YAMIN LI

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Education

Vanderbilt University Aug 2022 – Present
Ph.D. student in Computer Science (Expected Dec 2026)
GPA: 4.0/4.0 · Russell G. Hamilton Scholar · Engineering Graduate Fellowship

Shanghai Jiao Tong University Sept 2019 – Mar 2022
M.Sc. in Biomedical Engineering
Legend Medical Excellence Scholarship (top 2%) · Outstanding Graduate

Xi'an Jiaotong University Sept 2015 – Jun 2019
B.E. in Biomedical Engineering
National Scholarship (top 0.2% nationwide) · Outstanding Graduate

Research Interests

My research interests include, but are not limited to, multimodal foundation modeling across vision, language, and time series; large-scale time-series modeling; vision-language(-action) learning; AI for health and sensing; Neuro AI and brain decoding; cross-modal reasoning and transfer for human-centered AI.

Professional Experience

Research Scientist Intern (extended as Part-time Student Researcher) *Burlingame, CA*
Meta, Reality Lab Research May 2025 – Nov 2025

- Focus area: Multimodal Learning, Wearable-based Multimodal Fingertip Force Estimation, Egocentric Representation Learning, Vision-language(-action) learning.
- Project details remain confidential due to ongoing work; **a first-author manuscript based on this work is currently in preparation.**

Selected Research Experience

Neurdylab, Vanderbilt University Sept 2022 – Present
Advisor: Prof. Catie Chang

Multimodal Learning for Neural Representation, Physiological Time Series, and Beyond

- Developed a scalable, context-aware unified framework for cross-modality translation in neuroimaging, leveraging **large-scale self-supervised masked modeling** and **context-conditioned prompt learning** to generate whole-brain time series from limited sensors, achieving efficient and generalizable zero-shot transfer across tasks and subjects. (*submitted to ICLR'26*)
- Developed NeuroBOLT, a **multi-scale, multi-dimensional biosignal transformer** for EEG-to-fMRI translation, capturing spectral, temporal, and spatial dependencies in neural dynamics; supports flexible input sensor configurations and variable-length sequence generation, achieving zero-shot generalization across unseen participants, experimental conditions, and imaging systems. (*NeurIPS'24*).
- Co-developed a **VQ-VAE based framework for interpretable physiological signal generation**, learning discrete latent representations of fMRI dynamics to model respiration and heart-rate fluctuations; achieved state-of-the-art correlations. (*NeurIPS'25, BrainBodyFM*)
- Leading the development of a **unified benchmark and library for deep time-series foundation models and LLMs in neuroimaging and physiological data**, systematically evaluating state-of-the-art pre-trained architectures under out-of-the-box and few-shot settings across forecasting, imputation, and classification task to guide model selection and improve reproducibility. (*in progress*)
- Co-developed a **contrastive learning–based cross-modal foundation framework** that aligns multimodal neural embeddings for vigilance detection, integrating pretrained **foundation models** for both modalities and benchmarking their transferability and adaptation performance. (*MICCAI'25, OHBM'25*)

- Exploring multimodal brain decoding techniques aligning EEG with image and text embeddings via **self-supervised contrastive learning using pretrained CLIP models**. (*in progress*)

Efficient 4D Neural Radiance Field and Gaussian Splatting

- Contributed to the development of direction-aware representation designed to capture scene dynamics from six distinct directions, enhancing NeRF and GS's abilities to reconstruct both static and dynamic scenes. (*CVPR'24, preprint submitted to TPAMI*)

Neural Engineering Lab, Shanghai Jiao Tong University Sept 2019 – Mar 2022
Advisor: Prof. Shangbao Tong, Prof. Xiaoli Guo

EEG-based Multi-User Neural Interaction Modeling

- Led an end-to-end dual-EEG hyperscanning project modeling inter-brain dynamics during mother–child cooperation, covering experimental design, large-scale sensor data acquisition, preprocessing, and algorithm development. Coordinated cross-institution collaborations with hospitals, kindergarten to build a high-quality, time-synchronized multi-subject EEG dataset (**108 participants**) for social interaction modeling.
- Modeled inter-brain relationships as dynamic graph representations using phase-locking and causal metrics, revealing interpretable neural signatures of human cooperation. (*IEEE JBHI'25, HBM'24*)

