XINHUI LI

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EDUCATION

Georgia Institute of Technology — Atlanta, GA, US
Doctor of Philosophy in Electrical and Computer Engineering (GPA: 4.0/4.0) — *August 2021–July 2026 (Expected)*

University of Pennsylvania — Coursera
Master of Science in Computer and Information Technology (GPA: 4.0/4.0) — *May 2019–August 2021*

Columbia University — New York, NY, US
Master of Science in Biomedical Engineering (GPA: 4.0/4.3) — *August 2017–December 2018*

Xiamen University — Xiamen, FJ, CN
Bachelor of Science in Pharmaceutical Science (GPA: 3.6/4.0) — *August 2013–July 2017*

Utrecht University — Utrecht, UT, NL
Exchange Student in Economics and Humanities — *February 2016–June 2016*

WORK EXPERIENCE

Graduate Research Assistant — August 2021–Present
TReNDS Center, Georgia Institute of Technology | Advisors: Vince D. Calhoun, Rogers F. Silva — *Atlanta, GA, US*

- Led development of a multi-agent system built on large language models (LLMs) for mental disorder assessment and designed a retrieval-augmented generation (RAG) strategy that improved quantitative assessment performance by 22% over baselines.
- Developed Torch-MISA, a scalable multimodal representation learning framework in PyTorch for nonlinear independent subspace analysis, improving phenotype prediction robustness and reproducibility across multiple neuroimaging modalities.
- Designed an unsupervised learning framework leveraging variational autoencoders (VAEs) to model functional connectivity trajectories in neuropsychiatric populations.
- Developed pipeline-invariant representation learning methods using contrastive learning and data augmentation, improving brain-phenotype prediction robustness by 19%.

Data Scientist Intern — May 2024–August 2024
Amazon — *Sunnyvale, CA, US*

- Designed and deployed a multimodal validation pipeline using vision-language models (VLMs) to automate Alexa product certification process, achieving $> 99.5\%$ accuracy on image test cases and $> 96.7\%$ accuracy on video test cases.

Assistant Research Engineer — June 2019–August 2021
Computational Neuroimaging Lab, Child Mind Institute | Advisors: Michael P. Milham, Ting Xu — *New York, NY, US*

- Developed C-PAC, an open-source software toolbox for MRI preprocessing and analysis, harmonizing three commonly-used pipelines with inter-pipeline connectome correlations > 0.99 and enhancing reproducibility of neuroimaging workflows.
- Developed DeepBet and DeepSeg, U-Net models leveraging transfer learning for brain extraction and tissue segmentation on non-human primate structural MRI, achieving mean Dice coefficients > 0.97 across multi-site datasets.

Graduate Research Assistant — June 2018–May 2019
Hood Visual Science Lab, Columbia University | Advisor: Donald C. Hood — *New York, NY, US*

- Designed convolutional neural networks (CNNs) to detect glaucoma with wide-field OCT scans, achieving AUCs of $0.93 - 0.99$; applied Grad-CAM for model interpretability; improved cross-cohort generalization by $5 - 9\%$ through data augmentation and multimodal input integration.

MENTORING & TEACHING EXPERIENCE

Undergraduate Research Mentor — 2026
Petit Scholar Undergraduate Research Program, Georgia Institute of Technology

- Mentoring one undergraduate student in optimizing group principal component analysis for robust spatiotemporal pattern discovery in functional brain imaging.

Undergraduate Research Mentor — Summers 2022, 2024, 2025
Math Path Program and D-MAP Summer Program, Georgia State University

- Mentored one undergraduate student in translating the multi-dataset independent subspace analysis (MISA) codebase from MATLAB to PyTorch, supporting scalable and reproducible neuroimaging analysis.

- Mentored two undergraduate students in optimizing hyperparameters for independent vector analysis models using Torch-MISA, enhancing model accuracy and efficiency.
- Mentored three undergraduate students in developing a multi-agent system for depression assessment.

Graduate Teaching Assistant Fall 2020, Spring 2021

CIT 595 Computer Systems Programming, University of Pennsylvania | Instructor: Boon Thau Loo

- Instructed a graduate-level class of approximately 200 students, developing a Gradescope autograder, holding weekly office hours, moderating Piazza discussions, and grading exams.

