

Wenxi Chen

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EDUCATION

- Purdue University** West Lafayette, USA
PhD Student in Mechanical Engineering, Mentored by Dr. Yan Gu and Dr. Shaoshuai Mou. Aug 2023 - Present
- Research assistant in Terrain Robotics Advanced Control and Experimentation Lab (Mechanical Engineering) and Autonomous & Intelligent Multi-agent Systems Lab (Aeronautics and Astronautics Engineering)
 - Teaching assistant of machine design lab (Fall 2023) and statics (Spring 2024)
 - Student organizer of Purdue Institute for Control, Optimization, and Networks (ICON)
- Columbia University** New York City, USA
Master of Science in Mechanical Engineering, Robotics and Control (GPA: 3.7) Jan 2021 - Feb 2023
- Relevant courses: Numerical Methods, Data Science, Digital Signal Processing, Robotics, Robot Learning, Database, Computer Vision, Modern Control Theory, Evolutionary Computation
 - Course Assistant for Robotics Studio (Fall 2022): Support robot design, 3D printing, and hardware deployment.
- Huazhong University of Science and Technology** Wuhan, China
Bachelor of Science in Aerospace Engineering Sep 2016 - Jun 2020
- Relevant courses: Optimization theory, Drone path planning, Electronics, Dynamics, C++ Programming
 - Activities: lead organizer of TEDx speeches, award in Model United Nations English conference

AREAS OF EXPERTISE

- Domains: Data Analysis, Robotics, Deep Learning, Computer Vision, Reinforcement Learning
- Research keywords: VLA, World Model, Humanoid Robot, Uncertainty Quantification

PUBLICATIONS

* Denotes equal contribution

- [1] **Wenxi Chen**, Kaidi Zhang, Chi Lin, Zhiyuan Zhang, Yu She, Yuejiang Liu, Raymond A. Yeh, Shaoshuai Mou, Yan Gu. “DREAM-Chunk: Test-time Scaling of Action Chunking with World Model for Stochastic Dynamics.” The Fortieth Annual Conference on Neural Information Processing Systems (NeurIPS), 2026 (Submitted).
- [2] **Wenxi Chen**, Yuejiang Liu, Zijian He, Shaoshuai Mou, Yan Gu. “Rethink Action Chunking in VLA Through Human Motor Control.” The Fortieth Annual Conference on Neural Information Processing Systems (NeurIPS), 2026 (Submitted).
- [3] Ruixiang Wang , **Wenxi Chen** , Zehui Lu , Yan Gu , and Shaoshuai Mou. “Grounded Vision–Language Motion Planning Framework for Collaborative Robot Inscription.” The IEEE Transactions on Automation Science and Engineering (T-ASE), 2026 (Submitted).
- [4] Joonkyung Kim*, **Wenxi Chen***, Davood Soleymanzadeh*, Yi Ding, Xiangbo Gao, Zhengzhong Tu, Ruqi Zhang, Fan Fei, Sushant Veer, Yiwei Lyu, Minghui Zheng, Yan Gu. “Position: Modular Safety Guardrails Are Necessary for Foundation-Model-Enabled Robots in the Real World.” International Conference on Machine Learning (ICML) Position Paper Track, 2026 (Accepted).
- [5] Muqun Hu*, **Wenxi Chen***, Wenjing Li*, Falak Mandali, Zijian He, Renhong Zhang, Praveen Krisna, Katherine Christian, Leo Benaharon, Dizhi Ma, Karthik Ramani, Yan Gu. “Towards Versatile Humanoid Table Tennis: Unified Reinforcement Learning with Prediction Augmentation.” IEEE International Conference on Robotics & Automation (ICRA), 2026 (Accepted).
- [6] Zenan Zhu*, **Wenxi Chen***, Pei-Chun Kao, Janelle Clark, Lily Behnke, Rebecca Kramer-Bottiglio, Holly Yanco, Yan Gu. “Model-agnostic Meta-learning for Adaptive Gait Phase and Terrain Geometry Estimation with Wearable Soft Sensors.” IEEE Robotics and Automation Letters (RA-L), 2026 (Accepted).
- [7] **Wenxi Chen**, Raymond Yeh, Shaoshuai Mou, Yan Gu. “Leveraging Perturbation Robustness to Enhance Out-of-Distribution Detection.” IEEE / CVF Computer Vision and Pattern Recognition Conference (CVPR), 2025.
- [8] Xu, Jingxi, Runsheng Wang, Siqi Shang, Ava Chen, Lauren Winterbottom, To-Liang Hsu, **Wenxi Chen**, Khondoker

Ahmed, Pedro Leandro La Rotta, Xinyue Zhu, Dawn M Nilsen, Joel Stein, Matei Ciocarlie. "[ChatEMG: Synthetic Data Generation to Control a Robotic Hand Orthosis for Stroke](#)." IEEE Robotics and Automation Letters (RA-L), 10.2, 907-914, 2024.

