Zihong Luo

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Education

The University of Liverpool (UOL) Bachelor of Computing Science
Currently studying Year 2 - GPA: 3.796/4.0 *Expected June 2026*

- Liverpool, UK
- The average score in the Year 2 (Third year) was 79

Xi'an Jiaotong-Liverpool University (XJTLU) Bachelor of Science in Information and Computing Science
GPA: 3.75/4.0 *Expected June 2024*

- SuZhou, China
- The average score in the freshman year was 74
- The average score in the Second year was 70

Experience

PG-SAM: Prior-Guided SAM with Medical for Multi-organ Segmentation Dec–July 2025
Research Assistant, Supervised by Professor Imran Razzak *MBZUAI*

- Devised a fine-grained modality prior aligner that leverages a medical LLM to bridge the domain gap between high-level textual semantics and pixel-level image details.
- Engineered a multi-level feature fusion decoder with iterative mask optimization, enhancing segmentation accuracy and supporting unprompted learning.
- Validated the approach on the Synapse dataset, achieving state-of-the-art performance as showcased at MICCAI2025, with the implementation publicly available.

Multi-modal Deletion Completion of OCT and Fundus Medical Images Mar-Aug 2024
Summer Research Assistant, Supervised by Professor Yanda Meng *University of Exeter*

- Developed the experimental setup and implemented the core code for an Incomplete Modality Disentangled Representation strategy.
- Disentangled features into modal-common and modal-specific components using mutual information and designed a joint proxy learning module to reduce intra-modality redundancy, enhancing multimodal representations and recovering missing semantics.
- Validated the approach across four ophthalmology datasets, achieving significant improvement over state-of-the-art methods.

Interpretable Machine Learning Models for Detecting Peripheral Neuropathy and Lower Extremity Arterial Disease 2024
Research Contributor, Supervised by Professor Xiaoyun Xie *TUSM*

- Developed machine learning models to predict diabetic peripheral neuropathy (DPN) and lower extremity arterial disease (LEAD).
- Performed data preprocessing and feature engineering to enhance model interpretability.
- Utilized SHAP values to identify critical shared and unique risk factors, aiding in diabetic foot ulcer (DFU) prevention.

A Deep Belief Network-Based Model for Modality Completion Sep-Nov 2023
Research Assistant, Supervised by Professor Xiaobo Jin *XJTLU*

- Developed a framework for handling incomplete multi-modal data using an encoder-decoder structure with attention fusion.

- Created two loss functions: one to improve the encoder's data completion accuracy and another to enhance data integration.
- Built an encoder-decoder model combining deep belief networks (DBNs) and attention mechanisms for better multi-modal data analysis.

A Multi-modal Time Series Analysis Model Based on Spiking Neural Network Jun-Sep 2023
Research Assistant, Supervised by Professor Shuliang Zhao *XJTLU*

- Developed a multi-modal pulse peak network for detecting heart rate anomalies.
- Integrated image and time series data to overcome limitations of single-modal approaches, achieving strong classification performance.
- Innovated the application of pulse peak networks in heart rate anomaly detection, enhancing speed and resource efficiency.

International Quant Championship (IQC) – Top 0.1% Worldwide 2025
Team Member, WorldQuant *United Kingdom*

- Ranked in the top 0.1% of 79,000+ participants worldwide in IQC 2025, advancing to the National/Regional Finals with a highly commended presentation.
- Designed and implemented systematic trading strategies leveraging statistical modeling, factor analysis, and alpha generation.
- Invited to join WorldQuant's Research Consultant Program, with merit-based financial compensation and access to advanced quant research tools.

Articles

PG-SAM: Prior-Guided SAM with Medical for Multi-organ Segmentation 2025
- Author List: Yiheng Zhong∗, **Zihong Luo**∗, Chengzhi Liu, Feilong Tang, Zelin Peng, Ming Hu, Yingzhen Hu, Jionglong Su, Zongyuan Geand, Imran Razzak
- PDF: arXiv:2503.18227

Incomplete Modality Disentangled Representation for Ophthalmic Disease Grading and Diagnosis 2024
- Accepted by The 39th Annual AAAI Conference on Artificial Intelligence (**AAAI2025**)
- Author List: Chengzhi Liu∗, Zile Huang∗, Feilong Tang, Yu Tian, Zhongxing Xu, **Zihong Luo**, Yalin Zheng, Yanda Meng
- Project: Project Link