College of BME & Instrument Science, Zhejiang University Aug 2021 – Oct 2021
Advisor: Prof. Dan Wu

- Applied deep learning-based super-resolution reconstruction for fetal brain MRI, achieving a 5dB PSNR improvement over traditional optimization methods. Designed learning-based reconstruction pipelines combining model-driven and data-driven priors for efficient medical image synthesis. (*IEEE TMI'22, NI'21*)

Department of BME, Xi'an Jiaotong University Oct 2018 – Jan 2020
Advisor: Prof. Gang Wang

- Modeled neural state transitions during anesthesia using machine learning on EEG microstate dynamics; integrated Hilbert–Huang spectral features with unsupervised clustering to build interpretable representations, improved model accuracy for consciousness-state classification by 10% over conventional EEG markers. (*IEEE JBHI'20, IJNS'20, NI'21*)

Selected Publications

[*] *These authors contributed equally to this work.*

Conference Papers

[C.14] **Yamin Li**, Shiyu Wang, Chang Li, Ange Lou, Dario J. Englot, Daniel Moyer, Roza G. Bayrak, Catie Chang, "Towards Context-Aware and Unified Whole-Brain Signal Generation from Scalp Sensors", *under review*, International Conference on Learning Representations (**ICLR**), 2026

[C.13] **Yamin Li**, Ange Lou, Chang Li, Ziyuan Xu, Shengchao Zhang, Shiyu Wang, Dario J. Englot, Soheil Kolouri, Daniel Moyer, Roza G. Bayrak, Catie Chang, "A Scalable EEG-to-fMRI Translation Framework for Whole-Brain Inference and Functional Connectivity Reconstruction", *under review*, 2025

[C.12] Shiyu Wang, **Yamin Li**, Ziyuan Xu, Haatef Pourmotabbed, Chang Li, Roza G. Bayrak, Catie Chang, "A VQ-VAE Framework for Modeling Physiological Information in fMRI", Accepted by **NeurIPS 2025** workshop on Foundation Model for the Brain and Body

[C.11] Chang Li, Shiyu Wang, **Yamin Li**, Haatef Pourmotabbed, Jeffery M. Harding, Alexander Douma, Derek J. Doss, Anas Reda, Shengchao Zhang, Jorge A. Salas, Sarah E. Goodale, Shumit Saha, Dario J. Englot, Roza G. Bayrak, Catie Chang "EEG-to-fMRI Knowledge Distillation Empowers Few-shot Resting-state fMRI Vigilance Detection", Accepted by Medical Imaging 2026: Image Processing, **SPIE**

[C.10] Chang Li, **Yamin Li**, Haatef Pourmotabbed, Shengchao Zhang, Jorge A Salas, Sarah E Goodale, Roza G Bayrak, Catie Chang, "CBrain: Cross-Modal Learning for Brain Vigilance Detection in Resting-State fMRI", International Conference on Medical Image Computing and Computer-Assisted Intervention (**MICCAI**), 2025

[C.9] J. Mason Harding, Haatef Pourmotabbed, **Yamin Li**, Kimberly Rogge-Obando, Kate Wang, Sarah E. Goodale, Shiyu Wang, Camden Bibro, Bergen Allee, Caroline Martin, Victoria L. Morgan, Dario J. Englot, Catie Chang, "Joint-Source Decomposition Analysis of Resting-State fMRI and EEG in Epilepsy and Control Subjects", IEEE International Symposium on Biomedical Imaging (**ISBI**), 2025

[**C.8**] Ange Lou*, **Yamin Li***, Yike Zhang*, Robert F. Labadie, Jack Noble, "Zero-Shot Surgical Tool Segmentation in Monocular Video Using Segment Anything Model 2", Medical Imaging 2025: Image Processing, **SPIE**, 2025

