

Xiwen Dengxiong

Ph.D. · COMPUTING AND INFORMATION SCIENCES

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[[Google Scholar Link](#)] | [[Youtube Link](#)]: CDIME Labs

Highlights

Robotics and MR Tools: ROS/ROS2 Moveit, Isaac Lab, mujoco, Unity, OpenXR, WebXR

Robotics real/simulation projects: Robot teleoperation in XR using Oculus quest 2/3/Pro PICO 4 U, π_0 VLA implementation, Isaac Lab simulation & cloud XR implementation, XRrobottoolkits open source robot teleop tool for Jetson Orin, and x86 ubuntu/windows.

Contact-rich Robot Manipulation: Manipulators (UR5e, Ufactory, ARX r5), Dexterous hand (Inspire, Realhand L6/O6), Humanoid (Galaxea, RobotEra), Tactile sensor (Gelsight, resistive sensor), Multimodal LLM.

Education

Rochester Institute of Technology, Ph.D. Computing and Information Sciences 09/2021-08/2026

- Research interests: Robot learning, Few-shot learning, Human-robot collaboration

Rochester Institute of Technology, Master of Science in Computer Science 09/2019-08/2021

- Research interests: Open-set recognition, Anomaly detection

Qingdao University of Technology, Bachelor of Science in Applied Mathematics 09/2015-06/2019

Work Experience

Principle Scientist, Physical AI Research, Realhand – Palo Alto, CA 06/2026 – now

- Lead the RealStudio Project. Design and evaluate teleoperation and shared-autonomy methods for manufacturing assembly and training of vision-language-action (VLA) models.
- Conduct research and on end-to-end teleoperation pipelines VR/AR interfaces, wearable sensors, exoskeletons, motion trackers, haptic devices, and stereo vision systems for robotic applications.
- Collaborate with Nvidia and integrate the Realhand product into Isaac ecosystem.

Robotics Intern, Realhand – Palo Alto, CA 12/2025 – 04/2026

- Dexterous hand system: Technical PRD document preparation for contact-rich robot manipulation based on Realhand O6,L6,L20.
- Prepare dexterous hand simulation asset for isaac sim and SDK for python.

Teleoperation Research Intern, Bytedance Inc. – San Jose, CA 08/2025 – 12/2025

- **Isaac Lab & Cloud XR** : Collaborate with Nvidia cloud XR team and develop PICO XR teleop in Isaac Lab. Visualize teleop in XR via webXR.
- **XRRoboToolkit** open source project(>230 followers): Most popular open source XR and robot teleoperation solution with low latency (86ms). Develop rich-contact teleoperation software for XR headset and tactile sensing algorithm on dexterous hands and grippers. Implement π_0 on carpet folding task (dual ARX arms), item sorting task (dual UR5e arms).
- Technical collaboration with the Volcano Engine team on deploying robot teleop systems on cloud and simulation systems for automobile manufacturers (Changan, AITO, Chery), hospitals (Hemodialysis Center), Robot data center (UBTECH, IO intelligence, Atribot, Psibot) and retailers (automobile dealer, shoe retailer).
- Deliver live demos on XR-based robot teleoperation and robot data collection pipeline to Dr.Yonghui Wu (head of Bytedance Seed), leading research labs(Stanford Robotic Institute, Nvidia Gear, Nvidia cloud XR) and leading robotics startups(skild AI,Rhoda AI, RobotEra, Galaxea)

Robotics Intern, TouchTronix Robotics – Buffalo, NY 05/2025 – 08/2025

- TactX sensor project deployment: develop touch sensor API, SDK, and UI software for two-finger gripper.

Research Assistant, Toyota Production Systems Lab – Rochester, NY 06/2023 – 04/2025

- Develop AR/VR system and robot collaboration system for training assembly workers in manufacturing.
- Develop training system for 3D printers and CNC machines.

