JOSHUA CAI

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EDUCATION

Massachusetts Institute of Technology   Cambridge, MA
Candidate for Master of Business Analytics, Operations Research Center, August 2026   *Aug 2025 – Present*
Coursework: Machine Learning / Optimization / Deep Learning

University of California, Berkeley   Berkeley, CA
B.A. in Computer Science & Statistics   *Aug 2022 – May 2025*
Coursework: Statistical Models / Stochastic Processes / Linear Algebra / Data Structures / Algorithms / Probability Theory
Experience: Teaching Assistant for Real Analysis, Discrete Mathematics, and Probability Theory

SKILLS

Python / SQL / R / Java / C / Julia / Excel / Power BI / Git / Golang

EXPERIENCE

Agentic AI Research Assistant   Cambridge, MA
MIT Gupta Research Group   *Fall 2025*
- Developed an LLM-powered chatbot in Python using LangChain, retrieval-augmented generation (RAG), and targeted fine-tuning to analyze therapist–patient interaction patterns in mental health settings.
- Conducted EDA on 2024 customer data using Pandas, identifying actionable telehealth product recommendations.
- Designed multi-agent workflows leveraging modern techniques to model realistic conversational behavior for healthcare research applications.

Machine Learning Intern   Cambridge, MA
MIT Analytics Lab/Qrious Insight   *Fall 2025*
- Led large-scale data cleaning, feature engineering, and analysis on 100+ GB of data to support model development.
- Implemented and evaluated Random Forest, XGBoost, Isolation Forest, LSTM, and Transformer models in Python for fraud detection, achieving 0.80 AUC with 80%+ fraud capture at <20% false positive rate.
- Presented an improved algorithm at year-end, estimating $250K+ in revenue impact; ranked 2nd out of 22 teams.

Stochastic Simulation Research Assistant   Berkeley, CA
UC Berkeley Energy & Resources Group   *Fall 2023 – Spring 2025*
- Developed and evaluated a stochastic model using Python to simulate shifts in 2 unique perturbed systems.
- Refactored and optimized legacy code, improving runtime efficiency by 30% and increasing model flexibility.
- Applied numerical methods, verifying model calculations to within 0.1% of analytical solutions.

Actuarial Intern   Los Angeles, CA
Milliman   *Summer 2023*
- Built Power BI dashboards and data visualizations on 200k+ data points over homeowner data across 3 states.
- Performed feature engineering and industry research to increase pricing model prediction accuracy by 15%.
- Implemented statistical techniques and regression models in Excel and R, identifying key risk factors; presented findings and pricing model suggestions to the company branch.

PROJECTS

AI Chess Reasoning Engine
- Developed a reasoning-first chess engine integrating Stockfish evaluations, Transformer models, and large language models to generate high-quality, human-interpretable move and position commentary for commercial use.
- Designed an MCTS self-play engine in Python similar to AlphaZero that improves the engine from its own games.
- Hosted a web app with Supabase database support, attracting 50+ users and immense interest; connects to Chess.com and Lichess profiles and learns from player games to build player profiles and identify improvements.

ML-Guided Branching for Optimization
- Integrated ML models to replace traditional branch-and-cut heuristics, yielding a 10% average speedup.

ADDITIONAL INFORMATION

Avid tennis player (7 years) / Piano and violin hobbyist (12 years) / Competitive chess player (6 years)