[**C.7**] Ange Lou, **Yamin Li**, Yike Zhang, Jack Noble, "Surgical Depth Anything: Depth Estimation for Surgical Scenes using Foundation Models", Medical Imaging 2025: Image-Guided Procedures, Robotic Interventions, and Modeling, SPIE, 2025, (**Oral**)

[**C.6**] Shiyu Wang, Ziyuan Xu, Laurent M. Lochard, **Yamin Li**, Jiawen Fan, Jingyuan E. Chen, Yuankai Huo, Mara Mather, Roza G. Bayrak, Catie Chang, "Reconstructing Physiological Signals from fMRI across the Adult Lifespan", Medical Imaging 2025: Image Processing, **SPIE**, 2025, (**Oral**).

[**C.5**] **Yamin Li**, Ange Lou, Ziyuan Xu, Shengchao Zhang, Shiyu Wang, Dario J. Englot, Soheil Kolouri, Daniel Moyer, Roza G. Bayrak, Catie Chang, "NeuroBOLT: Resting-state EEG-to-fMRI Synthesis with Multi-dimensional Feature Mapping", the Conference on Neural Information Processing Systems (**NeurIPS**), 2024

[**C.4**] Ange Lou, Benjamin Planche, Zhongpai Gao, **Yamin Li**, Tianyu Luan, Hao Ding, Terrence Chen, Jack Noble, Ziyan Wu, "Darenerf: Direction-aware Representation for Dynamic Scenes", IEEE/CVF Conference on Computer Vision and Pattern Recognition (**CVPR**), 2024

[**C.3**] **Yamin Li**, Ange Lou, Ziyuan Xu, Shiyu Wang, Catie Chang, "Leveraging Sinusoidal Representation Networks to Predict fMRI Signals from EEG", Medical Imaging 2024: Image Processing, **SPIE**, 2024

[**C.2**] Ange Lou, **Yamin Li**, Xing Yao, Yike Zhang, Jack Noble, "SAMSNeRF: Segment Anything Model (SAM) Guides Dynamic Surgical Scene Reconstruction by Neural Radiance Field (NeRF)", Medical Imaging 2024: Image-Guided Procedures, Robotic Interventions, and Modeling, **SPIE**, 2024

[**C.1**] **Yamin Li**, Saishuang Wu, Wen Shi, Shanbao Tong, Yunting Zhang, Xiaoli Guo, "Enhanced inter-brain connectivity between children and adults during cooperation: a dual EEG study", 43rd Annual International Conference of the IEEE Engineering in Medicine and Biology Society (**EMBC**), 2021

Journal Papers

[**J.8**] Ange Lou, Benjamin Planche, Zhongpai Gao, **Yamin Li**, Tianyu Luan, Hao Ding, Meng Zheng, Terrence Chen, Ziyan Wu, Jack Noble, "DaRePlane: Direction-aware Representations for Dynamic Scene Reconstruction", *Preprint, under review*, IEEE Transactions on Pattern Analysis and Machine Intelligence (**TPAMI**)

[**J.7**] Jiayang Xu, **Yamin Li**, Ruxin Su, Saishuang Wu, Chengcheng Wu, Haiwa Wang, Qi Zhu, Yue Fang, Fan Jiang, Shanbao Tong, Yunting Zhang, Xiaoli Guo, "Dynamic theta-alpha inter-brain model during mother-preschooler cooperation", IEEE Journal of Biomedical and Health Informatics (**IEEE JBHI**), 2025

[**J.6**] **Yamin Li**, Saishuang Wu, Jiayang Xu, Haiwa Wang, Qi Zhu, Wen Shi, Yue Fang, Fan Jiang, Shanbao Tong, Yunting Zhang, Xiaoli Guo, "Interbrain substrates of role switching during mother–child interaction", Human Brain Mapping (**HBM**), 2024

[**J.5**] Wen Shi, Haoan Xu, Cong Sun, Jiwei Sun, **Yamin Li**, Xinyi Xu, Tianshu Zheng, Yi Zhang, Guangbin Wang, Dan Wu, "AFFIRM: affinity fusion-based framework for iteratively random motion correction of multi-slice fetal brain MRI", IEEE Transactions on Medical Imaging (**IEEE TMI**), 2022

