

Ellen Ma

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EDUCATION

Harvard University *M.S. Data Science*

Sept. 2024 – Jan. 2026

- Thesis: “Simulator-Augmented LLM Agents for Multi-Step Planning”
- Advisor: Kianté Brantley

University of Chicago *B.S. Mathematics, B.A. Economics*

Sept. 2020 – Jan. 2024

- Dean’s List, Katen scholar

WORK EXPERIENCE

Kempner Institute at Harvard University

Jun. 2025 – Present

ML Research Intern

- Designed meta-MDP framework enabling LLMs to choose between direct actions and simulator tool calls for planning without mutating environment state in Frozenlake, Sokoban ASCII grid worlds
- Built SFT data pipeline with BFS-solved chain-of-thought reasoning traces, deadlock injection for negative examples, and difficulty-parameterized curriculum
- Configured multi-node Ray on FASRC H100 clusters for OpenRLHF and VeRL; created custom multi-turn Gym wrappers for asynchronous RL training
- Stabilized tool-use training via GRPO/PPO ablations on KL penalties, reward shaping, and intrinsic reward capping to mitigate reward hacking
- Built evaluation harness executing LLM actions in live Gym environments over multi-turn rollouts, scoring rewards (agents learned strategic simulator use on FrozenLake; identified collapse failures on Sokoban)

Garcia Lab at UChicago Medicine

Jan. 2021 – Dec. 2023

Research Assistant

- Built signal processing and ML pipeline (RandomForest, PCA, UMAP, FFT) to analyze ventilatory reflexes and detect changes in preBötzing complex activity (brainstem respiratory control center)
- Findings revealed physiological adaptations that may explain variance in overdose susceptibility

1104Health

May 2022 – Sept. 2022

Data Science Intern

- Applied NLP techniques including Named Entity Recognition, relation extraction, and negation detection on medical terminology and healthcare data to distinguish inclusion/exclusion criteria in clinical trials
- Presented literature reviews and visualized data to highlight inefficiencies in clinical trial matching and demand for product to partners and investors (e.g. Johns Hopkins Medicine)

PROJECTS

Predicting election winners with NLP methods

- Used sentiment analysis (VADER), word embeddings (GloVE) and machine learning models (RandomForest, XGBoost) to predict presidential winners with NYT headline data

Emissions-optimized meal planning

- Formulated robust optimization problem minimizing emissions while meeting nutritional constraints
- Used polyhedral and ellipsoidal constraint sets to account for variability in ingredient-level carbon emission data

SKILLS

- **Programming:** Python, R, PyTorch, Git, GCP, Docker, Slurm, sklearn, NumPy, pandas
- **ML/AI:** reinforcement learning, supervised fine-tuning, distributed training, Ray, Slurm, OpenRLHF, VeRL
- **Coursework:** differential equations, probability theory, Markov chains & Brownian motion, machine learning