SKILLS

Languages: Mandarin (Native), English (Proficient), Spanish (Elementary)

Machine Learning: Representation Learning, Generative Models, Foundation Models, Agentic Systems, Computer Vision

Programming Languages: Python, MATLAB, C/C++, Java, JavaScript, R, Shell, HTML, CSS

Deep Learning Frameworks: PyTorch, TensorFlow, Keras, Ollama, HuggingFace

Data Science Libraries: NumPy, Pandas, Scikit-Learn, SciPy, Statsmodels, Matplotlib, Seaborn, Wandb, Optuna

Cloud Computing and Virtualization Platforms: Amazon Web Services, Google Cloud, Docker, Singularity

Neuroimaging Tools: AFNI, ANTs, FSL, FreeSurfer, SPM, Nipype, Nilearn

AWARDS

Mental Health and AI (MEXA) Hackathon First Place | *Neuromatch, Wellcome Trust and Google* 2024

NextGen Scholar Award | *IEEE Engineering in Medicine and Biology Society* 2024

Distinguished Scholar Award | *TReNDS Center and D-MAP Center* 2023

Society of Women Engineers Conference Travel Award | *Georgia Institute of Technology* 2023

Student-Postdoc Travel Award | *Resting State Brain Connectivity Conference* 2023

Diversity in Technology Scholarship | *Cadence* 2022

Electrical and Computer Engineering Fellowship | *Georgia Institute of Technology* 2021

Above and Beyond Outstanding Employee Award | *Child Mind Institute* 2021

Columbia Business School Hackathon First Place | *Columbia University* 2019

Outstanding Graduate | *Xiamen University* 2017

Study Abroad Scholarship | *Xiamen University* 2016

Outstanding Student | *Xiamen University* 2014–2016

First-Class Excellent Student Scholarship | *Xiamen University* 2014–2016

LEADERSHIP & MEMBERSHIP

Fellow | *Georgia Tech Technical AI Safety Fellowship Program* 2025

Scholar | *Georgia Tech/Emory Computational Neural-Engineering Training Program (CNTP)* 2022–2026

Chair | *Georgia Tech/Emory CNTP Professional Development Committee* 2023–2024

Fellow | *Georgia Tech Women in Engineering Graduate Women's Fellowship Program* 2023–2024

Member | *Organization for Human Brain Mapping (OHBM) Communications Committee* 2022–2024

Website and Communications Manager | *OHBM Brain-Art Special Interest Group* 2021–2024

Scholar | *Xiamen University Siyuan Excellent Student Training Program* 2014–2017

Vice President | *Xiamen University Sunshine Psychology Volunteer Team* 2014–2015

PROFESSIONAL SERVICE

Lead Organizer: Georgia Tech/Emory CNTP Professional Development Workshops 2023-2024

Co-Organizer: OHBM Brain-Art Exhibitions and Competitions 2022-2024, Educational Course 2024, Brainhack 2023

Roundtable Junior Chair: ML4H 2022

Journal Reviewer: Imaging Neuroscience, Human Brain Mapping, Journal of Open Source Software

Conference Reviewer: ML4H 2025, OHBM 2023-2024, ICML 2024, ICLR 2024, NeurIPS 2023, MICCAI 2023

