Yazhou (Harry) Zhang

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EDUCATION

Stanford University — California, U.S.
Master of Science in Mechanical Engineering — *Expected 06/2026*
Focus Areas: Robotics and Kinematics (Depth), Automatic Controls and Dynamics (Breadth) — *GPA: 4.0*

University of Toronto (UofT) — Ontario, Canada
Bachelor of Applied Science in Mechanical Engineering — *09/2019 – 05/2024*
Minors: Robotics and Mechatronics, Engineering Business — *GPA: 3.94*

SKILLS & INTERESTS

- **Programming Languages:** C++, Python, MATLAB
- **Robotic Tools and Platforms:** ROS2, Pinocchio, Mujoco, Isaac Gym, PyBullet, OpenCV, Gazebo, RViz,
- **Reinforcement Learning & Control:** PyTorch, TensorFlow, Stable-Baselines3, ACT, PPO, MPC, iLQR, LQR, Impedance Control
- **Hardware & Embedded Systems:** Arduino, Motor Control, Sensor Integration (Encoders, IMUs, Force/Torque Sensors)
- **CAD & Simulation:** SolidWorks, ANSYS, AutoCAD, Creo

INTERNSHIP & RESEARCH EXPERIENCES

XPENG Humanoid | Dexteroius hand manipulation — Shenzhen, China
Embodied Intelligence Intern — *05/2025 – 09/2025*

- Designed and implemented an admittance control framework enabling the dexterous hand to adaptively regulate contact forces; achieved safe manipulation of fragile objects (balloons, chips) and compliant reverse-bending behavior upon rigid contact, demonstrating robust active compliance control.
- Improved computational efficiency by replacing NLopt optimization with a direct qpos formulation, reducing runtime from 40 ms to 0.2 ms; developed a similarity analysis to enable batch comparison of optimized DexRetargeting results, enabling 30+ pose evaluations in 5 minutes for efficient tuning.
- Replicated state-of-the-art methods for fine-grained dexterous manipulation: **DexGen**, which generates stable grasps (any-grasp-to-any-grasp), trains PPO-based trajectories, and applies diffusion policies to filter unsafe retargeting; and **ManipTrans**, which couples imitation learning of hand trajectories with reinforcement learning that accounts for object motion to achieve precise manipulation.

Salisbury Lab | Tendon Actuated Robotic Arm — California, U.S.
Research Assistance — *01/2025 – 06/2025*
Project: (n+1) DOFs Tendon-Actuated Robotic Arm with Adjustable Compliance – Supervisor: Kenneth Salisbury

- Developed impedance-based position and torque control algorithms for a tendon-actuated robotic arm, achieving accurate trajectory following and real-time self-adjustable compliance across 1-DOF and 3-DOF systems.
- Implemented stiffness perception methods leveraging motor position and torque data to infer material properties, enabling adaptive interaction with objects of varying stiffness, including both linear and stiffening materials.

RELEVANT ENGINEERING PROJECTS

Mobilebase robotic arm manipulation for rice cooking — *03/2025 – 06/2025*

- Built a sim-to-real pipeline with MuJoCo and OpenSai to prototype perception and validate full-stack control, enabling safe deployment of a mobile manipulator for semi-autonomous rice cooking.
- Designed a hierarchical finite-state machine integrating vision, motion planning, and force/trajectory controllers to execute 10+ multi-stage kitchen tasks (e.g., grasping, pouring, compliant button pressing) with centimeter-level positional accuracy and stable contact transitions**.**

Frontier Exploration on TurtleBot — *09/2024 – 12/2024*

- Utilized modular ROS2 node communication to enable efficient data exchange between vision, navigation, and real-time control systems, forming the foundation of the exploration framework.
- Developed a ROS2-based frontier exploration system in Python combining the A* algorithm, ICP for pose estimation, and extended Kalman filter for sensor fusion, achieving 100% mapping accuracy in simulation and 82% coverage in hardware environments.
- Enhanced exploration capabilities by integrating stop sign detection using computer vision techniques, laying the groundwork for future object detection and fully autonomous navigation.