

Anlun Huang

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RESEARCH & WORK AREA

Robot Learning, Loco-manipulation, Whole-body Control, Neural Motion Planning; **Soft Robotics**, Continuum Robot Modeling

EDUCATION

University of California San Diego (UCSD) Department of Electrical and Computer Engineering	La Jolla, USA Master of Science in Intelligent Systems, Robotics & Control	Sept. 2023 – Jun. 2025
Southern University of Science and Technology (SUSTech) Department of Mechanical and Energy Engineering	Shenzhen, China Bachelor in Robotics Engineering	Sept. 2019 – Jun. 2023

RESEARCH EXPERIENCE

Graduate Student Researcher Nov. 2023 – present

Prof. Michael Yip, Advanced Robotics and Controls Laboratory, UCSD Contextual Robotics Institute La Jolla, USA

- Developing **imitation learning** and **reinforcement learning** methods to enable the **humanoid robot** to perform **loco-manipulation** tasks such as tray holding and trolley pushing, integrating **whole-body control** for stable and efficient execution.
- Introduced **Test-time Informed Sampling (TIS)**, a general test-time approach to **enhance neural planners' performance in unfamiliar environments**, reducing failures in real-world deployment. Designed an efficient constraint projection method with a learned differentiable collision checker (DiffCo) to mitigate invalid samples during inference. [\[1\]](#)
- Evaluated TIS with **neural motion planners (VQ-MPT, MPNet, M π Net)** trained on **simplistic synthetic datasets**. Achieved a 15% improvement in success rate, 50% reduction in planning time, and 80% fewer invalid samples in challenging **real-world out-of-distribution (OOD) environments**. [\[1\]](#)

Undergraduate Student Researcher Dec. 2020 – Aug. 2023

Prof. Zheng Wang, Bionic Robotics and Control Laboratory, SUSTech Institute of Robotics Shenzhen, China

- Introduced a novel **foam-embedded soft robotic joint design (Fe-Joint)** that effectively **reduces undesired oscillations** in soft robot motion. Integrated the Fe-Joint into the new **continuum soft robotic arm (Fe-Arm)** and defined four key performance metrics to optimize the design further. [\[2\]](#) [\(Demo Video\)](#)
- Proposed an **iterative self-improving learning strategy (ISL)** with the **LSTM architecture for end-to-end inverse kinematic modeling** of the Fe-Arm. Achieved a modeling error of less than 10% relative to the maximum horizontal radius of motion, even with limited data availability and human intervention. [\[2\]](#) [\(Code\)](#)

Undergraduate Student Researcher Dec. 2021 - Sept. 2022

Prof. Hongqiang Wang, Advanced Actuators and Robotics Lab, SUSTech Institute of Robotics Shenzhen, China

- Designed the **SR-Tank**, a revolutionary soft robot utilizing **origami twisting soft pneumatic actuators (OT-SPAs)** in conjunction with bellows, enabling **multidirectional movement on complex terrains and adjustable width**. Formulated the kinematic model for OT-SPAs. Developed the pneumatic control and vision system of the robot, facilitating **motor-like mobility** for the SR-Tank.
- The champion of "The IEEE RoboSoft Competition 2022 Locomotion Scenario".**

INTERNSHIP EXPERIENCE

Mechanical Engineering Intern Jun. 2021 – Jul. 2021

Research and Development Department, MileBot Robotics Co., Ltd. Shenzhen, China

- Designed a specialized **unilateral lower extremity exoskeleton robot** for bed rest patients, integrating a worm gear actuation method and a four-bar linkage mechanical structure. Developed a control system tailored to meet the specific rehabilitation requirements of patients, particularly those recovering from stroke.

Research Intern Aug. 2021

FlexoLink Technology Co., Ltd. Shenzhen, China

- Developed a **robot manipulator force-feedback system** based on **electromyography signal**. Employed neural networks for real-time recognition of human hand gestures and grip force, enabling manipulation tasks. Integrated pressure sensor data from the manipulator to provide feedback through a force feedback device worn by the user.

PUBLICATIONS

- Zhi, Y., **Huang, A.**, & Yip, M. (2025). TIS: Test-time Informed Sampling with Differentiable Collision Checking for Out-of-Distribution Neural Motion Planning. **2025 International Conference on Machine Learning (ICML)**. (Submitted)
- Huang, A.**, Cao, Y., Guo, J., Fang, Z., Su, Y., Liu, S., ... & Wang, Z. (2024). Foam-Embedded Soft Robotic Joint with Inverse Kinematic Modeling by Iterative Self-Improving Learning. **IEEE Robotics and Automation Letters (R-AL)** and **2024 International Conference on Intelligent Robots and Systems (IROS)**.
- Fang, Z., Huang, C., Wang, Y., Xu, J., Tan, J., Li, B., ... **Huang, A.**, ... & Wang, Z. (2022). Multi-Dimensional Proprioception and Stiffness Tuning for Soft Robotic Joints. **2022 International Conference on Robotics and Automation (ICRA)**.