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 - December 2025 (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*

PROFESSIONAL EXPERIENCE

Graduate Research Assistant — August 2021 - Present
Georgia Institute of Technology | Advisors: Vince Calhoun, Rogers Silva — *Atlanta, GA, US*

- Developing a deep multi-dataset independent subspace analysis framework to identify biomarkers of phenotypes and psychiatric disorders from multimodal neuroimaging data.
- Developed a functional network connectivity interpolation framework using a variational autoencoder to characterize individual heterogeneity and psychosis continuum.
- Evaluated the impact of preprocessing pipeline selection on the downstream performance of a supervised learning model and developed pipeline-invariant representation learning methodologies to improve brain-phenotype prediction robustness.

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

- Developed a multimodal validation pipeline using a vision-language foundation model to automatically validate image and video test cases for Alexa product certification.
- Analyzed video recordings of Alexa products and designed a workflow to automatically detect event-related video frames.
- Applied advanced prompt engineering techniques such as precognition and chain-of-thought, in-context learning and active learning to improve Alexa's validation performance.

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

- Developed the software Configurable Pipeline for the Analysis of Connectomes (C-PAC) for magnetic resonance imaging (MRI) processing and analysis; implemented fMRIPrep-options, XCP-options, ABCD-options, CCS-options, longitudinal, surface, non-human primate, and rodent pipelines in C-PAC.
- Developed a U-Net model and a transfer learning paradigm for brain extraction and tissue segmentation on non-human primate structural MRI data.

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

- Designed convolutional neural networks (CNN) to identify glaucoma with wide-field optical coherence tomography (OCT) scans; applied grad-cam and attention map to explain the CNN features; implemented multiple strategies, such as data augmentation and multimodal input, to enhance model generalizability.
- Built MATLAB-based APIs for qualitative and quantitative measures of glaucoma progression in both early and advanced glaucoma datasets using wide-field OCT scans.

Graduate Research Assistant — February 2018 - May 2019
Laboratory for Intelligent Imaging and Neural Computing, Columbia University | Advisor: Paul Sajda — *New York, NY, US*

- Collected eye tracking data under three conditions: when subjects watched lecture videos with soundtracks, slides and speakers, to assess determinant factors in online courses.
- Analyzed the eye tracking data from the video study using the structural equation model to explore the relationship between the amount of information loading and the mechanism of cognitive regulation.

Teaching Appointments

Graduate Teaching Assistant

CIT 595 Computer Systems Programming, University of Pennsylvania | Instructor: Boon Thau Loo *Fall 2020, Spring 2021*

- Developed an autograder for Gradescope, held weekly office hours, answered questions in the Piazza discussion forum, and graded exams.

Skills

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

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

Deep Learning Frameworks: PyTorch, TensorFlow, Keras

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 x AI (MEXA) Hackathon First Place | *Neuromatch, Wellcome and Google* 2024

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

Distinguished Scholar Award | *Georgia State/Georgia Tech/Emory 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 Cadre | *Xiamen University* 2014 - 2016

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

Leadership & Membership

Scholar | *Georgia Tech/Emory Computational Neural-Engineering Training Program (CNTP)* 2022 - 2025

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

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

Student Member | *Organization for Human Brain Mapping (OHBM)* 2021 - 2024

Brain-Art Liaison | *OHBM Program Committee* 2023 - 2024

Member and Brain-Art Liaison | *OHBM Communications Committee* 2022 - 2024

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

Student Member | *Institute of Electrical and Electronics Engineers (IEEE)* 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 Computational Neural-Engineering Training Program (CNTP) Events: Industry Panel Discussion (April 2024), Science-Art Communication Workshop (March 2024), Scientific Communication on Social Media Workshop (December 2023)
- Chinese Open Science Network OpenTalks: *Seeing Beyond the Brain: Conditional Diffusion Model with Sparse Masked Modeling for Vision Decoding* by Zijiao Chen (March 2023)

Co-Organizer

- Organization for Human Brain Mapping (OHBM) Brain-Art Exhibition and Competition: *The Connected Brain* (2022), *The Multifaceted Brain: Adaptation and Diversity* (2023), *Beyond Borders* (2024)
- OHBM Educational Course: *Communicating neuroscience across peoples, languages, and cultures* (2024)
- OHBM Brainhack: *Venture into the untapped depths of the brain* (2023)

