Sheyan Lalmohammed

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EDUCATION

University of Pennsylvania- The Wharton School **Philadelphia, PA**
Bachelor of Science - Economics (Statistics) (GPA: 3.88) *August 2022 - May 2026*

- Relevant Coursework Topics: Advanced Probability, Databases for Analytics, Venture Capital, Statistical Inference, Bayesian Data Analysis, Stochastic Processes, Corporate Finance, Corporate Accounting, Statistical Computing with R, Numerical Optimization for Data Science and Machine Learning, Business Analytics

University of Pennsylvania - College of Arts and Sciences **Philadelphia, PA**
Bachelor of Arts - Mathematical-Economics (GPA: 3.88) *August 2022 - May 2026*

- Relevant Coursework Topics: Single Variable Calculus, Multivariable Calculus, Linear Algebra, Partial Differential Equations, Real Analysis, Intermediate Microeconomics/Macroeconomics, Financial Economics, Numerical Methods for Macroeconomists, International Financial Markets and Cryptocurrencies, Econometrics Methods and Models, International Trade, Mathematical Economics, Microeconomic Theory

NOTABLE RESEARCH AND APPLICATION-BASED PROJECTS

Dynamic Bayesian Networks for BNPL Credit Risk (Wharton Research Scholars) - Undergraduate Statistics Thesis

- Conceived a static Bayesian Network (BN) and a time-dependent Dynamic Bayesian Network (DBN) to model BNPL credit risk, leveraging personal-loan data as proxies to address CFPB's consumer-protection gaps in pay-in-four/six products
- Worked with Dr. Paul Sabin (Statistics Department) to author and present a full research proposal and final thesis, execute a deep literature review on Bayesian and network-based risk models, and design an interpretable, statistically robust framework using a dataset of over 2 million loans
- Engineered a 5-period Dynamic Bayesian Network pipeline, pushing LendingClub static data into temporal components of payment history, delinquency and credit score evolution, and revolving credit utilization and integrated lagged macroeconomic indicators for quarter-period inference
- Implemented and compared results across score-based network structure learning algorithms, such as Hill-Climb Search and BIC/BDeu scoring across static BNs and DBNs
- Used a bootstrap evaluation to quantify the performance in a cost-sensitive framework for the trade offs in false-negative and false-positive rates for default and show that DBNs can be advantageous in temporal inference in BNPL lending

Economics of Optional NFT Royalties - Undergraduate Honors Economics Thesis (Ongoing)

- Formulating an economic model extension to Zou, Gu, and Liu (2024) which developed one of the first theoretical and formal models on the operations of NFT marketplaces in which ownership and copyright are separated
- Determining how partial or optional royalty enforcement affects equilibrium pricing, platform enforcement decisions, and trader routing decisions in NFT marketplaces
- Integrating switching costs, routing elasticity, and heterogeneous information (informed vs. uninformed traders) into a logit-based marketplace assignment framework to explain cross-platform trading flows
- Constructing empirical measures of realized enforcement credibility using on-chain trade data from NFT provider Dune Analytics and using a regression framework to estimate routing elasticity and switching costs during the 2023 royalty optional changes to OpenSea and Blur
- Filling gaps in existing literature by linking platform enforcement choices, trader reallocation, and market-share dynamics

Cumulative Prospect Theory Driven Multi-Agent Reinforcement Learning (Published at ICML MAS 2025)

- Worked under supervision of Professor Damek Davis in STAT 4830 (with 2 other undergraduates) to integrate CPT-based reward transformations into a MADDPG framework, enabling agents to exhibit loss aversion and probability weighting during negotiation and demonstrating stable convergence across risk profiles.
- Developed multi-agent simulations in which CPT-guided agents inferred opponents' utility parameters from their actions, leading to more human-like strategies and different joint payoffs than standard MARL approaches.

