OLIVER OREJOLA

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EDUCATION

Ph.D Mathematics, Tulane University 2024
Thesis: Essays on random matrix theory and applications
Relevant Coursework: Deep Learning, Data Science, Natural Language Processing, and Stochastic Processes

B.A Physics and Mathematics, University of Colorado Boulder 2016
Thesis: Cohomologous 2-cocycles are Homotopic 2-cocycles: k-graphs and C*-algebras *Magna Cum Laude*

SKILLS

Python, R, SQL, DuckDB, Snowflake, TensorFlow, Scikit-learn, Pandas, Polars, NumPy, SciPy
Machine Learning, Data Analysis, Signal Processing, Statistics, Linear Algebra, Algorithms

EXPERIENCE

Quantitative Research Intern June 2025 - Dec 2025
Engineers Gate *New York, NY*

- Developed multi-source ETL pipelines (Snowflake, Redshift, MS SQL) ingesting 100+ GB daily market and alternative data (e.g., guidance revisions, receipt panels, call transcripts) for quantitative research workflows
- Authored internal documentation and example analyses for 10+ alternative and market datasets, codifying feature definitions, interpretation guidelines, and reproducible usage patterns for the research team
- Built automated profiling system for market data, email receipt panels, and textual feeds, implementing outlier detection and distributional tests that reduced manual review cycles by 40%

Applied AI Researcher Dec 2024 - Present
Mercor *New York, NY*

- Reviewed 20+ LLM agent-generated code and research papers, assessing correctness, methodology, and alignment with domain-specific standards across mathematics and machine learning
- Designed 50+ advanced mathematical problems spanning calculus, linear algebra, probability theory, and optimization to evaluate and improve reasoning capabilities of state-of-the-art LLMs
- Evaluated 600+ multi-step mathematical reasoning traces, developing quantitative rubrics to assess logical consistency, computational accuracy, and problem-solving strategies

Graduate Student Researcher Aug 2019 - May 2024
Tulane University *New Orleans, LA*

- Developed novel statistical hypothesis tests and spectral clustering algorithms for high-dimensional time series analysis, resulting in 3 peer-reviewed publications in top-tier signal processing venues
- Pioneered machine learning approaches combining wavelet analysis and random matrix theory for self-similarity detection in stochastic processes, yielding 2 publications and advancing state-of-the-art in signal classification for large high-dimensional temporal datasets

Instructor and Teaching Assistant Aug 2018 - May 2024
Tulane University *New Orleans, LA*

- Designed and delivered graduate-level Python course covering data structures, algorithms, and machine learning (NumPy, Pandas, scikit-learn, TensorFlow) for 20+ students, emphasizing applications to quantitative research
- Instructed 3+ statistics courses and provided technical mentorship in advanced mathematics and statistical computing for classes of 10-35 students, with 90% reporting significant growth in analytical skills

Benefits Analyst Oct 2016 - Jul 2018
Willis Towers Watson *Denver, CO*

- Designed tiered review system for pension calculations and compliance workflows, leveraging process analysis and statistical monitoring to reduce SLA breaches by 20% across 500+ monthly cases

Researcher May 2016 - Aug 2016
Colorado School of Mines *Golden, CO*

- Optimized numerical simulations for adiabatic quantum computation on NP-Hard problems, achieving 50% runtime improvement through algorithm design and computational profiling

SELECTED PUBLICATIONS

"On the empirical spectral distribution of large wavelet random matrices based on mixed-Gaussian fractional measurements in moderately high dimensions" with Didier, G., Wendt, H. and Abry, P. (2025) Electronic Journal of Probability

"A spectral clustering-type algorithm for the consistent estimation of the Hurst distribution in moderately high dimensions" with Didier, G., Wendt, H. and Abry, P. (submitted)

"Identifying high-dimensional self-similarity based on spectral clustering applied to large wavelet random matrices" with Didier, G., Wendt, H. and Abry, P. (2024) 32nd European Signal Processing Conference (EUSIPCO)

"Shhh! The Logic of Clandestine Operations" with Naumov, P. (2023) 32nd International Joint Conference on Artificial Intelligence (IJCAI)

PROJECTS

Event Contract Arbitrage System 2025 – Present

- Developing statistical arbitrage and market-making strategies for cryptocurrency event contracts on Kalshi, implementing GARCH, jump diffusion, and Hawkes process models for real-time volatility estimation and signal generation to exploit pricing inefficiencies

Cointegration and Causality: Statistical Analysis of Apple's Supply Chain 2023

- Applied cointegration and Granger causality tests to 10+ years of daily equity returns across Apple's supplier network, identifying statistically significant lead-lag structures and long-run equilibrium relationships

Recipe Generator 2024

- Built hybrid sparse-dense RAG system combining BM25 and dense embeddings to generate structured recipes from natural language queries, achieving 50% improvement in relevance over baseline approaches

Agentic RAG 2024

- Built hierarchical multi-agent retrieval system with Chain-of-Thought orchestration for multi-document Q&A and summarization, processing 1000+ page corpora with parallel inference

Political Wikipedia Edit Trends: Indicators for Important Events 2022

- Developed anomaly detection pipeline processing 1M+ Wikipedia edits using Isolation Forests and time series decomposition, achieving 85% precision in identifying significant political events