



# Zihong Luo

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## Profile

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Research-driven undergraduate transitioning from **Multimodal Perception** to **Embodied Intelligence**. Possesses a strong track record in representation learning (publications in **AAAI**, **BIBM**, **ICPR**) and recent hands-on experience in **VLA policy learning** and **robotic manipulation**. Seeking a **Master's program** to bridge the gap between high-level AI reasoning and low-level **control/dynamics**, aiming to build generalizable robotic agents that interact robustly with the physical world.

## Education

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### University of Liverpool (UoL)

BSc in Computing Science — **GPA: 3.87/4.0** — **Major GPA: 3.93/4.0** Top 5%

Liverpool, UK

Expected Jun 2026

### Xi'an Jiaotong-Liverpool University (XJTLU)

BSc in Information & Computing Science — **GPA: 3.87/4.0** — **Major GPA: 3.93/4.0** Top 5% Sep 2022 – Jun 2026

Suzhou, China

**Relevant Coursework:** Machine Learning, Deep Learning, Computer Vision, Knowledge Representation.

## Research Experience

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### SmartLab, University of Liverpool

Research Assistant (Advisor: Prof. Trendaferov)

Liverpool, UK

Oct 2025 – Present

- **Project:** High-level trajectory reasoning for robotic end-effectors (Final Year Project).
- Proposed **GVLA**, a gripper-aware Vision-Language-Action policy using Mixture-of-Experts to fuse gripper morphology with visual input.
- Engineered a unified text bottleneck to align natural language instructions with **kinematic constraints**, demonstrating zero-shot transfer to unseen tools on real-robot benchmarks (Franka)

### Jifu Medical (AI Algorithm Group)

Algorithm Intern — Multimodal Robotics & Perception

Shenzhen, China

Jun 2025 – Aug 2025

- Led the feasibility study for extending clinical workflow from recognition to **robotic manipulation**.
- Deployed **ACT** and **ALOHA** frameworks; built a full control loop using **LeRobot** for data logging and teleoperation on SO-101 dual-arm robots.
- Prototyped a Sim-to-Real pipeline using **NVIDIA Isaac Sim**, mapping perception data to actionable policies.

### MBZUAI

Research Assistant (Remote, Advisor: Prof. Imran Razzak)

Abu Dhabi, UAE

Dec 2024 – Jul 2025

- Developed a **Modality Prior Aligner** leveraging Medical LLMs to guide pixel-level segmentation.
- Designed a fusion decoder with iterative mask optimization, bridging the gap between semantic reasoning and dense prediction (relevant to robotic affordance detection).
- Outcome: Paper submitted to **BIBM 2025**.

### University of Exeter

Summer Research Assistant (Advisor: Prof. Yanda Meng)

Exeter, UK

Mar 2024 – Aug 2024

- Contributed to **IMDR**, a framework for disentangling shared vs. specific modalities in noisy environments.

- Implemented proxy-learning modules to ensure robust representation under missing data, a key challenge in sensor fusion.
- Outcome: Accepted at **AAAI 2025** (Oral/Poster).

## Tongji University School of Medicine (TUSM)

Research Contributor (Prof. Xiaoyun Xie)

Shanghai, China

Nov 2023 - Jan 2024

- Built interpretable ML models for **DPN/LEAD** prediction; applied **SHAP** for risk factor analysis aiding DFU prevention.

## XJTLU

Research Assistant

Suzhou, China

Sep 2023 – Nov 2023

- Developed encoder–decoder with Deep Belief Network for **modality completion**; dual losses for accuracy and integration; accepted at **ICPR 2024**. (Prof. Xiaobo Jin)
- Integrated **image + temporal** signals via spiking networks for anomaly detection; published at **ICPR 2024**. (Prof. Shuliang Zhao)

## Publications

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- PG-SAM: Prior-Guided SAM with Medical for Multi-organ Segmentation (BIBM)** 2025
- Yiheng Zhong\*, **Zihong Luo\***, et al. [arXiv].
- Incomplete Modality Disentangled Representation for Ophthalmic Diagnosis (AAAI)** 2024
- Chengzhi Liu\*, Zile Huang\*, **Zihong Luo**, et al. [Project].
- ARIF: Adaptive Attention-Based Cross-Modal Representation Integration (ICANN)** 2024
- Chengzhi Liu\*, **Zihong Luo\***, et al. [SpringerLink].
- MTSA-SNN: Multimodal Time Series via Spiking Neural Networks (ICPR)** 2024
- Chengzhi Liu\*, **Zihong Luo\***, et al. [SpringerLink].
- MC-DBN: Modality Completion with Deep Belief Networks (ICPR)** 2024
- **Zihong Luo\***, Chengzhi Liu\*, et al. [SpringerLink].
- Interpretable ML for Peripheral Neuropathy & LEAD (BMC Medical Informatics)** 2024
- Ya Wu, Danmeng Dong, **Zihong Luo**, et al. [SpringerLink].

## Robotics & Hardware Projects

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- LeRobot SO-101 Implementation | Python, PyTorch, LeRobot** 2025
- Implemented dual-arm teleoperation and data collection pipelines; synchronized dual-camera streams for imitation learning.
  - Recorded and validated 50+ episodes for manipulation tasks, contributing to the open-source robot learning community.
- Bipedal Wheeled Robot Reproduction | C++, Arduino, ESP32** 2025
- Built a self-balancing wheel-legged robot from scratch. Implemented **Inverse Kinematics (IK)** for 5-link leg structure.
  - Designed cascaded **PID controllers** for balance and velocity control using IMU feedback; achieved stable RC locomotion.
  - *This project demonstrates capability in embedded systems and classical control theory.*

## Skills

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**AI & Compute:** Python, PyTorch, TensorFlow, OpenCV, Transformers, LLMs

**Robotics & Sim:** ROS/ROS2, Isaac Sim, MuJoCo, LeRobot, URDF, Kinematics (IK/FK)

**Hardware & Embedded:** C++, Arduino, Raspberry Pi, Sensors (IMU, LiDAR)

**Awards:** International Quant Championship (Top 0.1%, UK Finals), Biology Olympiad (Provincial 1st Prize)