[**J.4**] Kexu Zhang, Wen Shi, Chang Wang, **Yamin Li**, Zhian Liu, Tun Liu, Jing Li, Xiangguo Yan, Qiang Wang, Zehong Cao, Gang Wang, "Reliability of EEG microstate analysis at different electrode densities during propofol-induced transitions of brain states", **NeuroImage**, 2021

[**J.3**] Wen Shi, Guohui Yan, **Yamin Li**, Haotian Li, Tingting Liu, Cong Sun, Guangbin Wang, Yi Zhang, Yu Zou, Dan Wu, "Fetal brain age estimation and anomaly detection using attention-based deep ensembles with uncertainty", **NeuroImage**, 2020

[**J.2**] **Yamin Li**, Wen Shi, Zhian Liu, Jing Li, Qiang Wang, Xiangguo Yan, Zehong Cao, Gang Wang, "Effective brain state estimation during propofol-induced sedation using advanced EEG microstate spectral analysis", IEEE journal of biomedical and health informatics (**IEEE JBHI**), 2020

[**J.1**] Wen Shi, **Yamin Li**, Zhian Liu, Jing Li, Qiang Wang, Xiangguo Yan, Gang Wang, "Non-canonical microstate becomes salient in high density EEG during propofol-induced altered states of consciousness", International Journal of Neural Systems (**IJNS**), 2020

Selected Awards and Honors

Harold Stirling Vanderbilt Scholarship, Vanderbilt University	2025
Institutional Nominee for the 2025 Google PhD fellowship	2025
1st Place Runner-Up, AI Showcase, Vanderbilt University	2025
Top Reviewer, NeurIPS 2024	2024

Best Poster Award, ECE Day, Vanderbilt University	2024
Student Conference Travel Grant, Vanderbilt University	2023, 2024
SPIE Student Travel Award, SPIE Medical Imaging 2024	2024
Russell G. Hamilton Scholar, Vanderbilt University	2022
Engineering Graduate Fellowship, Vanderbilt University	2022
Outstanding Graduate (Top 6%), SJTU	2021
Legend Medical Excellence Scholarship (Top 2%), SJTU	2021
Graduate Academic Scholarship, SJTU	2019–2021
Outstanding Graduate, XJTU	2019
National Scholarship (**Top 0.2%, highest undergraduate scholarship nationally**)	2018
POSTECH Open-lab Scholarship, Pohang University of Science and Technology, South Korea	2018
University-level Outstanding Student, XJTU	2016–2018
Siyuan Scholarship, XJTU	2016–2017

Academic and Professional Service

Reviewing: Provided review services for multiple top-notched conference and journals in ML&AI and healthcare, including **NeurIPS**(2024, 2025), **ICLR**(2025, 2026), **ICML**(2025), **MICCAI**(2023, 2024, 2025), **AISTATS**(2026), **TMLR**, **IEEE TMI**.

Teaching: Teaching Assistant, Foundation of Machine Learning (VU CS4262/5262, Fall 2022) by Prof. Catie Chang, Prof. Soheil Kolouri.

Mentoring:

- Ziyuan Xu, B.S. in Computer Science, Vanderbilt University (now M.S. at Harvard University)
- Edward S. Tong, High school student researcher, Shanghai Jiao Tong University (now B.S. at UC San Diego)

Talks

Invited talk: Getting Started With Latest ML Approaches @ BrainHackVU	Jan 2025
Invited panelist: Open Science x Neuroscience Career Panel @ BrainHackVU	Jan 2025
Invited presenter @ Vanderbilt Lab for Immersive AI Translation Grand Opening	Mar 2025
Guest lecturer @ Foundation of Machine Learning (CS4262/5262), Spring 2025	Mar 2025

Additional Information

Programming skills: Python, Pytorch, scikit-learn, Matlab

Language: English (Proficient), Mandarin (Native)