Skills

Languages and Tools: python, C#, C++, JavaScript, HTML, Java, Unity, QT, OpenXR, WebXR

Robotics: ROS/ROS2, Mujoco, Isaac sim, Isaac Lab, Pinocchio, VLA

AI Models: Diffusion Model, LLM, RL, physical AI agent Hyperbolic Neural Network, Nerf, 3D Gaussian Splatting

Projects

Robot teleoperation and simulation

[XRobotoolkit](#)

- Developed robot teleoperation for Ufactory Xarm, Franka, and UR5 in Nvidia Isaac Lab simulation environment.
- Developed dexterous hand teleoperation for Ufactory Xarm, Franka, and UR5.
- Integrated tactile sensing module into the robot teleoperation system.

AR-based self-supervised 6 Dof Robot Grasping

[xarm moveit package](#)

- Developed a robot system in ROS that learns to grasp unseen objects within 3 demonstrations
- Bridged the robot interaction system with the self-supervised grasping model in Xarm 6-DoF robot arm.
- Integrated self-supervised contrastive learning model to match the unseen object with demonstration.

AR human robot interaction system

Unity Interaction Package

- Developed a human robot interaction panel that allows users to teleoperate with the robot in AR environment.
- Integrated and calibrated stereo camera with the robot and headset (quest 2).

AR teaching system

- Developed interaction panels that allow students to learn three AR courses in the assembly line.
- Enabled eye-tracking feature to evaluate the learning performance using Quest Pro and 3.
- User experiments of assembly CNC components

AR embodied intelligence

- Developed multimodal LLM human robot collaboration system.
- Enabled human robot interaction via verbal, visual, and demonstration
- User experiments of gear set assembly and frame construction.

Publications

- [P1] Xueting Wang, **Xiwen Dengxiong**, Jie-ke Pan, Yunbo Zhang, “Book Chapter on 3D Imaging for AR/VR Applications”, *Second Edition of Handbook of 3D Machine Vision: Optical Metrology and Imaging*.
- [P2] Xueting Wang, **Xiwen Dengxiong**, Shi Bai, Pai Zheng, Yunbo Zhang, “VLAbot: A Human-Vision-Language-Action Models Interaction Framework for Robotic Assembly”. *Robotics and Computer-Integrated Manufacturing* (RCIM 2026).
- [P3] Xueting Wang, **Xiwen Dengxiong**, Shi Bai, Yunbo Zhang, “RoPESim: A Framework for Robot Manipulation Policy Evaluation via Simulation”, *2025 IEEE 21st International Conference on Automation Science and Engineering (CASE 2025)*, Los Angeles, USA. August 2025. Video: <https://www.youtube.com/watch?v=BPrWFmKhWg8>.
- [P4] **Xiwen Dengxiong**, Xueting Wang, Shi Bai, Yunbo Zhang, “Self-supervised 6-DoF Robot Grasping by Demonstration via Augmented Reality Teleoperation System”, *2024 IEEE International Conference on Robotics and Automation (ICRA 2024)*, Yokohama, Japan, May 2024. Video: <https://youtu.be/mcrlj-tX90s>.
- [P5] Wenhao Yang, **Xiwen Dengxiong**, Xueting Wang, Yidan Hu, Yunbo Zhang, ““I Can See Your Password”: A Case Study About Cybersecurity Risks in Mid-Air Interactions of Mixed Reality-Based Smart Manufacturing Applications”, *Journal of Computing and Information Science in Engineering (JCISE)*, March 2024. Video: <https://www.youtube.com/watch?v=gTZPE8S1-0M>.
- [P6] **Xiwen Dengxiong**, Wentao Bao, Yu Kong. “Multiple Instance Relational Learning for Video Anomaly Detection”. *International Joint Conference on Neural Networks (IJCNN)*, Online, June 2021. <https://ieeexplore.ieee.org/document/9534124>

