JIAXIN YUE

Grace Hopper Celebration (GHC'25) Attendee

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EDUCATION

University of Southern California — *Los Angeles, US*
Ph.D. in Electrical and Computer Engineering — *08/2020 - 05/2026 (expected)*

University of Southern California — *Los Angeles, US*
M.S. in Electrical and Computer Engineering — *08/2018 – 05/2020*

Northwestern Polytechnical University — *Xi'an, China*
B.S. in Automation — *09/2014 – 06/2018*

RESEARCH EXPERIENCE

Large Language Models for AI-Medicine — *March 2025 - Present*

Fine-Tuning VLMs for MRI-Based Alzheimer's Disease Classification

- Fine-tuned a vision-language LLM (**BLIP-2 + LLaMA**) using **LoRA-based supervised fine-tuning (SFT)** on MRI scans (health vs disease).
- Implemented **PPO-based reinforcement learning (RLHF)** with clinician feedback to improve model consistency and interpretability.
- Achieved **92% accuracy**; generated explainable Grad-CAM heatmaps highlighting model-salient regions, supporting interpretability.

Longitudinal Disease Progression Predictions — *Dec 2024 – Present*

Graph-based spatiotemporal modeling for longitudinal imaging data [1]

- Designed a scalable **spatiotemporal pipeline** (data prep → graph feature extraction → training/eval) for large medical image cohorts.
- Built a **graph-topographical** representation of longitudinal tau PET images to infer subject-level disease progression trajectory.
- Developed an **unsupervised algorithm** to estimate subject-specific subtype and stage distributions across the population.
- Delivered individualized trajectory prediction via group-wise similarity, achieving **MSE = 0.0529** on a held-out test set.

Cross-Domain Image Translation via Diffusion Models — *Aug 2023 – Present*

Surface-based Tau PET Harmonization [2]

- Built an **end-to-end preprocessing + quality control pipeline** for tau PET images, delivering analysis-ready, high-quality data.
- Developed a multi-site harmonization framework based on spherical **Diffusion Models (PyTorch)**, reducing inter-site variance by **45%**.
- Developed a cross-site latent space translator for better domain adaptation.

Patient Phenotype Discovery with Medical Images — *Aug 2020 – Nov 2024*

Uncovering Heterogeneity of Neurodegenerative Pathology [3][5]

- Built a topographic representation of tau pathology via Reeb graph analysis **(MATLAB & C++)** to capture regional signal topology.
- Designed a **directed graphical model** for estimating spatiotemporal progression and population distributions in Alzheimer's cohorts.
- Identified three phenotypic subtypes with distinct spreading trajectories via **unsupervised clustering**.
- Achieved 24.76% higher generalization performance than SOTA, demonstrating strong out-of-distribution robustness.

PUBLICATIONS

[1] **Yue, Jiaxin**, et al. "*Robust Topographical Representation for Longitudinal Propagation of Tau Pathology*." MICCAI 2025.

[2] **Yue, Jiaxin**, et al. "*Tau PET Harmonization via Surface-based Diffusion Model.*" ISBI 2025.

[3] **Yue, Jiaxin**, et al. "*Uncovering Heterogeneity in Alzheimer's Disease from Graphical Modeling of the Tau Spatiotemporal Topography.*" MICCAI 2023.

[4] Zhang, Hongbo, et al. "*GPU Accelerated Modeling of Cortical Radial and Tangential Connectivity Changes in Neurodegeneration.*" MICCAI 2025. (**Oral** (5%); 3rd author)

[5] **Yue, Jiaxin**, et al. "*Graphical Modeling of Cortical Tau Pathology Topography for its Subtyping in Alzheimer's Disease.*" (under review)

[6] Zhong, Lujia, et al. "*TauAD: MRI-free Tau Anomaly Detection in PET Imaging via Conditioned Diffusion Models.*" *arXiv preprint arXiv:2405.13199* (2024). (3rd author)

TECHNICAL SKILLS

Languages: Python, Java, C/C++, JavaScript, MATLAB, Shell Scripting, HTML, CSS, SQL, Scala, LaTeX

Tools: PyTorch, Keras, Sklearn, TensorFlow, Git, OpenMP, OpenCL, Maven, WebGL, Perforce

ML/DL: Linux, Docker, AWS, Azure

Web: Angular, Express, Node.js, Flask, Apache Tomcat

Big Data: MapReduce, MongoDB, Hadoop, HBase, Hive