PUBLICATIONS

Journal Articles

- **Xinhui Li**, Eloy Geenjaar, Zening Fu, Godfrey D. Pearlson, and Vince D. Calhoun. **Brain functional network connectivity interpolation characterizes the neuropsychiatric continuum and heterogeneity**. *Imaging Neuroscience*, 4 2026
- **Xinhui Li** and Vince D Calhoun. **Artificial intelligence for schizophrenia: from unimodal prediction to multimodal characterization**. *Current Opinion in Psychiatry*, pages 10–1097, 2026
- Yufang Yang, Anibal Sólon Heinsfeld, Andrea Gondová, Bruno Hebling Vieira, Qing Wang, **Xinhui Li**, et al. **Proceedings of the OHBM Hackathon 2023**. *Aperture Neuro*, 5, 2025
- **Xinhui Li**, Nathalia Bianchini Esper, Lei Ai, Steve Giavasis, Hecheng Jin, Eric Feczko, Ting Xu, Jon Clucas, Alexandre Franco, Anibal Sólon Heinsfeld, Azeez Adebimpe, Joshua Vogelstein, Chao-Gan Yan, Oscar Esteban, Russell Poldrack, Cameron Craddock, Damien Fair, Theodore Satterthwaite, Gregory Kiar, and Michael Milham. **Moving beyond processing-and analysis-related variation in resting-state functional brain imaging**. *Nature Human Behaviour*, 8(10):2003–2017, 2024
- Rogers Silva, Eswar Damaraju, **Xinhui Li**, Peter Kochonov, Judith M. Ford, Daniel H. Mathalon, Jessica A. Turner, Theo G.M. van Erp, Tulay Adali, and Vince D. Calhoun. **A Method for Multimodal IVA Fusion Within a MISA Unified Model Reveals Markers of Age, Sex, Cognition, and Schizophrenia in Large Neuroimaging Studies**. *Human Brain Mapping*, 45(17):e70037, 2024
- Weizheng Yan, Godfrey D Pearlson, Zening Fu, **Xinhui Li**, Armin Iraji, Jiayu Chen, Jing Sui, Nora D Volkow, and Vince D Calhoun. **A brainwide risk score for psychiatric disorder evaluated in a large adolescent population reveals increased divergence among higher-risk groups relative to control participants**. *Biological Psychiatry*, 95(7):699–708, 2024
- Gregory Kiar, Jon Clucas, Eric Feczko, Mathias Goncalves, Dorota Jarecka, Christopher J Markiewicz, Yaroslav O Halchenko, Robert Hermosillo, **Xinhui Li**, Oscar Miranda-Dominguez, et al. **Align with the NMIND consortium for better neuroimaging**. *Nature Human Behaviour*, 7(7):1027–1028, 2023
- Michael Milham, Chris Petkov, Pascal Belin, Suliann Ben Hamed, Henry Evrard, Damien Fair, Andrew Fox, Sean Froudist-Walsh, Takuya Hayashi, Sabine Kastner, et al. **Toward next-generation primate neuroscience: A collaboration-based strategic plan for integrative neuroimaging**. *Neuron*, 110(1):16–20, 2022
- Xindi Wang, **Xinhui Li**, Jae Wook Cho, Brian E. Russ, Nanditha Rajamani, Alisa Omelchenko, Lei Ai, Annachiara Korchmaros, Stephen Sawiak, R. Austin Benn, Pamela Garcia-Saldivar, Zheng Wang, Ned H. Kalin, Charles E. Schroeder, R. Cameron Craddock, Andrew S. Fox, Alan C. Evans, Adam Messinger, Michael P. Milham, and Ting Xu. **U-net model for brain extraction: Trained on humans for transfer to non-human primates**. *NeuroImage*, 235:118001, 2021
- Kaveri A. Thakoor, **Xinhui Li**, Emmanouil Tsamis, Zane Z. Zemborain, Carlos Gustavo De Moraes, Paul Sajda, and Donald C. Hood. **Strategies to Improve Convolutional Neural Network Generalizability and Reference Standards for Glaucoma Detection From OCT Scans**. *Translational Vision Science & Technology*, 10(4):16, 2021

Preprints

- **Xinhui Li**, Peter Kochunov, Tulay Adali, Rogers F. Silva*, and Vince D. Calhoun*. **Multimodal subspace independent vector analysis effectively captures the latent relationships between brain structure and function**. *bioRxiv*, 2026

Conference Proceedings

- Adam Greene*, Neviah Blair*, Samin Mahdipour Aghabagher, Simmi Kumari, Micheal W. Schlund, Alex Fedorov, Vince D. Calhoun, **Xinhui Li***, and Rogers F. Silva*. **AI Psychiatrist Assistant: An LLM-based Multi-Agent System for Depression Assessment from Clinical Interviews**. In *Proceedings of the 5th Machine Learning for Health Symposium*, Proceedings of Machine Learning Research. PMLR, 2025
- **Xinhui Li**, Xindi Wang, Kathleen Mantell, Estefania Cruz Casillo, Michael Milham, Alex Opitz, and Ting Xu. **DeepSeg: a transfer-learning segmentation tool for limited sample training of nonhuman primate MRI**. In *2024 46th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, pages 1–4. IEEE, 2024
- Hyunkyung Shin, **Xinhui Li**, Zening Fu, and Henrik von Coler. **Schizosymphony: From Schizophrenia Brainwaves to Narrative Soundscapes**. In *29th International Conference on Auditory Display (ICAD)*. ICAD, 2024
- **Xinhui Li**, Tulay Adali, Rogers Silva*, and Vince Calhoun*. **Multimodal subspace independent vector analysis better captures hidden relationships in multimodal neuroimaging data**. In *2023 IEEE 20th International Symposium on Biomedical Imaging (ISBI)*, pages 1–5. IEEE, 2023
- **Xinhui Li**, Daniel Khosravinezhad, Vince Calhoun, and Rogers Silva. **Evaluating trade-offs in IVA of multimodal neuroimaging using cross-platform multidataset independent subspace analysis**. In *2023 IEEE 20th International Symposium on Biomedical Imaging (ISBI)*, pages 1–5. IEEE, 2023
- **Xinhui Li**, Eloy Geenjaar, Zening Fu, Sergey Plis, and Vince Calhoun. **Mind the gap: functional network connectivity interpolation between schizophrenia patients and controls using a variational autoencoder**. In *2022 44th Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, pages 1477–1480. IEEE, 2022

