

# Zhi (Leo) Wang

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## Education

### Tsinghua University

B.ENG. IN ELECTRONIC ENGINEERING

Advisor: Prof. Milin Zhang and Prof. Jianyu Chen

Beijing, China

Sep. 2020 - Present

### University of Illinois Urbana-Champaign

VISITING STUDENT IN ROBOTOUCH LAB, COMPUTER SCIENCE DEPARTMENT

Advisor: Prof. Wenzhen Yuan

Champaign, USA

Mar. 2024 - Sep. 2024

## Publications

### DoorMan: Closed-Loop Task Planning and Manipulation for Door Opening in the Wild with Haptic Feedback

Zhi Wang\*, Yuchen Mo\*, Shengmiao Jin, Wenzhen Yuan

IEEE International Conference on Robotics and Automation (ICRA), 2025, Under Review

[Paper], [Video], [Code], [Website]

### KOSMOS-E: Learning to Follow Instruction for Robotic Grasping

Zhi Wang\*, Xun Wu\*, Shaohan Huang, Li Dong, Wenhui Wang, Shuming Ma, Furu Wei

IEEE International Conference on Intelligent Robots and System (IROS), 2024

[Paper], [Video], [Code], [Website]

## Research Experience

### University of Illinois Urbana-Champaign (UIUC)

RESEARCH ASSISTANT AT ROBOTOUCH LAB, ADVISED BY PROF. WENZHEN YUAN

Champaign, USA

Mar. 2024 - Present

- **Research Topics: Mobile Manipulation, Humanoid Robot with Mobile Base, Bimanual Manipulation for Articulated Objects in the Open World**
- Proposed DoorBot, a haptic-aware closed-loop hierarchical control framework that enables robots to explore and open different unseen doors in the wild.
- Contributions: (1) Primitives Design (Split whole task into high-level and low-level components) (2) Grasping-and-Unlocking Model (Translate RGB to action parameters) (3) Closed-loop System with Haptic Feedback
- We test our system on 20 unseen doors across different buildings, featuring diverse appearances and mechanical types. Our framework achieves a 90% success rate, demonstrating its ability to generalize and robustly handle varied door-opening tasks.

### Microsoft Research Asia (MSRA)

RESEARCH INTERN AT NLC GROUP, ADVISED BY DR. SHAOHAN HUANG

Beijing, China

June. 2023 - Mar. 2024

- **Research Topics: Multimodal Large Language Model for Robotic Grasping**
- Proposed KOSMOS-E, a Multimodal Large Language Model (MLLM) that leverages instruction-following robotic grasping data to enhance capabilities for precise and intricate robotic grasping maneuvers.
- Proposed INSTRUCT-GRASP, a large-scale instruction-following robotic grasping dataset comprising 1.8 million grasping samples, 8 instruction types, 3 information sources, 3 tasks, and 2 scenes.

### Institute for Interdisciplinary Information Sciences (IIIS), Tsinghua

RESEARCH ASSISTANT AT ISR-LAB, ADVISED BY PROF. JIANYU CHEN

Beijing, China

Sep.2021 - Sep. 2022

- **Research Topics: Bipedal Humanoid Robot in the Wild**
- Introducing STAR1, a versatile humanoid robot capable of superior locomotion performance in diverse environments, where I finished the efficient BLDC-FOC motor driver design and whole-body circuit design.

## Industry Experience

### EncoSmart Technology (Beijing) Co., LTD.

Beijing, China

ROBOTICS AND COMPUTER VISION INTERN. [\[CODE\]](#) [\[WEBSITE\]](#)

Apr. 2023 - Jul. 2023

#### • Research Topics: Frying and Cooking Robot

- Developed a core vision component of LAVA for robotic grasping, which is a fully automated intelligent frying and cooking system.
- Created a highly precise and autonomous hand-eye calibration tool that enabled complicated robotic manipulation tasks like magnet suction, mobile manipulator calibration, and visual grasping.

## Projects Portfolio

### Image&Sensor-Based EIS Virtual Gimbal Embedded in SD Card

Beijing, China

FOUNDER & DEVELOPER

Nov. 2021 - May. 2022

- Developed a novel video stabilization solution using a custom SD card with integrated IMU and FlowNet2-based optical flow.

### Intelligent Aelos Robot

Beijing, China

CORE MEMBER & DEVELOPER

Jul. 2021 - Dec. 2021

- Developed a highly functional Aelos robot using PYNQ, featuring robust obstacle avoidance and efficient motion planning.

## Robotics Competitions

2023 **RoboCup 2023 (Robot World Cup)**, Home Service Robot

Bordeaux, France

2021 **EDC 2021 (Electronic Design Competition)**, Intelligent and Agile Vehicle

Beijing, China

## Research Interests

**Robot Learning** Reinforcement Learning, Imitation Learning

**Robotic Manipulation** Robotic Grasping, Mobile Manipulation, Bimanual Manipulation, Long-Horizon Manipulation

**Multimodal Learning** Tactile/Haptic Sensing, Computer Vision

## Honors & Awards (selected)

Oct, 2024 **Tsinghua University Science and Technology Innovation Scholarship (1 %)**, (2021, 2023, 2024)

Beijing, China

Oct, 2024 **Grand Prize of Tsinghua University International Study Scholarship (1 %)**, EE Department

Beijing, China

Apr. 2021 **Third Prize**, The 4th Tsinghua University Software Design Competition

Beijing, China

Apr. 2021 **Third Prize**, The 4th Tsinghua University Artificial Intelligence Challenge

Beijing, China

## Teaching Experience

2022 **Teaching Assistant**, THU 40231212: Intelligent Robots Design and Implementation

Beijing, China

2021 **Teaching Assistant**, THU 20230292: Project Design and Making of Electronic System

Beijing, China

2021 **Teaching Assistant**, THU 01550013: Synthetical Practice of Electronics System Design

Beijing, China

## Leaderships&Activities

**Chair of the EE Hardware Group at Tsinghua University.** Hosted two competitions with over 450 participants (2021-2023).

## Skills

**Programming** Python, C/C++, Linux Shell, MATLAB, Verilog,  $\LaTeX$

**Frameworks** PyTorch, NumPy, OpenCV, Git, Anaconda, Docker

**Hardware** Microcontroller Programming (STM32, ESP32, Arduino, FPGA), PCB Design, BLDC-FOC Driver

**Robotic Platforms** UR5e Robot Arm, FR5 Robot Arm, RealMan Humanoid Robot, Aelos Robot, ROS1/2, PyBullet, Realsense, Kinect

**Robotics** Frying and Cooking Robot, Home Service Robot, Bipedal Humanoid Robot, Mobile Humanoid Robot