ARIF: An Adaptive Attention-Based Cross-Modal Representation Integration Framework 2024
- Accepted by International Conference on Artificial Neural Networks(**ICANN2024**)
- Author List: Chengzhi Liu*, **Zihong Luo***, Yifei Bi*, Zile Huang, Dong Shu, Jiheng Hou, Hongchen Wang, Kaiyu Liang
- PDF: arXiv:2306.16950

MTSA-SNN: A Multi-modal Time Series Analysis Model Based on Spiking Neural Network 2024
- Accepted by International Conference on Pattern Recognition (**ICPR2024**) Paper ID: 978
- Author List: Chengzhi Liu*, **Zihong Luo***, Zheng Tao, Yitao Xu, Zile Huang
- PDF: arXiv:2402.05423

MC-DBN: A Deep Belief Network-Based Model for Modality Completion 2024
- Accepted by International Conference on Pattern Recognition (**ICPR2024**) Paper ID: 982
- Author List: **Zihong Luo***, Chengzhi Liu*, Zheng Tao, Heke Xin, Yitao Xu
- PDF: arXiv:2402.09782

Interpretable machine learning models for detecting peripheral neuropathy and lower extremity arterial disease in diabetics: an analysis of critical shared and unique risk factors 2024
- Accepted by BMC Medical Informatics and Decision Making
- Author List: Ya Wu, Danmeng Dong, Lijie Zhu, **Zihong Luo**, Yang Liu, Xiaoyun Xie
- PDF: https://link.springer.com/article/10.1186/s12911-024-02595-z

Internships

Multimodal Robotics and AI for Medical Imaging Systems June–August 2025

Algorithm Intern, AI Algorithm Group, Market and Strategic Planning Center *Jifu Medical*

- Researched state-of-the-art multimodal action models (e.g., ACT, Aloha) for integration into robotic-assisted medical workflows.
- Configured and operated the LeRobot SO-101 robotic arm, including hardware calibration and control, and replicated its motion control pipeline.
- Built and deployed the Isaac Sim simulation environment to enable virtual prototyping, testing, and reinforcement learning for robotic manipulation tasks.
- Developed a multimodal fusion pipeline combining endoscopic images and magnetic positioning data in a Magnetically Controlled Capsule Endoscopy (MCCE) system to improve anomaly detection robustness.
- Documented AI component failure mode analyses to support regulatory submission processes.

Projects

LeRobot SO101 Robotic Arm Control 2025

Open resource project

- Implemented and reproduced the LeRobot framework for SO101 dual-arm manipulation, enabling synchronized control and teleoperation.
- Developed dual-camera video synchronization and leader–follower teleoperation pipelines with dataset recording/upload to HuggingFace Hub.
- Achieved real-time robotic arm control and recorded 50 test episodes with synchronized dual-camera data.
- **Technologies:** Python, LeRobot, OpenCV, HuggingFace, PyTorch;
- **Hardware:** SO101 robotic arms (leader & follower), dual cameras (front & wrist).

Wheel-legged Robot Reproduction 2025

Open resource project

- Designed mathematical models and implemented control algorithms for wheel-legged robot locomotion, integrating real-time feedback control.
- Implemented forward/inverse kinematics for a 5-link leg mechanism and developed cascaded PID controllers for dual-mode balance control.
- Integrated IMU-based attitude feedback and RC teleoperation to achieve stable locomotion.
- **Technologies:** C++, Arduino, PID control, robot kinematics;
- **Hardware:** Wheel-legged platform, IMU, servo motors, BLDC motors.

Personal Academic Website 2024

- Developed a personal academic homepage with interactive features for portfolio, publications, and blog.
- Implemented parallax scrolling, theme switching, and responsive design to enhance user experience.
- **Technologies:** Jekyll, HTML/CSS, JavaScript.
- Live Demo: https://logan-0623.github.io/

Technical Skills

Programming Languages

- Python, Java, C++, LaTeX

Frameworks & Libraries

- PyTorch, scikit-learn, Jupyter, Matplotlib, OpenCV

Developer Tools

- Git, HuggingFace Hub, Isaac Sim, Arduino IDE

Operating Systems

- Windows, Linux (Ubuntu)

Languages

- IELTS Score 7

Awards

- China Undergraduate Mathematical Contest in Modelling – 2023
- Biology Olympiad – Provincial First Prize & National Second Prize – 2022
- International Quant Championship (WorldQuant) – UK Finals (Top 6) – 2025