SEAN MULHERIN

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PROFESSIONAL SUMMARY

Quantitative AI Architect and Ph.D. candidate in Statistics (UCLA) with a proven track record of translating mathematically rigorous research into scalable, production-grade AI systems. Expertise in designing machine learning frameworks, multivariate statistical models, and predictive analytics platforms for complex enterprise environments. Adept at bridging the gap between advanced theoretical mathematics and applied business solutions, with strong programming proficiency in Python, R, and web-based integrations. Recognized for technical leadership, cross-functional collaboration, and presenting complex quantitative strategies to executive stakeholders.

CORE COMPETENCIES & TECHNICAL SKILLS

- **AI & Machine Learning:** Artificial Neural Networks (ANN), NLP Pipelines, Predictive Analytics, Forecasting (Prophet, SARIMAX), Model Validation, Elastic Net Regularization.
- **Mathematics & Statistics:** Multivariate Statistics, Experimental Design, Spatial-Temporal Modeling, Hawkes Point Processes, Quantitative Finance Concepts, Causal Inference.
- **Programming & Engineering:** Python, R, JavaScript, HTML, SQL, Git/GitHub, Parallel Computing.
- **Production & Architecture:** Scalable AI Architecture, Semantic Similarity Analysis, Confidence Scoring Frameworks, Deduplication, Web-based Model Integration, AWS, GCP, Apache Airflow, Docker.

PROFESSIONAL EXPERIENCE

SoSystems Los Angeles, CA
Lead AI Architect 06/2025 – Present

- **AI Architecture & Deployment:** Architected and deployed a production-grade, multi-stage AI pipeline to transform unstructured government regulations into validated, machine-readable compliance outputs, processing 5,000+ documents monthly and accelerating manual processing speeds by over 600%.
- **Statistical Modeling & NLP:** Engineered advanced NLP systems applying statistical reasoning and semantic similarity analysis, improving data extraction accuracy to 96% for 10+ enterprise users.
- **Model Validation & Risk Mitigation:** Designed and integrated confidence scoring, clustering, and deduplication frameworks to manage uncertainty in a high-stakes regulatory setting, achieving a 33% reduction in compliance errors.
- **Technical Leadership:** Lead a cross-functional team of engineers and data scientists; oversee the end-to-end integration of AI models into scalable web-based applications using a Python back end and JS front end.

UCLA Dept. of Statistics and Data Science Los Angeles, CA
Quantitative Researcher & Technical Instructor 09/2023 – Present

- **Advanced R&D Modeling:** Developed spatial-temporal Hawkes models utilizing penalized Poisson likelihood maximization and elastic net regularization. Improved baseline prediction accuracy by 2.25% (RMSE) for complex, large-scale mobility and infectious disease forecasting.

- **Statistical Testing & Experimental Design:** Applied Neyman-Scott models and likelihood-ratio tests to analyze multi-year temporal datasets (2016-2023). Designed experimental frameworks that successfully identified statistically significant causal clustering across diverse environments.
- **Mentorship & Communication:** Mentored and instructed over 500+ students and peers in Data Technologies, Statistical Reasoning, and Parallel Computing in R. Regularly translated complex multivariate statistical concepts into accessible presentations for non-technical audiences and academic conferences.

Secondary Education Institutions (Brentwood School, Jackson Hole, etc.) Various Locations
Mathematics & Physics Department Faculty / Academic Advisor 08/2019 – 08/2025

- **Technical Leadership & Instruction:** Directed quantitative curriculum development across multiple institutions, training students in advanced mathematics (Calculus, Statistics, Trigonometry) and Physics.

APPLIED AI & QUANTITATIVE PROJECTS

Full portfolio, academic papers, and source code (Python, R, HTML) available at seanmulherin.github.io

- **Quantitative Financial Modeling & Optimization:** Engineered a web-based financial analytics platform integrating Prophet models to forecast daily asset closing prices. Developed a portfolio optimization tool computing volatility, returns, and dynamic weighting capable of supporting portfolios with 100+ assets.
- **Operational Housing Price Forecasting:** Deployed a predictive web application utilizing SARIMAX-inspired forecasting to analyze atypically volatile U.S. housing markets. Built an interactive HTML/JS interface for real-time exploratory data analysis, achieving 96% prediction accuracy across 1000+ municipalities.
- **Artificial Neural Network Healthcare Classifier:** Architected and trained a custom ANN from scratch using CDC datasets to classify type II diabetes risk based on multivariate survey inputs, achieving 84% validation-set accuracy.

EDUCATION

University of California, Los Angeles (UCLA) Expected 2027
Ph.D. in Statistics (Focus: Spatial-Temporal Modeling, Point Processes, Machine Learning)
M.S. in Applied Statistics and Data Science 2025

- *Honors: UCLA Statistics Outstanding Masters Student Award (2025)*

University of North Carolina, Chapel Hill (UNC) 2020
M.A.T. Secondary Mathematics

North Carolina State University 2019
B.S. Mathematics