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, STATA, Bash/Unix for HPC
- 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, Computational Social Sciences
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

Research Intern, Computational Social Cognition Lab | September 2024 – Present
- Developed a novel framework for studying & quantifying bias in LLMs based on graph-based representations of correlated concepts
- Designed an iterative querying system to probe LLMs for implicit biases and extract key conceptual relationships.
- Built and analyzed graph structures, employing graph-based algorithms to reveal complex patterns of bias propagation

Research Intern, Computational Affective Social Neuroscience Lab | June 2024 – Present
- Conducted literature review and analyzed existing methodologies to frame and design a self-lead project on event segmentation
- Performed analysis on large-scale fMRI timeseries brain data, implementing ML models and techniques, including Hidden Markov Models (HMM), Support Vector Machines (SVM) and Random Forests, to identify patterns in brain activity.
- Preprocess & denoise by applying shared response modelling (SRM) & hyper-alignment techniques to align data across subjects

Research Intern, Motivation and Cognition Neuroscience Lab | June 2023 – June 2024
- 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

RELATED PROJECTS

Cognitive Neuroscience Memory Reconsolidation with 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*)