Shucheng Jia

Durham, NC, USA | shucheng.jia@duke.edu | Website

EDUCATION

Duke University **Durham, NC**
M.S. in Mechanical Engineering and Materials Science Aug 2025 – May 2027 (Expected)
Coursework: Robotics, Control Theory, Medical Robotics, Data Science & Machine Learning GPA: 4.0/4.0

Ritsumeikan University **Osaka, Japan**
B.Eng. in Information Science and Systems Engineering Apr 2021 – Feb 2025
Honors: Saionji Memorial Scholarship (awarded for academic excellence) GPA: 3.7/4.0

RESEARCH EXPERIENCE

General Robotics Lab, Duke University (Advisor: Prof. Boyuan Chen) **Durham, NC**
Research Assistant May 2026 – Present

CoDance | Learning Reactive and Compliant Human-Humanoid Interaction from Video

- Built an **asymmetric actor-critic PPO** pipeline with a privileged critic and decoupled upper/lower-body rewards, reaching **99.6% partner-following success** in simulation with 4× the wrist compliance of a stiff tracker.
- **Deployed the policy on a Unitree G1** with Vicon motion capture (50 Hz policy), sustaining fall-free two-hand dancing with a human for up to 39 s and holding the 0.5 m partner distance within 0.1 m 73–93% of the time.

Modular Legged Robot Design & RL Locomotion (in progress)

- Trained separate **PPO locomotion policies for biped and quadruped robots**, tailoring observations and rewards to each kinematic structure; **both now walk on hardware**.
- Designed **modular joint-connector templates**, assembled the robots, and integrated onboard compute, servo control, and IMU feedback, resolving servo torque limits, IMU noise, and latency in sim-to-real deployment.

Lab Automation (in progress)

- Integrating **FoundationPose** 6D pose tracking with RGB-D sensing and SAM segmentation to feed tool-to-target pose error into PD visual servoing (ongoing).
- Modeled **all 7 lab instruments** and designed custom manipulation fixtures in CAD; improved an **automated fixture-generation tool**, succeeding on all 33 simulated and 7 real-world labware tests.

PUBLICATIONS

- Z. Chen, **S. Jia**, B. Chen. "CoDance: Learning Reactive and Compliant Human-Humanoid Interaction from Video." Under review at *ICRA 2027*. arXiv:2610.05324.
- W. Liu, **S. Jia**, M. Svinin. "Super-Ellipse Control Barrier Functions for Enhanced Obstacle Avoidance in Complex Multi-Agent Environments." *IEEE ICRAS 2025*. DOI: 10.1109/ICRAS65818.2025.11108843.

PROJECTS

SE-CBF | Safe Mobile Robot Navigation **Osaka, Japan**
Graduation Research (Advisors: Prof. Wenbin Liu, Prof. Mikhail Svinin) Oct 2023 – Jan 2025

- Formulated **super-ellipse control barrier functions (SE-CBF)** within a QP controller to reduce overly conservative avoidance, **halving multi-robot task time** versus standard CBF (123 s → 62 s).
- Localized obstacles with OpenCV color segmentation and pixel-to-world mapping; validated the controller in ROS/Gazebo and on physical robots.

Dual-Arm Tic-Tac-Toe | Coordinated Bimanual Manipulation **Durham, NC**
Individual Project Sep 2025 – Dec 2025

- Built a **ROS 2 perception-to-decision pipeline** that fuses RGB-D 3D localization with a Python game engine, enabling two Kinova Gen3 Lite arms to play tic-tac-toe autonomously.
- Integrated MoveIt 2 IK, motion planning, and collision checking for pick-and-place with per-turn visual state updates, reaching **90% success in Gazebo and 50% on hardware**.

SKILLS

Programming: Python, C++, C, MATLAB, Java, Linux
Robot Learning & Control: Reinforcement Learning (PPO), Isaac Gym, MuJoCo, Model Predictive Control (MPC), Control Barrier Functions (CBF), Sim-to-Real Transfer
Robotics Software & Hardware: ROS/ROS 2, MoveIt 2, Gazebo, OpenCV, YOLOv8, CAD, 3D Printing