Roundtable Junior Chair

- Machine Learning for Health (ML4H) Symposium 2022

Reviewer

- Organization for Human Brain Mapping (OHBM) 2023 - 2025
- International Conference on Machine Learning (ICML) 2024
- International Conference on Learning Representations (ICLR) 2024
- Advances in Neural Information Processing Systems (NeurIPS) 2023
- The Medical Image Computing and Computer Assisted Intervention Society (MICCAI) 2023

PUBLICATIONS

Journal Articles

- **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*, pages 1–15, 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*, pages 1–2, 2023
- Michael Milham ... **Xinhui Li** ... **Toward next-generation primate neuroscience: A collaboration-based strategic plan for integrative neuroimaging**. *Neuron*, 2021
- 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*, 10:16, 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*, 2024
- **Xinhui Li**, Eloy Geenjaar, Zening Fu, Godfrey D. Pearlson, and Vince D. Calhoun. **Brain functional network connectivity interpolation characterizes neuropsychiatric continuum and heterogeneity**. *bioRxiv*, 2024

Conference Proceedings

- **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)*. 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

- **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

Conference Abstracts

- **Xinhui Li**, Rogers Silva*, and Vince Calhoun*. **Deep independent vector analysis reveals linked and identifiable nonlinear representations from multimodal neuroimaging data**. Resting State Brain Connectivity Conference, September 2023
- **Xinhui Li**, Rogers Silva, and Vince Calhoun. **Multimodal subspace independent vector analysis better captures hidden relationships in multimodal neuroimaging data**. Suddath Symposium: Biomedical Big Data and AI for Accelerating Bioengineering and Bioscience, March 2023
- **Xinhui Li**, Rogers Silva, and Vince Calhoun. **Cross-platform Multidataset Independent Subspace Analysis**. Collaborative Research in Computational Neuroscience PI meeting, October 2022
- **Xinhui Li**, Lei Ai, Steve Giavasis, Hecheng Jin, Jon Clucas, Alexandre Franco, Eric Feczko, Joshua Vogelstein, Cameron Craddock, Ting Xu, Oscar Esteban, Russell Poldrack, Damien Fair, Theodore Satterthwaite, and Michael Milham. **Putting Pipeline Implementation-related Variation into Perspective for Functional Connectomics**. Organization for Human Brain Mapping, 2021
- **Xinhui Li**, Xindi Wang, Kathleen Mantell, Estefania Casillo Cruz, Michael Milham, Alex Opitz, and Ting Xu. **Toward Automatic Segmentation for Non-human Primates**. 2nd International Workshop on Non-invasive Brain Stimulation, 2021
- **Xinhui Li**, Steve Giavasis, Hecheng Jin, Lei Ai, Anibal Sólon Heinsfeld, Azeez Adebimpe, Alexandre Franco, Russell Poldrack, Joshua Vogelstein, Ting Xu, Theodore Satterthwaite, Oscar Esteban, Cameron Craddock, and Michael Milham. **Evaluating and Improving Cross-Pipeline Reproducibility in Functional Connectomics: A Case Study**. Organization for Human Brain Mapping, 2020
- **Xinhui Li**, Emmanouil Tsamis, Kaveri A. Thakoor, Zane Z. Zemborain, Carlos Gustavo De Moraes, and Donald C. Hood. **Evaluating the transferability of deep learning models that distinguish glaucomatous from non-glaucomatous OCT circumpapillary disc scans**. Investigative Ophthalmology & Visual Science, 2020

Invited Talks

Xinhui Li. **Interpretable, Reproducible and Creative Neuroimaging Data Visualization**. Organization for Human Brain Mapping Educational Course, 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

Art Exhibitions

Hyunkyung Shin and **Xinhui Li**. **Schizosymphony: From Schizophrenia Brainwaves to Narrative Soundscapes**. Organization for Human Brain Mapping Brain-Art Exhibition, Seoul, June 2024

Erin Lottes and **Xinhui Li**. **Butterfly Effect**. Organization for Human Brain Mapping Brain-Art Exhibition, Glasgow, June 2022