

# XINHUI LI

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## EDUCATION

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### Georgia Institute of Technology

Ph.D., Electrical and Computer Engineering (GPA: 4.0/4.0)

Atlanta, GA, US

Aug 2021 - Exp. May 2025

### University of Pennsylvania

M.S., Computer and Information Technology (GPA: 4.0/4.0)

Coursera

May 2019 - Aug 2021

### Columbia University

M.S., Biomedical Engineering (GPA: 4.0/4.0)

New York, NY, US

Aug 2017 - Feb 2019

### Xiamen University

B.S., Pharmaceutical Science (GPA: 3.6/4.0)

Xiamen, FJ, CN

Aug 2013 - Jul 2017

### Utrecht University

Exchange Student, Economics and Humanities

Utrecht, UT, NL

Feb 2016 - Jun 2016

## PROFESSIONAL EXPERIENCE

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### Graduate Research Assistant

Center for Translational Research in Neuroimaging and Data Science | Advisors: Vince Calhoun, Rogers Silva

Aug 2021 - Present

Atlanta, GA, US

- Developing a deep multidataset independent subspace analysis framework to identify linear and nonlinear latent sources from multimodal neuroimaging data.
- Developed a functional network connectivity interpolation method to estimate continuous alternations between controls and patients with mental disorders (schizophrenia, autism, depression) using a variational autoencoder.
- 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.

### Assistant Research Engineer

Computational Neuroimaging Lab, Child Mind Institute | Advisors: Michael Milham, Ting Xu

Jun 2019 - Aug 2021

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.
- Improved brain-behavior variance explained using shared response model on Human Connectome Project data.
- Analyzed spatial temporal dynamics and inter-subject correlation on naturalistic neuroimaging data.

### Graduate Research Assistant

New York State Psychiatric Institute | Advisor: Xiaofu He

Aug 2018 - May 2019

New York, NY, US

- Designed a motor imagery task interface for electroencephalogram (EEG) data recordings using PsychoPy.
- Developed a cascade ResNet-LSTM deep learning model to classify motor imagery EEG signals.

### Graduate Research Assistant

Hood Visual Science Lab, Columbia University | Advisor: Donald Hood

Jun 2018 - May 2019

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 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

Laboratory for Intelligent Imaging and Neural Computing, Columbia University | Advisor: Paul Sajda

Feb 2018 - May 2019

New York, NY, US

- Collected eye tracking data in three conditions when subjects watch lecture videos with soundtrack, slides and the speaker, to assess determinant factors in online courses.
- Analyzed eye tracking data of 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

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### Graduate Teaching Assistant

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

- Developed an autograder, held weekly office hours, answered students' questions in discussion forum, graded exams.

## SKILLS

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

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

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

**Deep Learning Libraries:** PyTorch, TensorFlow, Keras, Weka

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

## AWARDS

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**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 Award** | Child Mind Institute      2021

**Columbia Hackathon First Prize** | Columbia University      2019

**Outstanding Graduate** | Xiamen University      2017

**Study Abroad Scholarship** | Xiamen University      2016

**Outstanding Student Cadre** | Xiamen University      2014, 2015, 2016

**First Class Excellent Student Scholarship** | Xiamen University      2014, 2015, 2016

## LEADERSHIP & MEMBERSHIP

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**Scholar**      2022 - 2025

Georgia Tech/Emory Computational Neural-Engineering Training Program      Atlanta, GA, US

**Fellow**      2023 - 2024

Georgia Tech Women In Engineering Grad Women's Fellowship Program      Atlanta, GA, US

**Member and Brain-Art Liaison**      2022 - 2024

Organization for Human Brain Mapping Communications Committee

**Website and Communications Manager**      2021 - 2024

Organization for Human Brain Mapping Brain-Art Special Interest Group

**Student Member**      2021 - 2023

Organization for Human Brain Mapping

**Student Member**      2021 - 2023

Institute of Electrical and Electronics Engineers

**Scholar**      2014 - 2017

Xiamen University Siyuan Excellent Student Training Program      Xiamen, FJ, CN

**Vice President**      2014 - 2015

Xiamen University Sunshine Psychology Volunteer Team      Xiamen, FJ, CN

### Co-Organizer

- Organization for Human Brain Mapping Brain-Art Exhibition and Competition 2023: *The Multifaceted Brain: Adaptation and Diversity*
- Organization for Human Brain Mapping Brain-Art Exhibition and Competition 2022: *The Connected Brain*
- Organization for Human Brain Mapping Brainhack 2023: *Venture into the untapped depths of the brain*
- Chinese Open Science Network OpenTalks March 2023: *Seeing Beyond the Brain: Conditional Diffusion Model with Sparse Masked Modeling for Vision Decoding* by Zijiao Chen

### Roundtable Junior Chair

- Machine Learning for Health (ML4H) Symposium 2022

### Reviewer

- Schizophrenia Bulletin
- Journal of Open Source Software
- International Conference on Learning Representations (ICLR) 2024
- Advances in Neural Information Processing Systems (NeurIPS) 2023
- NeurIPS Symmetry and Geometry in Neural Representations (NeurReps) Workshop 2023
- The Medical Image Computing and Computer Assisted Intervention Society (MICCAI) 2023
- International Conference on Machine Learning (ICML) Data-centric Machine Learning Research (DMLR) Workshop 2023
- ICLR Practical ML for Developing Countries (PML4DC) Workshop, Tiny Papers 2023
- Computer Vision and Pattern Recognition Conference (CVPR) Topological, Algebraic, and Geometric Pattern Recognition with Applications (TAG:PRA) Workshop 2023
- Organization for Human Brain Mapping (OHBM) 2023
- NeurIPS A Participatory Approach to AI for Mental Health (PAI4MH) Workshop 2022

## PUBLICATIONS

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Weizheng Yan, Godfrey D Pearlson, Zening Fu, **Xinhui Li**, Armin Iraj, Jiayu Chen, Jing Sui, Nora D Volkow, and Vince D Calhoun. **A brain-wide risk score for psychiatric disorder evaluated in a large adolescent population reveals increased divergence among higher-risk groups relative to controls.** *Biological Psychiatry*, 2023

**Xinhui Li**, Tulay Adali, Rogers Silva, and Vince Calhoun. **Multimodal subspace independent vector analysis captures latent subspace structures in large multimodal neuroimaging studies.** *bioRxiv*, 2023

**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

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

**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**, 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

**Xinhui Li**, Eloy Geenja, 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

**Xinhui Li**, Lei Ai, Steve Giavasis, Hecheng Jin, Eric Feczko, Ting Xu, Jon Clucas, Alexandre Franco, Anibal Sólón 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 Neuroscience.** *bioRxiv*, 2021

Rogers Silva, Eswar Damaraju, **Xinhui Li**, Peter Kochonov, Aysenil Belger, Judith M. Ford, Daniel H. Mathalon, Bryon A. Mueller, Steven G. Potkin, Adrian Preda, Jessica A. Turner, Theo G.M. van Erp, Tulay Adali, and Vince D. Calhoun. **Direct linkage detection with multimodal IVA fusion reveals markers of age, sex, cognition, and schizophrenia in large neuroimaging studies.** *bioRxiv*, 2022

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

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

## INVITED TALKS & SELECTED PRESENTATIONS

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**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.** **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**, 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 Sólón 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

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