Zijun Chen

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Education Background

Nanyang Technological University, Singapore Aug 2025 – Present
M.Sc. Biomedical Data Science (Artificial Intelligence)
GPA: 4.83/5.00

University of Birmingham, United Kingdom Sep 2021 – Jun 2025
B.Sc. Applied Mathematics and Mathematics, First Class Honours
GPA: 4.0/4.25

Jinan University, China Sep 2021 – Jun 2025
B.Sc. Mathematics and Applied Mathematics (Dual Degree Program)
GPA: 89/100

Relevant Coursework: Real Analysis (85), Multivariable & Vector Analysis (92), Differential Geometry (96), Integer Programming & Combinatorial Optimization (92), Applied Statistics (93), Data Structure(85), Computational Intelligence(96), Deep Learning in Biomedical Science (A+), Biomedical Data Mining (A+), Advanced Artificial Intelligence for Biomedical Imaging Informatics & Clinical Diagnosis (A).

Research Interests

Multimodal Reasoning, Vision-Language Models, Medical AI, Training-Free Methods, Unsupervised Learning, Generative Modeling.

Research Experience

Multimodal Train-Free framework for Medical Tasks Nov 2025 – Present
Institute of High Performance Computing, A*STAR, Singapore — Research Intern
Supervisor: Prof. Yong Liu

- Developing a multimodal train-free framework enabling medical reasoning to adapt to unseen diseases and domain shifts using small sets of examples with medically logical reasoning thread.

Membrane-Level Cell Segmentation for mIF Imaging Aug 2025 – Mar 2026
Bioinformatics Institute (BII), A*STAR, Singapore — Research Intern
Supervisors: Prof. Weimiao Yu, Prof. Chengxiang Yuan

- Designed preprocessing pipelines for real laboratory multi-channel multiplex immunofluorescence (mIF) imaging datasets and diagnosed practical segmentation bottlenecks.
- Mannually curated a high-quality subset for macrophage-family and developed automated QC filters with biological meaning to pre-filter unusable tiles and standardize segmentation evaluation.
- Utilized DINO-guided SAM prompting to improve mask segmentation stability in crowded tiles compared with pretrained Cellpose-SAM.

Physics-Informed Neural Networks for Solving PDEs Sep 2024 – Jul 2025
Data-Driven Intelligent Systems Laboratory, JNU — Research Assistant
Supervisor: Prof. Junwei Duan

- Developed and analyzed **Physics-Informed Broad Learning Systems (PIBLS)** for solving long computational time and low training efficiency for partial differential equations (PDEs) on complex domains more efficiently while maintaining accuracy.
- Conducted extensive experiments on benchmark PDEs and a practical physical case, where the model achieved fast training speed while maintaining high accuracy compared to state-of-the-art PINNs methods.
- Manuscript is currently under review at *IEEE Transactions on Neural Networks and Learning Systems (TNNLS)*.

DS-CAN: Dual-path Sensor Contrastive Attention Network Sep 2024 – Apr 2025
Bachelor Graduation Thesis
Supervisor: Prof. Zhenyu He

- Proposed **DS-CAN**, a multimodal contrastive learning framework that fuses accelerometer and gyroscope signals via dual convolutional encoders and a multi-head attention module with a temperature-scaled contrastive loss to extend contrastive learning to multimodal sensor data for capturing temporal alignment and motion correlations.
- Achieved 94% classification accuracy with 1–3% F1-score improvement on MEMS gesture datasets with completed comparison and ablation studies.
- Paper published in *ACM International Symposium on Integrated Circuit Design and Integrated Systems (ICDIS 2025)*.

Infectiou Disease Simulation with Bayesian Inference Sep 2024 – Feb 2025
Summer Research — Supervisor: Prof. Panayiota Touloupou

- Implemented compartmental epidemic simulations based on Susceptible–Infectious–Recovered (SIR) models and its variants.
- Applied Bayesian inference with Markov Chain Monte Carlo (MCMC) methods, including Metropolis–Hastings, adaptive MCMC, and Gibbs sampling based on R.
- Estimated transmission and recovery parameters while quantifying uncertainty in epidemic dynamics.

Machine Learning Prediction on Tropical Geometry Jul 2024 – Aug 2024
University of Birmingham Research Summer School, UK
Advisor: Prof. Michel van Garrel

- Trained machine learning models including MLP, RNN, SVM, LSTM, GNN over 28 million quantum period data to infer geometric properties such as dimensions and torus weights.
- Identified key factors aligning with mathematical proof and proposed improvements for mathematical modelling.

Internship Experience

Fujian Level One Big Data Development Co., Ltd.
Data Analyst Jan 2024 – Feb 2024

- Processed government portal datasets using Python and R and performed exploratory data analysis to identify usage patterns.

China Council for the Promotion of International Trade
Marketing Intern Jul 2023 – Aug 2023

- Developed Python web scraping pipelines and conducted statistical analysis in SPSS to identify regional export trends.

Experimental Research in Clinical Medicine, Fujian Provincial Hospital
Laboratory Assistant Jul 2022 – Aug 2022

- Assisted in clinical research data collection, processing, and documentation.

Honors & Awards

University Third-Class Scholarship (2023–2024, 2024–2025)
Excellent Scientific Research Scholarship (2024)
Mathematical Contest in Modeling (MCM/ICM): Honorable Mention (2024)
National College Student Mathematical Modeling Competition: Provincial Second Prize (2022)

Technical Skills

Programming: Python, MATLAB, C, R, SPSS
Tools: FASTQ, LaTeX, Microsoft Office
Languages: IELTS 7.5, GRE 323 (Q170, V153, W3.5)