

# Neo Lee

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## EDUCATION

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### University of California, Berkeley

**GPA: 4.0/4.0**

Bachelor of Arts, Applied Mathematics, Computer Science

*Graduation: Spring 2025*

Cal Alumni Leadership Scholarship

**Mathematics Coursework:** Real Analysis, Complex Analysis, Topology, Algebra, Linear Algebra, Probability Theory, Stochastic Processes, Mathematical Statistics, Time Series Analysis, Graph Theory, Numerical Analysis, Discrete Mathematics, Cryptography

**Computer Science Coursework:** Optimization Theory, Machine Learning, Deep Learning, Efficient Algorithms, Functional Programming, Object Oriented Programming, Dynamic Programming, Data Structures, Computer Architecture

## EXPERIENCE

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### CyphaLab

**Remote**

Portfolio Manager

*April 2024 - Present*

- Spearheaded the development and optimization of the proprietary algorithmic trading portfolio for the company's cryptocurrency fund of \$500,000.
- Engineered and implemented a comprehensive suite of CTA strategies utilizing machine learning models such as LSTM, ARIMA, GBDT with Pytorch, Statsmodels, and XGBoost for effective reinvestment of corporate capital.
- Leveraged sophisticated optimization methodologies, including mean-variance, Calmar ratio, Kelly criterion, and expected shortfall, to enhance portfolio performance.
- Applied elastic regularization and principal component analysis (PCA) for dimensionality reduction, ensuring model robustness and mitigating overfitting.
- Achieved an annual Sharpe ratio of 3.49 and an annual Calmar ratio of 13.8 since inception.

Data Scientist

*January 2024 - April 2024*

- Ensembled CodeBERT and gradient boosting decision trees using Pytorch and XGBoost to classify malicious Ethereum smart contracts, achieving 0.89 F1 score on the test set.
- Built a transaction optimizer with Python to dynamically calculate the optimal gas price for Ethereum transactions and routing them through the optimal MEV relayer, reducing gas fees by 30%.
- Built a data relayer hosted on Google Cloud Virtual Machine to provide on-chain DEX transaction data for online time series forecasting.

### UC Berkeley Department of Mathematics

**Berkeley, CA**

Undergraduate Researcher - Stake-governed Random Turn Games

*August 2023 - Present*

- Built a finite integer line tug-of-war game simulator with Python, Numpy, and Pandas to solve for Markov perfect equilibria with dynamic programming, and visualized the results with Matplotlib.
- Constructed a computer assisted proof for the sufficient and necessary condition for the existence of a Markov perfect equilibrium in infinite integer line tug-of-war games, being that the reward ratio is bounded within a  $1 \times 10^{-4}$  interval from a symmetric game: paper is currently under review.
- Reduced the run-time of the computer-assisted proof by from 3 hours to 20 minutes through the implementation of dynamic programming and vectorization techniques.

Undergraduate Researcher - Mechanistic Interpretability

*September 2023 - December 2023*

- Reverse engineered Stockfish's efficiently updatable neural network's learned algorithm using Pytorch, Sklearn, and Seaborn, achieving MSE of 1.8 compared to a simple linear regression model with MSE of 126.
- Applied dimension reduction techniques such as SVD, neuron pruning, and feature projection onto ReLU privileged basis to reverse engineer the embedding layer, showing that each neuron's activation space is 95%+ correlated.
- Aggregated 38GB training dataset with Sqlite and used Git for version control.
- Built an Alpha-beta pruning algorithm & NN based chess engine with C++ to study the effect of neural network based evaluation functions on the performance of the algorithm.

**UC Berkeley Department of EECS**

Academic Tutor - CS61A

**Berkeley, CA***August 2023 - December 2023*

- Tutored students in Functional Programming, Object Oriented Programming, and Dynamic Programming with Python in lab sessions.
- Held weekly office hours to help students with homework and projects, and tutored other tutors.

**HKUST School of Engineering**

Undergraduate Researcher - Machine Learning

**Remote, CA***March 2023 - July 2023*

- Scraped and cleaned online data on the US economy and stock market using Python, BeautifulSoup, Selenium and Pandas, and stored mass data with MySQL.
- Analyzed economic indicators such as CPI and interest rate with regression and clustering using Numpy and Scikit-learn.
- Surveyed and summarized academic papers on state-of-the-art machine learning topics such as diffusion models for generative AI.