

ALICIA LIU

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PROFILE

- Skilled in advanced statistical, computational techniques, with a focus on ML applications in neural time-series data from fMRI, EEG, FNIRS recordings
- Programming Languages: Python, C, PostgreSQL, Rust, JavaScript, MATLAB, R (Tidyverse), STATA,
- Bash/Unix for High Performance Computing
- Libraries: Scientific Computing (NumPy, SciPy), Data Manipulation (Pandas), Data Mining (Scrapy, Requests), Machine Learning (HuggingFace, Scikit-Learn, PyTorch, Keras), Visualization (Seaborn, Tensorboard).

EDUCATION

University of Chicago, Chicago, IL

Sept. 2024 – June 2025

M.A, Psychology (with a focus in Computational Methods)

Relevant Courses: Data Engineering for Laboratory Research, Data Interaction

University of Chicago, Chicago, IL

Sept. 2020 – June 2024

B.S in Computer Science (Specialization in Machine Learning) & B.A in Philosophy | GPA 3.7

Relevant Courses: Mathematical Foundations of Machine Learning, Machine Learning, Computer Vision, Theory and Design of Algorithms, Computer Systems, Discrete Math, Computational Biology, Databases, Data Science, Computer Vision, Complexity Theory

EXPERIENCE

Quantitative Neuroscience Research Intern, Computational Affective Neuroscience Lab | Summer 2024 – Present

- Conducted literature review and analyzed existing methodologies to frame and design a research project
- Performed analysis on large-scale fMRI timeseries brain data, implementing search algorithms & dynamic programming algorithms to compare segmentation rates between healthy and anxious individuals.
- Implemented machine learning models and techniques, including Hidden Markov Models, (HMM), Support Vector Machines (SVM) and Random Forests, to identify patterns in brain activity.
- Pre-processed data using Principal Component Analysis (PCA) and Shared Response Modeling (SRM) for dimensionality reduction and alignment across subjects, ensuring data integrity and model readiness
- Applied hyper-alignment techniques to align data across subjects, enhancing model robustness in multi-subject analyses.

Computational Research Intern, Motivation and Cognition Neuroscience Lab | Summer 2023

- Conducted statistical tests using Generalized Linear Mixed Models (GLMM) on large-scale behavioral datasets
- Applied hierarchical drift diffusion models (HDDM) with MCMC sampling to decompose decision-making processes, analyzing individual differences in punishment sensitivity and perceptual biases under aversive motivation.
- Designed and executed two experimental studies, deploying JavaScript-based online study and optimizing data workflows with Python for efficient processing of high-throughput participant data.
- Contributed to manuscript writing and editing, leading to publication in peer-reviewed scientific journal *Emotion* as second author
- Collaborated in an interdisciplinary team, communicated results through data visualization and presented results at conference

RELATED PROJECTS

Cognitive Neuroscience Memory Reconsolidation LLM, May 2024 – Present

- Developed a web-based chatbot application using LLaMA 2 and OpenAI APIs for memory activation and reconsolidation experiments, integrating generative AI models for personalized mental health intervention; fine-tuned using Hugging Face
- Designed and implemented a FastAPI backend and React frontend for real-time data collection and analysis, ensuring secure and efficient handling of sensitive user information
- Applied NLP techniques to analyze and identify patterns in user conversations, using clustering methods (e.g., k-means, hierarchical clustering) to profile the cognitive and emotional responses of participants.

Machine Learning Group Project: Image-to-Image Translation with CycleGAN, Spring 2024

- Developed a CycleGAN model in Python for image-to-image translation, implementing domain adaptation to convert real-world images into anime-style outputs; optimized data pipelines using PyTorch transformations for consistency and model robustness
- Fine-tuned model architecture for efficient GPU-accelerated training, leveraging data augmentation techniques and hyperparameter optimization to ensure stable convergence and high-quality results

AWARDS AND GRANTS

- *TechFoundation-Harvard Medical School Research Grant*: awarded \$5k stipend for neuroscience research with data sci methods
- *UChicago Advanced Scholars Grant*: awarded \$5k to support research in computational neuroscience, \$20k scholarship
- *UofToronto President's Scholars of Excellence Program*: received \$15,000 scholarship awarded to top 0.8% of students

PUBLICATIONS

- Kim, H., Liu, A., & Leong, Y.C. Desirability biases perceptual decision making in aversive context. (*Accepted, under revision*)