Alicia Liu

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EDUCATION

The University of Chicago Chicago, IL
M.A. in Psychology expected June 2025

The University of Chicago Chicago, IL
B.S. in Computer Science with a Specialization in Machine Learning June 2024
B.A in Philosophy June 2024

GRANTS & AWARDS

2024 TechFoundation-Harvard Medical School Summer Research Grant ($5,000)
2023 University of Chicago Advanced Scholars Summer Research Grant ($5,000)
2023 University of Chicago Advanced Scholars Scholarship ($20,000)
2021 University of Chicago Jeff Metcalf Award ($8,000)
2020 University of Toronto President's Scholars of Excellence Program ($15,000)

RESEARCH EXPERIENCE

Environmental Neuroscience Lab, University of Chicago Chicago, IL
Research Assistant, *PI:* ***Dr. Marc Berman*** *Dec 2024 - Present*

- Worked with PhD student to develop an interactive user study testing ML interpretability
- Designed and implemented custom jsPsych plugins to create interactive flowchart-based UI
- Deploy user study using Cognition.run and analyze reaction time and interactivity data

Computational Social Cognition Lab, University of Chicago Chicago, IL
Research Assistant, *PI:* ***Dr. Xuechunzi Bai*** *Sept 2024 - Present*
Project 1: Graph representation of implicit cognitive bias in large language models (*ongoing*)

- Leading project to develop a novel graph-based framework for studying and quantifying bias in LLMs by integrating results from cross-domain semantic alignment in human psychology
- Engineered prompts & iterative query system to probe LLMs (ChatGPT4o and LLaMA-2)for implicit biases and extract prediction probabilities and key conceptual relationships.
- Utilized Python and machine learning libraries (e.g., NetworkX, SpaCy) to build and analyze graph structures, employing graph-based algorithms to reveal patterns of bias propagation

Computational Affective Social Neuroscience Lab, **University of Chicago** Chicago, IL
Research Assistant, *PI:* ***Dr. Yuan Chang Leong*** *May 2023 – Present*
Project 1: Motivational bias on perceptual decisions

- Investigated individual differences in personality and mood disorders in motivational and perception bias through behavorial experimentation and computational modelling
- Coded & deployed multiple versions of online task using JsPsych (HTML, JavaScript, CSS) on Cognition.run. Deployed task to 500+ subjects on Prolific
- Conducted statistical tests with GLMM in Rstudio, applied Hierarchical Drift Diffusion Modelling (with Monte Carlo Sampling) in Python to mode decision-making and bias

Project 2: Computational approach to individual differences in neural event segmentation (*ongoing*)

- Leading individual project to analyze differences in event segmentation patterns between healthy and anxious individuals across naturalistic fMRI dataset
- Clean, pre-process, and signal enhance imaging data using FSL, NiLearn, NiBabel, using statistical methods such as hyper alignment and shared response models
- Performed analysis on large-scale fMRI timeseries brain data, implementing statistical models and techniques, such as Hidden-Markov Models (HMM), Greedy State Boundary Search (GSBS), and IS-RSA in Linux HPC
- Submitted preliminary results to SANS 2025, accepted as a poster presentation

Project 3: LLM-based autobiographical memory activation & reconsolidation (*on hold*)

- Perform literature review of chatbot LLM usage in augmenting and improving mental health, creativity, productivity, social interactions, and communication
- Design experimental paradigm to investigate whether LLM can perform text-based cognitive re-appraisal and reframe negative autobiographical memories; draft and submit and IRB
- Develop 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
- Applying 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 participant

Perry World House, University of Pennsylvania Chicago, IL
Remote Research Assistant, *PI:* ***Dr. Joshua Byun*** *Aug 2022 – September 2022*

- Translated, coded, and qualitatively analyzed the results of a nuclear weapons attitude survey administered to 3,748 Chinese citizens

Political Science Division, University of Chicago Chicago, IL
Research Assistant, *PI:* ***Dr. Jongyoon Baik*** *May 2021 – June 2022*

- Analyzed 2000+ media reports of administrative lawsuits in China to assist in the development of an administrative lawsuits dataset to support research on administrative lawsuits systems
- Developed a systematic workflow of organizing and categorizing media reports based on analysis
- Utilized RStudio to clean and visualize data; assisted in the testing of a Python NLP package for text-based quantitative analysis in the social science

CONFERENCE PRESENTATIONS

"Trait Anxiety is Associated With Idiosyncratic Neural Event Boundaries in the Temporoparietal Junction During Movie-watching". Poster talk to be delivered at *Social & Affective Neuroscience Society Conference, Chicago, 2025*.
"Information Release as a Form of Control: Open Government Information Request in China". Poster talk delivered at *Midwest Political Science Association Conference, Chicago, 2022*.

PROFESSIONAL EXPERIENCE

immersionED Chicago, IL
Software Engineering Intern June 2022 – Sept 2022

- Developed a game software from beginning to end with senior game developer and two other interns to be deployed in K-12 classrooms. Gained experience in scripting, Perforce, C++, and testing/debugging to ensure gameplay goals were met.
- Implemented & designed game mechanics based on insights from educational psychology and game-based learning

TECHNICAL SKILLS

Programming: Python, RStudio, C/C++, HTML/CSS/JavaScript, Rust, SQL, MATLAB, Bash/Unix, TensorFlow, PyTorch, SciPy, Scikit-learn, Google Cloud, NiLearn, BrainIAK
Neuroscience & Psychology:
Software: JsPsych, Cognition.run, Prolific, Qualtrics
Hardware: SR Research Eyelink 1000/Portable Duo eyetracker
Other tools: Git/SVN/Perforce, Jupyter/Google Collab, HPC, Docker, Unity, Unreal Engine, Occulus
Languages: English (native), Mandarin Chinese (native)

SELECTED COURSEWORK

PHIL 29904 Ethics in the Digital Age
CMSC 25300 Mathematics of Machine Learning
CMSC 25000 Computer Vision
CMSC 23700 Scientific Visualization
CMSC 25025 Machine learning and Large-Scale Data Analysis
CSMC 20300 Human-Computer Interaction
CMSC 21800 Data Science for CS
CMSC 23500 Introduction to Databases
PSYC 26000 Social Psychology
CMSC 20370 Inclusive Technology
CMSC 31500 Data Interaction
PSYC 42350: Advanced Topics in Human Neuroimaging

REFERENCES

Dr. Yuan Chang Leong
Assistant Professor in Psychology, University of Chicago
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Dr. Xuechunzi Bai
Assistant Professor in Psychology, University of Chicago
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