Abhi Wadhwa

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Education

University of Southern California **Aug. 2023 - May 2027**
B.A. Applied Mathematics **3.8/4.0 GPA**
Coursework: Analysis I-II, Complex Analysis, Linear Algebra, Abstract Algebra, Probability, Optimization, Statistics, Numerical Analysis
Honors: Dean's Scholar ($70k), Dean's List, Academic Achievement Award, Directed Reading Program, Competitive Debate Team

Experience

The World Bank **Oct. 2024 - April. 2025**
Research Intern Los Angeles, CA

- Developed a population distribution function in TensorFlow that leveraged a spatial realignment model to reconcile counts across 150+ shifting district boundaries, reducing cross-boundary population misallocation and enabling policy impact analysis
- Engineered data annotation pipelines in Python using pandas to process, validate, and sort 300K+ agricultural yield records, leveraging chunking to accelerate throughput and reduce pre-processing for faster feature extraction and classification accuracy
- Designed PostgreSQL schema with joins, CTEs, and indexed query execution to integrate auxiliary datasets into the research warehouse, improving reproducibility of regression results through standardized data relationships and reducing query execution time

RBC Capital Markets **Sept. 2024 - Feb. 2025**
Markets Apprentice New York City, NY

- Developed a fixed-income analytics tool in Python using QuantLib to calibrate spot and forward yield curves via bootstrapping and interpolation, automating duration and convexity decomposition to dynamically rebalance portfolio exposures
- Studied sector-specific financial modeling techniques under the advisory of the PU&I group, focusing on building integrated valuation models, analyzing industry-specific key drivers, and applying sensitivity/scenario analysis to assess investment outcomes
- Applied GARCH volatility models to understand vega-driven options strategies, capturing asymmetric volatility patterns arising from macroeconomic uncertainties and identifying systematically mispriced contracts with potential for excess returns

USC Mathematics Department **Sept. 2024 - Dec. 2024**
Undergraduate Researcher Los Angeles, CA

- Studied *Measure theory and Fine Properties of Functions* (Evans) under guidance of a PhD mentor, applying concepts of Measure and Functional Analysis to formally define probability spaces underlying transformer-based NLP architectures
- Modeled transformer architectures as Markov Decision Processes over filtered probability spaces, presenting to the mathematics department on the formulation of token prediction as a sequential decision problem and its implications for language model behavior

USC Marshall School of Business **Aug. 2024 - Oct. 2024**
Research Assistant Los Angeles, CA

- Developed scripts in Python to automate validation checks, apply missing-data imputation rules, and standardize feature formats for 200K+ records from 120 districts, reducing manual effort and preparing datasets for econometric modeling
- Implemented propensity score matching across 120 districts using statistical methods to estimate the effects of SNAP, TANF, and Medicaid policy changes as part of study on efficacy of public sector welfare programs across varying demographics

UC Berkeley, Haas School of Business **Aug. 2021 - Feb. 2022**
Research Assistant Berkeley, CA

- Analyzed the effectiveness of monetary incentives on vaccination uptake across 200+ counties in 6 states by processing multi-state datasets, using OpenRefine to clean and standardize county-level records for consistent statistical evaluation

Awards and Recognition

USAMO Qualifier + 2x AIME
- Qualified for AIME 2x based on AMC (Top 3,000/300,000), crossed USAMO threshold 1x (Top 300)

BMO Distinction + 2x BMO
- Qualified for British Maths Olympiad R1 2x based on UKMT (Top 1,000/700,000) + 1x Distinction (Top 250)

British Parliamentary Debate Awards
- 5th Novice in North America (NAUDC), 2nd Novice at Hart House, 7th Open at Berkeley, 3rd Novice at USC

JHU CTY Julian C. Stanley Study of Exceptional Talent
- Issued by Johns Hopkins University for 99th Percentile SAT Math score at Age 12

Skills

Programming Languages: Python (NumPy, SciPy, Pandas, QuantLib, cvxpy, MatPlotLib), R, C++, SQL, JavaScript, Java
Machine Learning: Stochastic, Causal Inference, Monte Carlo, Martingales, Markov Chains, Time Series Analysis, Bayesian Methods
Tools: Excel/VBA, Bloomberg Terminal, CapIQ, MATLAB, LaTeX, Jupyter, Git/GitHub, Docker, AWS, Linux/Unix, Tableau, Power BI
Financial Knowledge: Option Pricing, Risk Management, Equity Analysis, Credit Modeling, Rates Modeling, Market Microstructure
Research Interests: Computational Social Choice, Behavior Models, Algorithmic Game Theory, Policy Design, Experimental Economics