Ellen Ma

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EDUCATION

Harvard University *M.S. Data Science* **Sept. 2024 – Jun. 2026**
- Thesis: "Reinforcement Learning and Tool Use for AI Agents"
- 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
- Implemented meta-MDP enabling LLMs to act or call tools for planning without mutating state; prototyped in FrozenLake and extending to coding tasks using ReTool
- Configured multi-node Ray for OpenRLHF and VeRL to run asynchronous training and created custom multiturn environment wrappers to integrate Gym into OpenRLHF
- Stabilized tool-use training via GRPO/PPO ablations on KL and reward shaping; mitigated reward hacking while preserving tool use
- Built end-to-end FrozenLake pipeline: BFS map generator for solvable training data and evaluation harness that parses prompts to Gym environments, executes LLM actions, and returns reward and end state

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