- [9] La Rotta, Pedro Leandro, Jingxi Xu, Ava Chen, Lauren Winterbottom, **Wenxi Chen**, Dawn Nilsen, Joel Stein, and Matei Ciocarlie. "[Meta-Learning for Fast Adaptation in Intent Inferral on a Robotic Hand Orthosis for Stroke](#)." IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS), 2024.

ACADEMIC SERVICE

- Reviewer for robotics venue: IEEE Robotics and Automation Letters (RAL), IEEE International Conference on Robotics and Automation (ICRA), and IEEE International Conference on Humanoid Robots (Humanoids).

RESEARCH TOPICS

PhD Research, Purdue University

West Lafayette, USA

Research Assistant, Co-advisors: Dr. Yan Gu and Dr. Shaoshuai Mou

Aug 2023 - Present

- **Test-time Scaling with World Model:** Designed a world-model-based test-time scaling framework to improve reactivity in long-horizon VLA control under stochastic dynamics. Evaluated the method in Kinetix simulation and on Pi0.5/SmolVLA across SO-101 and Franka Panda arms for four manipulation tasks. Led a submission to a top machine learning conference.
- **Action Chunking in VLA:** Built a JAX benchmark to measure the coherence–reactivity tradeoff in representative generative VLA decoding methods; Worked on reinforcement learning for expert training and behavior cloning for chunking-policy, and integrated it into LeRobot (SmolVLA / diffusion policy). Led a position paper connecting action chunking in VLA to evidence from human motor control; under review at a top ML conference.
- **Safety of robotics with foundational model:** Surveyed safety methods for foundation model (FM) -powered robotics (end-to-end VLA and FM-based perception/planning), covering uncertainty quantification, adversarial robustness, and human-in-the-loop control. Co-led a position paper outlining a research roadmap for safe deployment of generalist robots; accepted at ICML 2026.
- **Reinforcement Learning for Humanoid Robot Control:** Led development of the first end-to-end RL policy for whole-body humanoid control, using parallel simulation in IsaacSim to train a humanoid to play table tennis. Proposed a physics-guided RL architecture to address reward sparsity and promote proactive strategy. Paper accepted at ICRA 2026. Now leading extensions that incorporate human demonstrations as priors to enable learning a broader skill repertoire.
- **Uncertainty Quantification of Deep Learning Model:** Integrated and extended deep learning benchmarking frameworks such as OpenOOD and RobustBench to evaluate diverse deep learning architectures for uncertainty quantification, adversarial robustness, and OOD detection in computer vision; Developed a novel state-of-the-art method that bridges adversarial robustness and uncertainty quantification, leading to a CVPR 2025 paper.
- **Visual-language Navigation:** Developed a semantic mapping pipeline on the Unitree Go2 quadruped robot for in-building navigation, combining lidar and visual-language model reasoning, and explored shared autonomy allocation by uncertainty quantification. This VLN problem was used to study a human-robot teaming setting funded by DAC, and I served as the lead researcher, reporting project deliverables to the funding organization.
- **Interactive human-robot inscription powered by VLM:** Mentored an MS student's thesis to include conformal prediction in VLM reasoning for uncertainty-aware human-robot interaction, leading to a paper under review.
- **Meta-Learning for Wearable Robots:** Developed a human gait recognition system using wearable soft sensors. Applied model-agnostic meta-learning for rapid user adaptation, demonstrating high fine-tuning efficiency in cross-subject tests with data from nine participants. The paper is accepted at IEEE RA-L 2026.

PROFESSIONAL EXPERIENCE

Department of Function Integration, NIO

Shanghai, China

Intern

Sep 2020 - Nov 2020

- Automated Software-in-the-Loop (SIL) testing by developing a Python script to translate natural-language test cases into Simulink scenarios, processing hundreds of cases in minutes and significantly accelerating validation progress. Liaised between the engineering team and international suppliers to streamline project communication and ensure alignment.