- Kaveri A. Thakoor, **Xinhui Li**, Emmanouil Tsamis, Paul Sajda, and Donald C. Hood. **Enhancing the Accuracy of Glaucoma Detection from OCT Probability Maps using Convolutional Neural Networks**. In *2019 41st Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC)*, pages 2036–2040, 2019

Workshop Publications

- Victoria Yan, Honor Chotkowski, Fengran Wang, **Xinhui Li**, Carl Yang, Jiaying Lu, Runze Yan, Xiao Hu, and Alex Fedorov. **Towards Synthesizing Normative Data for Cognitive Assessments Using Generative Multimodal Large Language ModelsTowards Synthesizing Normative Data for Cognitive Assessments Using Generative Multimodal Large Language Models**. *Workshop on GenAI for Health at the Conference on Neural Information Processing Systems (NeurIPS)*, 2025
- **Xinhui Li**, Shabie Iqbal, and Aditya Bodi. **AlexaTester: A Multimodal Validation Pipeline for Alexa Product Certification**. *Amazon Computer Vision Conference (ACVC) Workshop on Video Understanding*, 2024
- **Xinhui Li**, Alex Fedorov, Mrinal Mathur, Anees Abrol, Gregory Kiar, Sergey Plis, and Vince Calhoun. **Learning pipeline-invariant representation for robust brain phenotype prediction**. *Data-centric Machine Learning Research (DMLR) Workshop at the International Conference on Machine Learning (ICML)*, 2023
- Yujia Xie*, **Xinhui Li***, and Vince D. Calhoun. **Predictive Sparse Manifold Transform**. *Workshop on High-dimensional Learning Dynamics (HLD) at the International Conference on Machine Learning (ICML)*, 2023
- **Xinhui Li**, Alex Fedorov, Mrinal Mathur, Anees Abrol, Gregory Kiar, Sergey Plis, and Vince Calhoun. **Pipeline-Invariant Representation Learning for Neuroimaging**. *Machine Learning for Health (ML4H) Symposium*, 2022

INVITED TALKS

Xinhui Li. **A Method for Multimodal IVA Fusion Within a MISA Unified Model Reveals Markers of Age, Sex, Cognition, and Schizophrenia in Large Neuroimaging Studies**. MINED Research Group at Georgia Institute of Technology, Atlanta, September 2025

Xinhui Li. **Deep Generative Modeling for Latent Source Separation and Psychosis Continuum Estimation from Neuroimaging Data**. Organization for Human Brain Mapping Symposium: *Machine Learning for Brain Imaging: Predicting Traits, Disease Progression, and Treatment Response*, Brisbane, June 2025

Xinhui Li. **Interpretable, Reproducible and Creative Neuroimaging Data Visualization**. Organization for Human Brain Mapping Educational Course: *Communicating neuroscience across peoples, languages, and cultures*, Seoul, June 2024

Xinhui Li. **Moving Beyond Processing and Analysis-Related Variation in Neuroscience**. Chinese Open Science Network OpenTalks, March 2022

Xinhui Li and Hecheng Jin. **C-PAC: A flexible and ease-of-use MRI preprocessing and analysis toolbox**. Chinese Open Science Network OpenTutorials, October 2021

Xinhui Li and Hecheng Jin. **fMRI preprocessing with containers: How to run C-PAC with Docker and Singularity**. Brainhack Global, New York, November 2019