Richard Zhuang

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EDUCATION

University of California, Berkeley, CA **June 2021-June 2025**
Triple Majoring in Applied Mathematics, Computer Science, and Statistics GPA: 4.0/4.0

Relevant Coursework: Linear Algebra, Multivariable Calculus, Real Analysis, Probability Theory and Stochastic Processes, Principles and Techniques of Data Science, Design and Analysis of Computer Algorithms, Optimization Models in Engineering, Machine Learning, Time Series Analysis, Foundations of Large Language Models, Deep Unsupervised Learning and Generative Modeling, Statistical Learning Theory.

HIGHLIGHTED PROJECTS & WORK EXPERIENCES

Berkeley AI Research: Representation Learning of Large Language Models (LLMs) **Jan 2024-Present**
Undergraduate Researcher

- Collaborated with Ph.D. Tianhao Wu in exploring methods to extract valuable representation of various large language models.
- Implemented an encoder-decoder based model that outperforms traditional machine learning methods like Nearest Neighbors in predicting correctness of model response of unseen multiple-choice questions.

UCSF Mindscape Lab: Modeling Hospital-Associated Infection Dynamics **Sep 2023-Present**
Undergraduate Research Intern

- Developed an agent-based graph simulation for *Clostridium difficile* transmission within hospital departments, utilizing Monte Carlo methods to model infection spread.
- Proposed a novel method that uses deep learning algorithms to infer patient status by recovering a "full image" of the transmission dynamics.

Undergraduate Research Apprentice Program: LLM Behavior Analysis **Sep 2023-May 2024**
Undergraduate Researcher

- Collaborated with postdoctoral researcher Yujin Kwon and Professor Dawn Song to understand the interaction between large language models (LLM) under various game settings.
- Assisted prompt engineering and performed simulations of LLM interactions in Prisoner's Dilemma game and Story Relay game, elucidating improvements of performance with multi-agent collaboration and revealing model vulnerabilities when adversarial entities are present.

Berkeley Data Discovery Program: Continuous Learning of LLM **Jan 2024-Present**
Undergraduate Researcher

- Collaborated with Ph.D. candidate Akshat Gupta in improving LLM abilities amid poker games.
- Established a benchmarking dataset to evaluate LLM poker playing abilities and performed fine-tuning to improve LLMs' reasoning abilities.

Morgan Stanley Investment Management China **Summer 2023**
Quantitative Investment Intern

- Performed an in-depth analysis of cutting-edge deep learning techniques and their practical applications in forecasting stock market trends, particularly focusing on the viability within China's A-share market.
- Evaluated and summarized key findings from 15 leading research papers, reproducing architectures and highlighting advancements in deep learning time series modeling.

SKILLS

Languages: Python, Java, R, SQL, MATLAB, JavaScript

Tools & Packages: AWS, PyTorch, HuggingFace, LangChain, vLLM, NumPy, Pandas, Matplotlib