Yi Tian

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Education

Xi'an Jiaotong Liverpool University (XJTLU)(First Class) Overall GPA: 3.65/4.0
BEng in Data Science and Big Data Technology with Contemporary Entrepreneurialism *Sep. 2021 – June 2025*

National University of Singapore (NUS)
MSc in Biomedical Informatics *Jul. 2025 – Jan. 2027*

Awards And Honors

University Academic Achievement Award (Top 10%) GPA:3.7/4.0
Xi'an Jiaotong Liverpool University (XJTLU) *July 2023*

University Academic Achievement Award (Top 10%) GPA:3.91/4.0
Xi'an Jiaotong Liverpool University (XJTLU) *July 2024*

Publication

[1] **Yi Tian**†, Ye Huang, and Yi Chen. "Convolutional Neural Network-Based Identifying Gender of Kiwifruit Flowers in Autonomous Pollination for Future Farming." Advances in Intelligent Manufacturing and Robotics. **ICIMR 2023** https://doi.org/10.1007/978-981-99-8498-5_12

[2] Yunze Wang†, Silin Chen†, Xi Long, **Yi Tian**, Ye Huang, Tianyang Wang, Jingxin Liu. "BiF^3-Net: A Full BiFormer Full-scale Fusion Network for Accurate Gastrointestinal Images Segmentation." **MIDL 2024** https://openreview.net/forum?id=kIRMpUufhm

[3] Biwen Meng†, Xi Long†, Wanrong Yang, Ruochen Liu, **Yi Tian**, Yalin Zheng, Jingxin Liu. "Advancing Cross-Organ Domain Generalization With Test-Time Style Transfer and Diversity Enhancement." **ISBI 2025**

[4] **Yi Tian**†, Ruochen Liu†, Jiahao Wang, Hongbin Liu, Xianxu Hou, Jingxin Liu. "*CellMamba*: Adaptive Mamba for Accurate and Efficient Cell Detection." **BMVC 2025**

[5] **Yi Tian**†, Ruochen Liu†, Yalin Zheng, Yuxuan Zhao, Jingxin Liu. "*Direction-Guided Watershed for Adherent Cell Instance Segmentation.*" **ISBI 2026**

[6] **Yi Tian**†, Xinkun Wang†, et al. "*KPMamba: Token-Level Semantic Alignment for Pose Estimation.*" (manuscript prepared, not yet submitted)

[7] **Yi Tian**†, Xinkun Wang†, et al. "*Semantic Alignment in Medical Data: A Survey.*" (manuscript prepared, not yet submitted)

[8] Wen Yuxin†, **Yi Tian**, Nguyen Quoc Khanh Le, Matthew Chin Heng Chua. "*Transcriptionally Controlled De Novo Molecular Generation through Hierarchical Gene Encoding and Adaptive Feature Modulation.*" under review

Project Experience

CellMamba: Lightweight Adaptive Cell Detection via Full Mamba Backbone BMVC 2025

- **Project background:** Developed a lightweight, structure-aware cell detection network addressing the inefficiency and heavy parameters of existing models such as DINO and CellViT.
- **Technical solution:** Introduced Full Mamba into detection backbone. Designed two key modules: **TMAC (Triple-Mapping Adaptive Coupling)** for multi-scale attention fusion, and **Adaptive Mamba Head** for multi-resolution decoding and precise small-cell localization.

- **Responsibilities and implementation:**
  1. Built complete anchor-free detection framework based on MMDetection
  2. Designed and implemented TMAC module and Adaptive Head decoder
  3. Constructed joint training strategy using Focal Loss + L1 Loss
  4. Established reproducible training and ablation evaluation pipeline
- **Project results:** Achieved **F1-score 64.8%**, **AP@50 51.1%** on **CoNSeP**. Inference latency 1.6ms/image with only 29% parameters of DINO. First-author paper accepted at The British Machine Vision Conference(BMVC) 2025.

Direction-Guided Watershed for Adherent Cell Instance Segmentation ISBI 2026

- **Project background:** Redesigned watershed post-processing in relation-based cell segmentation to address over-/under-segmentation in adherent regions without modifying backbone networks.
- **Technical solution:** Proposed **DDBD** and **OAWA** modules to build a direction-guided watershed framework using gradient magnitude and directional cosine disparity. Integrated pixel classification, distance regression, and instance classification heads into a unified framework.
- **Responsibilities and implementation:**
  1. Designed the overall direction-guided watershed algorithm and two core modules
  2. Implemented edge screening and topographic map re-weighting
  3. Built full experimental and ablation evaluation process
- **Project results:** Achieved SOTA on **CytoDArk0** with **DQ(Detection Quality) 0.833** and **PQ(Panoptic Quality) 0.725** ($p < 0.05$). First-author paper accepted at The IEEE International Symposium on Biomedical Imaging (ISBI) 2026.

Semantic Alignment in Multimodal Medical AI: A Systematic Review

- **Project background:** Conducted a large-scale systematic review on semantic alignment mechanisms across multimodal medical data including images, structured records, and clinical text.
- **Technical solution:** Reviewed 200+ recent studies and organized them into six technical directions including vision-language alignment, medical VQA, report generation, atlas fusion, contrastive learning, and large-scale pretraining. Constructed a technical taxonomy evaluating alignment strategies and task transferability.
- **Responsibilities and implementation:**
  1. Led framework design, taxonomy construction, and visual organization
  2. Responsible for vision-language alignment section and literature classification
  3. Coordinated manuscript integration and final submission
- **Project results:** Completed a 78-page survey paper planned for submission to ACM Computing Surveys / TIST, demonstrating systematic research synthesis and multimodal modeling insights.

Technical Skills

Research Interests: AI for Healthcare, Computational Pathology, Medical Foundation Models, Multimodal Medical AI, Semantic Alignment in Medical Data
Languages: Java, Python, C/C++, SQL, JavaScript, HTML/CSS, R, Matlab
Developer Tools: Git, Docker, Google Cloud Platform, VS Code, Visual Studio, PyCharm, IntelliJ, SPSS
Libraries: pandas, NumPy, Matplotlib, TensorFlow, PyTorch, YOLO