Yu (Anna) Luo

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Education

Ph.D. University of California, Davis — Applied Mathematics 2023–Present
Advisors: Jesús De Loera & Alexander Wein Research focus: tensor & polytopes

B.S. Columbia University — Financial Engineering 2020–2022

B.S. Dickinson College — Mathematics, *Summa Cum Laude* 2017–2020

Experience

Ph.D in Applied Mathematics Sept. 2023 - Present
University of California, Davis

- Ongoing project: Critical Moments of The Slab (with Jesús), will be submitted to SoGC by Dec. 3rd.
- Finished writing piece: Symmetric Extension of Overcomplete Tensor Decomposition via Koszul–Young Flattenings (with Alex). Link to Demo

Quantitative Trading Assistant Oct. 2022 - Apr. 2023
Beijing Boyudingshi Management and Consulting Co.

- Trained predictive models (ARIMA, LSTM) on 700+ ETFs and A-shares, achieving significant improvements in forecast accuracy (over 70% winrate) compared to baseline winrate of 55%.
- Generated trading signals that directly supported portfolio management of a 3M fund. Collaborated with senior traders to integrate model outputs into live trading strategies.

Tech Department Manager (Internship) Apr. 2020 - Apr. 2021
Jetzy Co.

- Led the team construct and published website version of Jetzy.
- Led a cross-functional team of 20+ engineers and interns on app development and data analysis.
- Conducted 10+ technical interviews, improving intern recruitment and selection work flow.

Projects

Critical Moments of the Slab Link to Demo

Advised by Prof. De Loera. Collaborative work with Marie-Charlotte Brandenburg and Meroni Chiara. Used Sage and Maple to compute extreme values and critical values of volume and moments of a slab (same-dimensional slice of the hypercube) in 4D.

Symmetric Extension of Overcomplete Tensor Decomposition via Koszul-Young Flattenings

Advised by Prof. Wein. Computed asymptotic rank and decomposition of symmetric overcomplete 3D tensors.

Time-Frequency Analysis for Non-Stationary Signals Link to Demo

Collaborated work with Chen Qian. Applied two harmonic analysis methods (PWVD and WPT) each combined with a different machine learning method (CNN and Random Forest) to stock price forecasting and compare their performance using **Python**, achieving a mean win rate of **72.61%**.

Distributionally Robust Mean–Variance Portfolio Optimization (dr-mv) Link to Demo

Columbia University, Spring 2022

Developed a **distributionally robust mean–variance (dr-mv)** model using the **Wasserstein distance** to handle uncertainty in stock returns. Tuned (δ, α) on 19 years of S&P 500 data, where dr-mv **outperformed benchmarks** with higher Sharpe ratios and lower volatility.

Clustering Analysis on Three Different Methods

Columbia University, Fall 2021

Applied **unsupervised clustering** to historical stock return data using **Hartigan–Wong**, **Lloyd**, and **K-Means** algorithms to explore structural market patterns. Used **PCA** for dimensionality reduction and evaluated models by within-cluster variance and convergence speed. **Identified Hartigan–Wong as the best-performing method**, achieving the most compact and interpretable clusters among all algorithms tested.

Credit Default Risk Classification Using Machine Learning

Columbia University, Fall 2020

Built an end-to-end **ML pipeline** to predict **credit default risk** from bank data. Engineered key features, created **Bokeh dashboards**, and optimized Decision Tree and Random Forest models via **Grid Search**, achieving F1$\approx$ 0.62 and AUC$\approx$ 0.64 with interpretable financial insights.

Publications

DiSilvio, S., **Luo, Y.**, and A. Ozerov (2021). "Traders in a Strange Land: Agent-Based Discrete-Event Market Simulation of the Figgie Card Game". In: *arXiv preprint arXiv:2110.00879*. URL: https://arxiv.org/abs/2110.00879.

Awards & Honors

Pi Mu Epsilon Honor Society Member 2020-Present
1st Place, Brain Teaser hosted by Susquehanna International Group, LLP 2021

Leadership

SIAM UCD Representative 2025-Present
CSSA Treasurer 2019-2020

Skills

Coding	Python (sklearn, Sage)
Some More Skills	Also some more of this, Some more that, And some of this and that etc.