotion". [Online] [Video] (* indicates equal contribution)
- Y. Huang*, **Y. Zeng***, and X. Xiong, "Stride: An open-source, low-cost, and versatile bipedal robot platform for research and education," in 2024 IEEE-RAS 23rd International Conference on Humanoid Robots (Humanoids), 2024, [Online] [Video]. (* indicates equal contribution)

PROJECTS

Reference-Steering for Robotic Flying-Hopping Locomotion via DeePC — Jun 2024 — Sep 2024

- Utilize Data-Enabled Predictive Control (DeePC) method for accurate trajectory tracking of a flying-hopping robot.
- Identify input-output dynamics of both hopping and flying behavior using Hankel Matrices.
- Propose artificial trajectory completion method to represent discontinuous ground phase dynamics of hopping.
- Extend Predict Error Method MPC (PEM-MPC) by incorporating slackeness for real-time prediction and robustness.
- Achieve accuarate trajectory tracking for hybrid flying-hopping locomotion outdoors on the robot PogoX.

An Open-Source, Low-Cost, and Versatile Bipedal Robot Platform — Sep 2023 — Jun 2024

- Develop a low-cost and modular bipedal robot platform with modular terrain setup and disturbance injection system.
- Implement a walking controller based on Step-to-Step (S2S) dynamics and data-driven adaptation for robust locomotion.
- Validate system robustness and controllers performance with different natural terrains, disturbance forces and leg designs.
- Open-source the robot software and hardware for diverse educational and research scenarios. [Github]

Design and Control of a Wheel-legged Bipedal Robot — Sep 2021 — May 2022

- Design and build a wheel-legged bipedal robot that features parallel linkages actuation and joint limit mechanism.
- Implement a Spring Loaded Inverted Pendulum (SLIP) based optimal controller for balancing and velocity tracking.
- Integrate the controller on hardware system after verification in ROS-Gazebo simulation.

Mechanical Design of a Railed Sentry Robot — Oct 2020 — Jul 2021

- Develop the design for a fully-autonomous robot mounted on a linear rail for the RoboMaster Competition.
- Redesign the chasis to reduce weight and enhance robustness, added design to enable fast mounting on the rail.
- Design a brake system that enables swift direction conversion to avoid opponent attack.
- Perform multiple test-design iterations and co-design with autonomous algorithm to enhance robustness and performance.

TEACHING EXPERIENCES

ME240 - Dynamics — University of Wisconsin - Madison
Teaching Assistant — 2023 Fall— 2024 Spring—2024 Fall

- Supervise 50-80 Students per semester, work 10-20 hours per week.
- Organize Discussion sessions, Make exam problems, grade exams, Q&A via Office Hours and piazza.

AWARDS

Outstanding Graduate Hangzhou, China
Zhejiang University Jun, 2022

Chu-Kochen Honored Degree Hangzhou, China
Zhejiang University Jun, 2022

First Class Awards of RoboMaster University Championship Shenzhen, China
RoboMaster National University Championship: Silver Medal Mid-China Division Jul, 2021

Meritorious Awards the United States
Mathematical Contest in Modeling (MCM) Jan, 2020

First Class Awards Hangzhou, China
Student scientific innovation competition of Zhejiang University Oct, 2021

CAMPUS EXPERIENCE

Team HelloWorld of Zhejiang University Hangzhou, China
Mechanical Engineer, Robot Operator Sep 2020 - Jul 2021

- Particapte in the RoboMaster national championship as an engineer and operator.
- Design a sentry robot and help iterate the standard robot with teammates.
- Operate one standard robot in the field with other teammates.

QSC Tech Group Hangzhou, China
Technical consultant Oct 2019 - Jan 2022

- Group leader of several major advertising videos for the univerisy.
- Organizer of several internal training lectures and mentor for new team members.
- Director of Photography, Lighting Technician, Storyboard Artist for several short films.

SKILLS

- **Programming Skills:** C++, Python, MATLAB
- **Engineering Skills:** CAD design, Mechanical Assembling, Embedded systems coding, Linux, ROS/ROS2
- **Knowledge Base**: Optimal Control, Model Predictive Control, Linear Control, Nonlinear Control, Robotic Locomotion

REFERENCES

Prof. Xiaobin Xiong
Assistant Professor, Department of Mechanical Engineering, University of Wisconsin, Madison, the United States
E-mail: xiaobin.xiong@wisc.edu
Scholar Profiles: Personal Webpage — Google Scholar

Prof. Jeremy Coulson
Associate Professor, Department of Electrical and Computer Engineering, University of Wisconsin, Madison, the United States
E-mail: jeremy.coulson@wisc.edu
Scholar Profiles: Personal Webpage — Google Scholar

Prof. Yu Zhang
Associate Professor, College of Control Science and Engineering, Zhejiang University, Hangzhou, China
E-mail: zhangyu80@zju.edu.cn
Scholar Profiles: Personal Webpage — Google Scholar