- [P7] **Xiwen Dengxiong**, Yu Kong. "Ancestor Search: Generalized Open Set Recognition via Hyperbolic Side Information Learning". Winter Conference on Applications of Computer Vision (WACV), Waikoloa, Hawaii. https://openaccess.thecvf.com/content/WACV2023/papers/Dengxiong_Ancestor_Search_Generalized_Open_Set_Recognition_via_Hyperbolic_Side_Information_WACV_2023_paper.pdf
- [P8] Xueting Wang, **Xiwen Dengxiong**, Jie-ke Pan, Zipeng Guo, Rui Liu, Yunbo Zhang, "AssemblyMate: An Interactive Context-Aware AI-XR Co-Worker with Multimodal Spatial-Temporal Reasoning for Manufacturing Assembly", *Nature Partner Journal Advanced Manufacturing (Under Review)*.
- [P9] Xueting Wang, **Xiwen Dengxiong**, Shi Bai, Yunbo Zhang, "HALO: Hierarchical Long-horizon Manipulation with Failure Recovery", *Submitted to The 2026 IEEE/RSJ International Conference on Intelligent Robots and Systems (IROS 2026)*, Pittsburg, USA. Video: https://www.youtube.com/watch?v=AB2y6Q_Q1Gw.
- [P10] Jie-ke Pan, Xueting Wang, **Xiwen Dengxiong**, Yunbo Zhang, Zipeng Guo, Chih-Hsing Chu, "Augmented Reality Assisted Human Machine Collaboration Spraying Task", *Submitted to The 2026 ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC 2026)*, Huston, USA.
- [P11] **Xiwen Dengxiong**, Xueting Wang, Rui Li, Yunbo Zhang, "Zero-shot Robot Manipulation via Action Decomposition and Composition". *Submitted to The 2026 IEEE 22nd International Conference on Automation Science and Engineering (CASE 2026)*, Shenyang, China. Video: https://youtu.be/WB-m_ZyHw44.
- [P12] Huadong Zhang, Xueting Wang, **Xiwen Dengxiong**, Justus Robertson, Yunbo Zhang, David Schwartz, Sean Z Gao, Xuhang Yuan, Chao Peng, "LLM-ResiGame: Multi-Agent Large Language Models for Creating Scenario-Based Resilience Games in Critical Infrastructure Decision-Making Practices". *International Journal of Disaster Risk Reduction (IJDRR)(Major Revision)*.
- [P13] **Xiwen Dengxiong**, Xueting Wang, Ke Jing, Yunbo Zhang, "XRoboToolKit 2.0: Teleoperation with Dexterous Hands and Force Sensing". *(Under Preparation)*.

Exhibitions

- [E1] CES 2026 North Hall. Dexterous hand live demo. Las Vegas, NV
- [E2] "Self-supervised 6-DoF Robot Grasping by Demonstration via Augmented Reality Teleoperation System", 2024 IEEE International Conference on Robotics and Automation (ICRA 2024), Yokohama, Japan, May 2024.

Activities and Honors

Academic Service: Reviewer of IROS 24, ICRA 25, Multimedia 21, Multimedia 22, Nature Partner Journal.

Volunteer: SPM 2025 online organizer, RIT open house event

Honors: ICRA travel funds \$ 2000, RIT research scholar \$ 500, IEEE Travel funds \$ 1400, 2026 CASE Best Student Paper Finalist, IDETC-CIE VARE Best Paper Award.

Student Mentoring

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| 1. Liyi Zhang. M.S. student at Rochester Institute of Technology | 01/2021 - 04/2021 |
| 2. Chenrui Chen. M.S. student at The Hong Kong University of Science and Technology. | 08/2025 - present |
| 3. Xudong Zhang. M.S. student at The Hong Kong University of Science and Technology. | 08/2025 - 04/2026 |
| 4. Wei Long. M.S. student at The Hong Kong University of Science and Technology. | 08/2025 - 04/2026 |
| 5. Yi Shao. Undergraduate student at The South China University of Technology. | 08/2025 - 04/2026 |

Presentations

- [P1] Oral Presentation, "Zero-shot Robot Manipulation via Action Decomposition and Composition", 2025 ASME International Design Engineering Technical Conferences & Computers and Information in Engineering Conference (IDETC 2025), Anaheim, California, August 2025.
- [P2] Paper Presentation, "Self-supervised 6-DoF Robot Grasping by Demonstration via Augmented Reality Teleoperation System", 2024 IEEE International Conference on Robotics and Automation (ICRA 2024), Yokohama, Japan, May 2024.