



# Zihong Luo

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## Profile

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

<b>University of Liverpool (UoL)</b> <i>BSc in Computing Science — GPA: 3.87/4.0 (First Class Honours projected)</i>	<i>Liverpool, UK</i> <i>Expected Jun 2026</i>
<b>Xi'an Jiaotong-Liverpool University (XJTLU)</b> <i>BSc in Information &amp; Computing Science — GPA: 3.87/4.0</i>	<i>Suzhou, China</i> <i>Sep 2022 – Jun 2026</i>

**Relevant Coursework:** Machine Learning, Deep Learning, Numerical Analysis, Applied Physics, Optimization.

## Research Experience

<b>SmartLab, University of Liverpool</b> <i>Research Assistant (Advisor: Prof. Trednaferov)</i>	<i>Liverpool, UK</i> <i>Oct 2025 – Present</i>
<ul style="list-style-type: none"><li>– <b>Project:</b> High-level trajectory reasoning for robotic end-effectors (Final Year Project).</li><li>– Proposed <b>GVLA</b>, a gripper-aware Vision-Language-Action policy using Mixture-of-Experts to fuse gripper morphology with visual input.</li><li>– Engineered a unified text bottleneck to align natural language instructions with <b>kinematic constraints</b>, demonstrating zero-shot transfer to unseen tools on real-robot benchmarks.</li></ul>	
<b>Jifu Medical (AI Algorithm Group)</b> <i>Algorithm Intern — Multimodal Robotics &amp; Perception</i>	<i>Shenzhen, China</i> <i>Jun 2025 – Aug 2025</i>

- 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.

<b>MBZUAI</b> <i>Research Assistant (Remote, Advisor: Prof. Imran Razzak)</i>	<i>Abu Dhabi, UAE</i> <i>Dec 2024 – Jul 2025</i>
<ul style="list-style-type: none"><li>– Developed a <b>Modality Prior Aligner</b> leveraging Medical LLMs to guide pixel-level segmentation.</li><li>– Designed a fusion decoder with iterative mask optimization, bridging the gap between semantic reasoning and dense prediction (relevant to robotic affordance detection).</li><li>– Outcome: Paper submitted to <b>BIBM 2025</b>.</li></ul>	

<b>University of Exeter</b> <i>Summer Research Assistant (Advisor: Prof. Yanda Meng)</i>	<i>Exeter, UK</i> <i>Mar 2024 – Aug 2024</i>
<ul style="list-style-type: none"><li>– Contributed to <b>IMDR</b>, a framework for disentangling shared vs. specific modalities in noisy environments.</li></ul>	

- 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)

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## Publications

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

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## Robotics & Hardware Projects

<b>LeRobot SO-101 Implementation   Python, PyTorch, LeRobot</b>	<i>2025</i>
– 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.	
<b>Bipedal Wheeled Robot Reproduction   C++, Arduino, ESP32</b>	<i>2025</i>
– Built a self-balancing wheel-legged robot from scratch. Implemented <b>Inverse Kinematics (IK)</b> for 5-link leg structure.	
– Designed cascaded <b>PID controllers</b> for balance and velocity control using IMU feedback; achieved stable RC locomotion.	
– <i>This project demonstrates capability in embedded systems and classical control theory.</i>	

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## Skills

**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)