Wharton Directed Reading Program Presentation - Causal Interference under Interference

- Worked with a Statistics Department 4th-year PhD Student to create a presentation and conduct a literature review to explore how causal studies often assume each person's treatment only affects themselves, and what happens when that assumption fails and treatments spill over to others
- Discussed simple modeling methods to correct for spillover bias and illustrate how social network features like homophily and contagion can make treatment effects appear stronger than they truly are
- Studied intuitive graph-based representations, such as temporal DAGs and chain graphs, and presented a practical two-step approach to using these representations that remains effective even when the full network connections aren't known

Negotiations and Game Theory in Online Chess - Schweitzer Lab Project (Ongoing)

- Analyzing chess games under Dr. Uri Zak in order to understand topics in negotiation using three-fold repetition draw offers as a strategic mechanism
- Developed python code to analyze the FEN of a chess game, determine the point at which the draw offer was made, who made the offer, whether the draw offer was accepted or rejected, and run a chess engine simulation to determine the scoring evaluation of the position of the board at the time of the offer

- Applying developed code to over 10 million chess games, in person and online, to determine if variations in time can cause differences in considerations for negotiation or lapses in judgement in determining optimal strategy from chess players of various skill level and demographics

Portfolios Tracker - *Developer*
- Used Python to write a program that takes in multiple self-created portfolios of assets, each learning towards a specific market or by spanning multiple optimization methods around specific values of Value at Risk, Volatility, Sharpe Ratio, Variance of Returns, Beta, and Alpha
- All details are provided in an open-source format and reports can be run daily with previous real returns and Monte Carlo simulations of returns going forward while weights are adjusted based on long-term returns history

Digital Currencies and Financial Inclusion in Developing Economies (Wharton GRC Social Impact Research)
- Conducted an extensive economic and social policy focused study of digital currencies in developing economies, such as cryptocurrencies, utility tokens, stablecoins, and CBDCs, to evaluate their potential to improve economic development opportunities, increase socioeconomic mobility, and boost financial inclusion
- Synthesized over 25 pieces of relevant literature, including case-studies and research in Latin America, the Caribbean, and Africa, and then identified the structural components of developing economies limiting adoption and effects of implementation
- Evaluated the pathways that digital currencies can directly impact the emerging markets, such as remittance efficiency, transaction-cost reduction, market stability, investment flows, and infrastructure scaling, to determine that stablecoins currently present the most viable near-term inclusion benefits, while CBDCs require significant infrastructure and governance improvements for equitable adoption.

AI-Human Collaboration Welfare Modeling - Independent Research
- Wrote a preprint research article developing a discrete-time game-theoretic framework incorporating a collaboration index, equity penalty, and Nash bargaining solution to quantify total output and welfare from human–AI interactions.
- Used Agent-Based Modeling (ABM) to exemplify the intuitive results under pre-chosen specific parameters of the model and the convergence to an equilibrium
- Parameterized risk attitudes, human ability, AI competency, and cognitive costs, and ran agent-based simulations to reveal that trust-building and skill development maximize total output and welfare in this human-AI system.

Harvard University International Economics Essay Competition CBDC Framework
- Wrote research paper titled “The Complex Framework to a Successful Central Bank Digital Currency” which discussed the implementation of a CBDC by the Federal Reserve through an interest-bearing CBDC (Placed Top 20 Worldwide)
- Described implementation using DLT token-based access through a decentralized two-party system for retail transactions and a centralized token system for wholesale transactions through expanded central processing networks

RECENT WORK EXPERIENCE (RESEARCH AND NON-RESEARCH RELATED)

BMO Capital Markets **New York, NY**
Global Markets Summer Analyst *June 2025 - August 2025*
- Automated technical indicator analysis for DeMarks and RSI as well as risk reporting metrics such as Stress and VaR
- Conducted a long-term research project on historical returns of specific execution algorithms and technical screeners to determine mathematical similarity of executing clients
- Learned from sector-specific traders on key strategies used to gain traction and gain an edge in equities markets trading
- Wrote market summaries on market-moving events in global equities and debt markets for traders and sales-traders

Edelman Financial Engines **Santa Clara, CA (Remote Houston, TX)**
Portfolio Research Intern *June 2024 - August 2024*
- Worked with the portfolio management team to conduct portfolio optimization under market and risk constraints
- Built analytics assets with the financial technology team to develop financial model statistic generation infrastructure
- Productized key investment management tools while integrating research from the financial research team

Graham Capital Management L.P. **Norwalk, CT**
Summer Intern *June 2023 - August 2023*
- Analyzed flow accounts to identify trends in investor spending on specific systematic, discretionary, and blended trading strategies across commodities, fixed income, currencies, and equities
- Conducted statistical analysis of historical market returns from a team of portfolio managers over a 29-year span to identify optimal allocations in discretionary strategies and used simulations to predict future returns
- Researched various macroeconomic topics, such as prediction of future CPI and Unemployment Data, Federal Reserve changes in policy, and trends in industries to write weekly market commentary for internal distribution
- Conducted a research project on financial crisis indicators in hedge funds through the use of systematic strategies, such as trend following, mean reversion, and statistical arbitrage as well as discretionary strategies such as credit trading

