Zhi (Leo) Wang

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Education

University of Maryland, College Park — *Aug. 2025 - Present*
PH.D IN COMPUTER SCIENCE DEPARTMENT
Advisor: **Prof. Yiannis Aloimonos** — *College Park, USA*

Tsinghua University — *Sep. 2020 - Present*
B.ENG. IN ELECTRONIC ENGINEERING
Advisor: **Prof. Milin Zhang** and **Prof. Jianyu Chen** — *Beijing, China*

University of Illinois Urbana-Champaign — *Mar. 2024 - Nov. 2024*
VISITING STUDENT (ON-SITE) IN COMPUTER SCIENCE DEPARTMENT
Advisor: **Prof. Wenzhen Yuan** — *Champaign, USA*

Publications

[C2] DoorBot: 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***
[Paper], [Video], [Code], [Website], [Dataset], [UIUC Summary], [UIUC Freshmen Welcome Video]

[C1] 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, Oral***
[Paper], [Video], [Code], [Website], [Dataset]

Research Experience

University of Maryland, College Park (UMD) — *Aug. 2025 - Present*
PERCEPTION AND ROBOTICS GROUP, ADVISED BY PROF. YIANNIS ALOIMONOS — *College Park, USA*

- **Research Topic: Learning-based Robotic Manipulation with Multimodal Sensing**

University of Illinois Urbana-Champaign (UIUC) — *Mar. 2024 - Nov. 2024*
RESEARCH ASSISTANT AT ROBOTOUCH LAB, ADVISED BY PROF. WENZHEN YUAN — *Champaign, USA*

- **[C2] Research Topics: Mobile and Bimanual Manipulation for Articulated Objects in the Open World**
- Proposed **DoorBot**, a hierarchical, closed-loop, haptic-aware control framework with unified action representation, enabling a bimanual, mobile robot to explore and open diverse unseen doors in the wild. DoorBot achieves a **90%** success rate across 100 trials on totally **20 unseen doors** in the UIUC Campus.
- Main Contributions: **(1)** Primitives Design: **Well-designed primitives** split the whole task into the high-level planner and low-level policy to lower the dimensionality. **(2)** Grasping-and-Unlocking Model: **A novel action representation** maps RGB images to 3D action parameters. **(3)** Closed-loop System with Haptic Feedback: Robots learn from mistakes adaptively, correct actions autonomously, **sense object attributes from haptics**.

Microsoft Research Asia (MSRA) — *Jun. 2023 - Mar. 2024*
RESEARCH INTERN AT NLC GROUP, ADVISED BY DR. SHAOHAN HUANG — *Beijing, China*

- **[C1] Research Topics: Multimodal Learning for Semantically Robotic Grasping**
- Proposed **KOSMOS-E**, a Multimodal Large Language Model (**MLLM**) combining visual and textual information to enhance capabilities for semantically robotic grasping maneuvers.
- Proposed **INSTRUCT-GRASP**, a large-scale, instruction-following, multimodal, robotic grasping dataset comprising **1.8 million** grasping data, 2 modalities, 8 instruction types, 3 information sources, 3 tasks, and 2 scenes.
- KOSMOS-E achieves an **85.19%** success rate for image-wise evaluation and a **72.63%** success rate for object-wise evaluation on Cornell Grasping Dataset.

Institute for Interdisciplinary Information Sciences (IIIS), Tsinghua *Sep.2021 - Sep. 2022*

Research Assistant at ISR-LAB, Advised by Prof. Jianyu Chen *Beijing, China*

- **Research Topics: The World's Fastest Humanoid Robot in the Wild [Website] [Media]**
- Designed 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 power supply.
- As the prototype of RobotEra's **STAR1**, **the fastest humanoid robot** in the open world at that time, it attracts numerous media reports and commercial interests.

Industry Experience

EncoSmart Technology (Robotics Startup) *Beijing,China*

Robotics and Computer Vison Intern. [Code] [Website] *Apr. 2023 - Jul. 2023*

- **Topics: Autonomous Frying and Cooking Robot**
- Developed a crucial vision module for robotic grasping and insertion, helping LAVA, an autonomous cooking and frying robot, achieve **sub-millimeter accuracy**.

Research Interests

My research lies at the intersection of robotics, learning, manipulations, and interactions. My ultimate goal is to develop **intelligent manipulation systems** and **general-purpose robot foundation models**. Some sub-goals could be:
(1) Multimodal Leaning: Integrating **vision, language, touch, audio** for fine-grained and effective manipulation.
(2) Robot Learning: Using **imitation learning and reinforcement learning** for long-horizon embodied interaction.
(3) Human-Robot Interaction: Enabling robots to **safely and intelligently interact** with humans in the open world.
(4) Generalizability: Developing **generalizable policies and learning architectures** across diverse embodiments.

Leaderships & Activities

Chair of the Electronic Engineering Hardware Group *2021-2023*

30-Person Team, Tsinghua University [Website] *Tsinghua University*

- Organized two major annual, university-wide competitions, engaging over **450 participants**.

Leader of Hardware and Vision Team in Future Robot Club *2021 - 2023*

15-Person Team, Tsinghua University [Website] [GitHub] *Bordeaux, France*

- Led the team of Tinker, a domestic service robot, participating in annual **RoboCup@Home** Competition.

Teaching Experience

Fall 2025	**Graduate Teaching Assistant**, CMSC420: Advanced Data Structure	*UMD*
2022	**Head Teaching Assistant**, 40231212: Intelligent Robots Design and Implementation	*Tsinghua University*
2021	**Head Teaching Assistant**, 20230292: Project Design and Making of Electronic System	*Tsinghua University*
2021	**Head Teaching Assistant**, 01550013: Synthetical Practice of Electronics System Design	*Tsinghua University*

Honors & Awards (selected)

Oct, 2024	**Science and Technology Innovation Scholarship (1 %) , Three times: 2021, 2023, 2024**	*Tsinghua University*
Oct, 2024	***Grand Prize* of International Study Scholarship (0.2 %) , Only 2 in 1018 People**	*Tsinghua University*
Jul. 2023	**Top 8 in the world in RoboCup@Home Competition (2 %)**, Domestic Service Robot	*Bordeaux, France*
Dec. 2021	**Winner Price (5 %)**, The 23rd Electronic Design Competition	*Tsinghua University*
Apr. 2021	**Third Prize (5 %)**, The 4th Software Design Competition	*Tsinghua University*
Apr. 2021	**Third Prize (5 %)**, The 4th Artificial Intelligence Challenge	*Tsinghua University*

Skills

Programming	**Python** (PyTorch, NumPy, OpenCV), **C/C++**, Linux Shell, MATLAB, Verilog, LaTeX
Software Tools	Git, Anaconda, Docker, **ROS1/2**, **PyBullet**
Hardware System	**Mechanics** (Solidworks, Blender, Cura), **Electronics** (STM32, ESP32, Arduino, FPGA, **PCB Design**)
Robotics	**Gelsight Mini**, **UR5e Robot Arm**, **RealMan Humanoid Robot**, FR5 Robot Arm, Realsense, Kinect