

# Xinchen Yao

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## Education

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Dual degree program in Zhejiang University - University of Illinois Urbana-Champaign Institute:	
<b>University of Illinois Urbana-Champaign</b> , Urbana, Illinois, US	Sep 2022 – May 2026
BS in Computer Engineering, GPA: 3.77/4.0	
<b>Zhejiang University</b> , Zhejiang, China	Sep 2022 – May 2026
BS in Electronic and Computer Engineering, GPA: 3.83/4.3	

## Technical Skills

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**Programming:** Python, C/C++, CUDA, Matlab, Rust

**Machine Learning:** PyTorch, Jax, Reinforcement Learning, Generative Models

**Robotics:** Robot Simulators, Control Theory, ROS/ROS2, Computer Vision, SLAM

**Systems:** Linux, Embedded Systems, Parallel Computing

## Awards and Honors

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- Outstanding Student in Academic Achievement, ZJU-UIUC Institute (2024 - 2025)
- Zhejiang University Scholarship (2024 - 2025)
- Second Prize in RoboMaster University League Competition (2023, 2024)

## Experience

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<b>Physical Intelligence Lab</b> , Zhejiang, China	Undergraduate Researcher
Zhejiang University - University of Illinois Urbana-Champaign Institute	Jul 2025 - Present
Advisor: <b>Prof. Hua Chen</b>	

- Developing locomotion controllers for bipedal robots and humanoids using reinforcement learning, achieving emergent behaviors that adapt to various terrains and conditions.
- Building evaluation pipelines to test trained robot policies across multiple simulation environments and deploying them to physical robots.
- Researching methods to reduce the performance gap between simulated and real-world robot operation through learned dynamics models.
- Improving reinforcement learning algorithms to achieve better training efficiency and performance stability.

<b>Human Dynamics and Controls Lab</b> , Illinois, US	Undergraduate Researcher
The Grainger College of Engineering, University of Illinois Urbana-Champaign	Sep 2024 - Jun 2025
Advisor: <b>Prof. Elizabeth Hsiao-Wecksler</b>	

- Developed a dynamics model for a self-balancing ballbot platform, simulating omniwheel behavior while maintaining computational efficiency.
- Implemented learning-based control to optimize balancing and movement performance and robustness.
- Integrated new force sensors into robot hardware, improving state estimation and control reliability.

<b>RoboMaster Meta Team</b> , Zhejiang, China	Control Group Leader
Zhejiang University - University of Illinois Urbana-Champaign Institute	Jun 2023 - Present
Advisor: <b>Prof. Jiahuang Cui</b>	

- Led control group to win second prize in RoboMaster regional competition, managing a team developing software for multiple competitive robots.
- Designed and implemented a distributed control system supporting real-time coordination for multiple robots with modular architecture.
- Developed software for motor control, sensor integration, autonomous navigation, and decision-making algorithms.

- Trained and mentored new team members on control theory, robot software development, and algorithm design.
- Collaborated with mechanical team to optimize robot design for improved controllability and performance.

## Projects

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**Where to Learn: Analytical Policy Gradient Directed Exploration for On-Policy Robotic Reinforcement Learning** Second Author

- Implemented a novel reinforcement learning algorithm that enhances exploration efficiency and training stability for robotic control.
- Evaluated the algorithm across multiple benchmark environments with comprehensive hyperparameter tuning and ablation studies.
- Successfully trained and deployed a walking policy on a physical biped robot for real-world validation.
- Website: wheretolearn.github.io

**Omni WBR: Learning Adaptive Hybrid Wheeled-Biped Robot Omnidirectional Locomotion via Position-Based Incentive** First Author

- Developed a reinforcement learning method to generate adaptive omnidirectional gaits for wheeled bipedal robots, enabling smooth movement on uneven terrains without explicit gait planning.
- Implemented a training and deploying pipeline to evaluate the method on physical robot.
- Demonstration available on my website: yao-xinchen.github.io/projects/omni-wbr

**Meta-Team/Meta-ROS: Modular ROS2 Control Framework for multiple RoboMaster Competition Robots** Creator, Maintainer

- Created a comprehensive robot control system supporting multiple competitive robots with sensor integration, motion control, and autonomous coordination.
- Designed modular architecture enabling easy extension and real-time performance for competition scenarios.
- Integrated advanced capabilities including visual recognition, trajectory prediction, localization, and learning-based controllers.
- Code: [github.com/Meta-Team/Meta-ROS](https://github.com/Meta-Team/Meta-ROS)

**Custom Wheeled Biped Robot with RL-base Locomotion Controller** Leader

- Co-designed and built a custom wheeled biped robot with 4 degrees of freedom and closed chain structure.
- Trained a reinforcement learning-based locomotion controller and deployed it on the physical robot.
- Demonstration available on my website: [yao-xinchen.github.io/projects/wheeled-biped](https://yao-xinchen.github.io/projects/wheeled-biped)

## Course Projects

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**Unix-Like RSIC-V Operating System, Including Kernel and Shell** ECE391 Computer Systems

- Implemented core operating system components including device drivers, filesystem, virtual memory, process management, and multitasking capabilities.
- Designed and implemented a Unix-style shell with process spawning and management.
- Composed a tutorial on workflow setup: [github.com/Yao-Xinchen/ECE391-Workflow](https://github.com/Yao-Xinchen/ECE391-Workflow)

**Convolution Neural Network Implementation in CUDA** ECE408 Applied Parallel Programming

- Implemented and optimized neural network inference using GPU parallel computing, achieving over 40% performance improvement.
- Applied advanced optimization techniques including tensor cores, memory tiling, and specialized libraries for efficient computation.

**Autonomous Diagonal and Parallel Parking** ECE484 Safe Autonomy

- Implemented localization and mapping system, and visual path recognition using deep learning.
- Designed and implemented autonomous parking system with diagonal and parallel parking maneuvers.
- Demonstration available on my website: [yao-xinchen.github.io/projects/auto-parking](https://yao-xinchen.github.io/projects/auto-parking)