The Wharton School **Philadelphia, PA**
Research Assistant *September 2023 - Present*
- Conducting Research under Professor Maurice Schweitzer of the Operations, Information, and Decisions Department related to topics in negotiation, game theory, and motivation
- Worked with P.h.D student (and 2 other undergraduate students) to create detailed dataset of over 500 speeches on understanding advice in the context of commencement speeches
- Worked with Professor Samir Nurmohammad of the Management Department on topics (November 2024 - May 2024) on topics related to team performance as underdogs

PALX Insights **Philadelphia, PA**
Economic Optimization Analyst / Co-Founder *October 2022 - Present*

- Created a network-based system to identify successful small business brick-and-mortar locations based on transaction and geometry data in specific polygons in the United States
- Identified optimal investment value for a specific type of small business in a specific geographical region to get the best return on investment within five years of opening a new store location using 200,000 store experiences

EXTRACURRICULAR ACTIVITIES / PROGRAMS

University of Pennsylvania Center for Undergraduate Research and Fellowships (CURF) **Philadelphia, PA**
Research Peer Advisor *August 2025 - Present*
- Acting as the first line of contact to a group of 13 undergraduate students to assist in getting involved with research at Penn. This includes introductions to reading research papers, being actively aware of new economics and statistics research, and connecting students with faculty in the economics and statistics departments.
- Working with other RPAs to complete multiple engagement projects aimed at opening up access to research, including data science workshops, discussions with professors at Penn on their journey to their current positions, and a podcast on ongoing research at Penn

Wharton Global Research and Consulting Group **Philadelphia, PA**
Analyst - Insights/Articles Division *January 2023 - Present*
- Used research skills to develop research paper on developing economies digital assets infrastructure and its effect to social outcomes, specifically in the context of cryptocurrencies, utility tokens, CBDCs, and stablecoins
- Specialized in economics-related research for financial behavior and consumer behavior concerning multiple industries, including hospitality, investment management, retail, and technology as an articles fellow
- Wrote an article, published on GRC Global Website, on the economics of gambling addiction to argue that harm-minimization policies, such as slowing betting frequency and restricting cash access, can reduce financial and social harm for individuals in low-income communities.

Machine Learning Research at Penn **Philadelphia, PA**
Research Team Member *January 2024 - Present*
- Attended and spoke at lectures related to various machine learning, generative-AI, LLMs, and statistical theory
- Conducting research on Multi-Agent Negotiation with Reinforcement Learning using Prospect Theory and the extension of the reinforcement learning to large language models for more human acting LLMs

United States Ismaili Professionals Network **United States**
National Certifications Volunteer Representative *June 2025 - Present*
- Created a dataset of over 500 professional certifications across finance, technology, mechanical and structural engineering, healthcare, and insurance
- Working actively on an AI and tech guide for the Ismali Muslim Community aimed at educating the population of United States Ismaili Muslims with limited educational background on effective ways of using artificial intelligence to compliment their work and improve their quality of life rather than see it as an impediment to their careers going forward

Mack Institute for Innovation Management **Philadelphia, PA**
Research Associate *January 2024 - May 2024*
- Estimated the current size and projected growth of the benchmarking industry, especially within the intelligent automation niche and analyzing trends impacting the market while identifying potential growth areas
- Conducted a comprehensive analysis on the generative AI industry using a combination of advanced data analysis and visualization as well as using proprietary data sets, product attributes, and service offerings

Summit@Wharton **Philadelphia, PA**
Attendee *April 2025*
- Attended and completed a prestigious undergraduate pre-doctoral application program intended on introducing undergraduate students with exceptional backgrounds in research to graduate-level students and faculty at The Wharton School of the University of Pennsylvania
- Over the course of the summit, I heard from faculty in Industrial Organization, Management, and Marketing on the topics of careers in university teaching and research, the PhD application process, and their ongoing research.

TECHNICAL SKILLS

Advanced Python | Advanced R | Intermediate MATLAB | Intermediate SQL | Intermediate STATA | Intermediate Excel VBA | Advanced Bloomberg Terminal | Intermediate Adobe Photoshop