Aryan Malik

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Education

Rutgers University, Honors College, *B.S. Mathematics, Computer Science, and Economics* — New Brunswick, NJ | Dec 2026

- **Coursework:** Mathematical Finance (MSMF track), PDEs, Real Analysis, Abstract Algebra, Econometrics, ML, Applied Statistics
- **Awards:** 1st place SQC Quant Challenge, 1st BITS/Barclays Datathon, 1st Rutgers/KPMG Ideation Challenge; SAT 1600/1600

Experience

LuminArx Capital Management, *Software and Data Intern* — New York, NY | Jul 2026 – Present

- Built **Lumin**, a proactive agent that watches firm email and Teams traffic and flags problems for the investment and operations teams; in its first week it served 30 users over 200+ messages and caught ∼10 real issues on its own
- Built its knowledge base: SharePoint Markdown behind an MCP server with keyword and semantic search, updated autonomously from company documents, email, and Lumin's own conversations
- Moving ∼10 data sources (∼10–15 GB/day) from ad hoc SFTP scripts and consultant-run jobs to firm-owned Azure pipelines

Independent Quant Research, *Researcher and Developer* — Remote | May – Aug 2026

- Built a Python/Rust mid-frequency trading stack: Rust Thetadata FPSS streaming client (600+ symbols), risk daemons (pre-trade limits, kill switch, stale-data halts), and a Rust gRPC execution service routing to Interactive Brokers
- Built an autonomous research loop: researcher, trader, and risk-officer agents test arXiv-seeded ideas in a Docker sandbox and gate them on Deflated Sharpe and train/test gaps, with memory of past trials
- Trained an execution-cost model on Databento MBP-10 order-book data: 1.0 bp out-of-sample error on $10k slippage, 1.9 bp on spread

Gradient Trading (early-stage quantamental fund), *Quant Researcher/Developer* — Remote | Jan – Jul 2025

- Built a Python L2 backtester modeling spread and slippage; simulations landed within 50 bps of live results
- Trained a PyTorch time-series attention model to reconstruct L2 order-book depth from L1 data for stress and scenario testing
- Built Bloomberg, USPTO, and SEC ingestion (2 TB extracted) on Dockerized Airflow pipelines (3 GB/day, Grafana/Prometheus)

New Jersey Big Data Alliance, *Data Science Extern* — New Brunswick, NJ | May – Aug 2024

- Built an NLP matcher on a local quantized embedding model that mapped 1,138 course equivalencies from 2-year to 4-year degrees, 100% accurate on a held-out eval set and spot checks, saving hundreds of review hours
- Designed a statewide data science curriculum (benchmarked on UC Berkeley, UT Austin) adopted across 9 colleges

Projects

Osmo — *self-hosted personal AI agent* — aryanmalik.com/osmo

- Self-hosted on my GPU server: 26 permission-tiered MCP tool servers (Gmail, Calendar, iMessage, GitHub, browser, sandbox, memory)
- A small decision model routes each turn: picks the model tier (cheap open models, escalating to Claude Opus on repeated tool failures) and which tools to load, under per-turn cost caps
- Acts unprompted: watchers on email, messages, and job feeds plus 11 scheduled jobs (morning brief, weekly review, opportunity sweeps)
- Memory over 11,532 past AI conversations (0.974 recall@8); a code-enforced one-tap gate guards email, code pushes, and replies

Football Greeks — *pricing NFL yardage contracts like options* — github.com/cantsoar/football_greeks

- Simulates games snap by snap from 1M+ plays (play-call net, mixture-density net over outcomes and yards, pace net, rules engine) and computes delta, gamma, theta, and vega of yardage contracts as a game unfolds
- Beats two baselines on held-out likelihood with calibrated intervals (80% covers 78%); paper-traded Kalshi totals at +$0.115/contract

Trade the Knight → KnightGym — *exchange turned RL environment* — github.com/cantsoar/knightgym

- Built the Rust exchange behind Rutgers' first live algorithmic trading competition (90 participants, 54 Dockerized bots) across spot, FX, bonds, options, and prediction markets; matching core runs 5.5M orders/s (p99 0.85 μs)
- Wrapped it as a Gymnasium/PettingZoo RL environment and audited the reward: teammate wash trades inflated marked equity by $1,077/episode while true equity fell; team-level STP plus mid marking closed the hole

Leadership

Rutgers Quantitative Finance Club, *Math/CS/Data Science Chair* — New Brunswick, NJ | May 2024 – Present

- Trained forward-backward neural SDEs with PPO on synthetic Heston data; showed they need 100+ years of tick data to converge
- Directed 9 research teams replicating foundational quant papers (Heston, SABR)

Rutgers Economics Lab, *Research Lead* — New Brunswick, NJ | Sep 2024 – Present

- Led 6 researchers for NJDEP: STORM Act participation compressed municipal bond yields while geospatial flood risk went unpriced

Skills & Interests

- **Engineering:** Python, Rust, C++, Java, SQL, TypeScript; PostgreSQL, Docker, Airflow, gRPC, Azure, AWS
- **AI & agents:** MCP tool servers, model routing, RAG and semantic search, agent evals, PyTorch
- **Quant:** backtesting, market microstructure, time series, HMMs, stochastic calculus and SDEs
- **Other:** Third-degree black belt; AI reviewer (Outlier); Spanish, Hindi; rebuilt a '95 Miata engine; fantasy football (go Hawks)