Qinghao (Leo) Liang

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EDUCATION

Yale University, New Haven, CT *Expected Dec 2024*
Ph.D., Engineering and Applied Science (Specialty in Biomedical Engineering)
Selected Courses: Data Mining and Machine Learning, Object-Oriented Programming, Optimization and Computation, Deep Learning Theory and Applications, Unsupervised Learning of Big Data, Mathematical Methods of Physics
Awards: Best Paper Award, MICCAI 2022

University of Science and Technology of China, Hefei, China *June 2018*
B.S, Physics

TECHNICAL SKILLS

- Programming Languages: Python, R, MATLAB, C++, SQL
- Machine Learning & Data Science Tools: PyTorch, Scikit-learn, Pandas, NumPy, SciPy, Jupyter, Git
- Expertise: Predictive Modeling, Data Imputation, Federated Learning, Graph Learning, Medical Imaging Analysis

RESEARCH AND LEADERSHIP EXPERIENCE

Yale School of Medicine, *Graduate Researcher*, New Haven, CT *Mar 2019 - Present*
Department of Biomedical Engineering, Advisor: Dustin Scheinost, PhD

- Developed a predictive modeling pipeline for brain connectomes with advanced data imputation, increasing dataset utilization by 60% and model accuracy by 45%.
- Innovated a domain adaptation method using graph matching and optimal transport, eliminating preprocessing burdens and enhancing data sharing in neuroimaging.
- Designed a federated learning approach in PyTorch for multi-site neuroimaging studies, achieving a 25% improvement in model performance while preserving data privacy.
- Implemented a meta-learning strategy for heterogeneous domains, boosting prediction accuracy by 40% with limited samples.
- Collaborated with psychiatrists to develop predictive models of alcohol addiction scores using connectomes, providing valuable insights into the neuro-mechanisms of alcohol dependence.
- Delivered an oral presentation to a global audience of 50+ attendees at MICCAI 2022 in Singapore and presented research findings at poster sessions held at the 26th, 27th, and 29th OHBM conferences, the 37th ICML workshop, and the IEEE ISBI 2021.

Yale Graduate & Professional Student Senate (GPSS), *Senator*, New Haven, CT *Sept 2020 - May 2022*

- Collaborated with the GPSS leadership team to evaluate and vote on proposals affecting graduate student life and professional development, maintaining regular communication with the dean of the graduate school.
- Organized career networking events with the Yale Alumni Association, drawing over 100 participants.

Yale School of Engineering & Applied Science, *Research Assistant*, New Haven, CT *Sept 2018 - Mar 2019*

- Applied PLUMED with LAMMPS to accelerate simulations of bulk metallic glass crystallization.
- Modified GROMACS to simulate protein folding under customized repulsive forces.

Yale School of Engineering and Applied Science, *Teaching Fellow*, New Haven, CT *Jan 2021 - Dec 2021*
Courses: Introduction to Engineering; Medical Software Design

- Supervised and guided 16+ students in the completion of their final projects and demonstrations.
- Conducted weekly seminars on emerging tech topics, fostering a collaborative and innovative learning environment.

SELECTED PROJECTS

Yale Department of Radiology & Biomedical Imaging, *Graduate Researcher*, New Haven *Mar 2019 – Present*

- Optimized matrix completion methods for high-dimensional data, enhancing imputation accuracy and computational efficiency.
- Executed large-scale simulations on high-performance computing clusters using Linux-based parallel processing.

Yale Department of Radiology & Biomedical Imaging, *Graduate Researcher*, New Haven *Sept 2021 – Present*

- Developed a graph transformation framework with spectral embedding and graph-matching methods.
- Implemented a federated learning approach in PyTorch to train a deep learning model for classification and regression tasks.
- Created a transfer-learning strategy with domain alignment using optimal transport to adapt pre-trained models to new domains.

ADDITIONAL INFORMATION

- **Publications**: Authored 17 papers on neuroimaging data analysis, featuring method development in *Imaging Neuroscience*, *MICCAI*, and *ICML Workshops*, with applications published in *The Lancet Digital Health*, *JAMA Psychiatry*, and other top journals.