

# Varun Budati

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## EDUCATION

**Virginia Tech**, Blacksburg, Virginia Aug 2023 – May 2027  
B.S. in Computer Science, Minor in Mathematics & Finance GPA: 3.67/4.0

## RESEARCH EXPERIENCE

- Quantitative Research**, Dataism Lab for Quantitative Finance, Blacksburg, Virginia October 2024 – Present
- Created an end-to-end algorithmic execution framework in **Python (PyTorch, NumPy, Pandas)**, developing a Mixture of Experts (MoE) architecture that routes high-frequency limit order book data into specialized **Double Deep Q-Learning (DDQL)** optimal liquidation agents.
  - Programmed custom feature extraction pipelines using **Scikit-learn** and **SciPy** to cluster non-stationary market regimes based on rolling realized volatility, bid-ask spread compression, and order book volume imbalances ( $Q, T, S, BA$ ), cutting implementation shortfall 59% versus TWAP under increasing market impact.

## PROJECT WORK

**ShadeFinder | Software Engineering Project** December 2025

- Designed a geospatial **Python** app (**Streamlit, Folium, OSMnx, Pysolar**) to compute and visualize real-time building shadows from live solar-position and OpenStreetMap data.
- Debugged critical rendering bugs (coordinate-system mismatches, UI reload loops) and refactored duplicated shadow-physics logic into a shared module, integrating real-time **OpenWeatherMap** climate data.

**Undergraduate Commodities Competition | Houston, TX** October 2025

- Set up a quantitative pricing engine in **Python (NumPy, Pandas, SciPy)** to back a multi-leg trade thesis (Short Jan '26 Waha Basis), calibrating a modified **Ornstein-Uhlenbeck (OU)** stochastic process to model structural temperature mean-reversion ( $\kappa = 0.2905$ ) and local price drivers ( $R^2 = 0.40$ ).
- Programmed a time-varying seasonal volatility matrix using an integrated **Cubic B-Spline (BSpline)** smoothing model and ran 10,000 high-dimensional Monte Carlo path simulations to accurately price complex winter Heating Degree Days (HDD) exotic call options for weather risk derivatives hedging.

**IMC Prosperity 3 | Top 0.12%** April 2025

- Ranked **15th in the US out of 12,600 teams** in IMC's Prosperity 3 algorithmic trading competition, designing automated strategies across multi-asset markets.
- Developed signal-driven market-making algorithms in **Python** by identifying mean-reversion patterns and synthetic mispricing via rolling z-scores, spread compression, and correlation clustering.

## PUBLICATIONS

**Publication:** Budati, Varun et al. "Bridging the code gap: Understanding pedagogical patterns in CS1 programming courses." *Proceedings of the 57th ACM Technical Symposium on Computer Science Education V.2*, pp. 1561–1562. Feb 2026

**Working Paper:** Budati, Varun et al. "Order Execution for Cryptocurrency using Mixture of Experts" *In Progress* Aug 2025 – Present

## LEADERSHIP

**President, FinTech Club**, Virginia Tech, Blacksburg, Virginia October 2024 – Present

- Managed financial operations and a comprehensive budget for 100+ members, while organizing high-profile speaker events to drive networking and quantitative finance career development.
- Spearheaded a faculty-advised quantitative research initiative replicating the foundational Evans & Archer (1968) paper; created an interactive **Streamlit** dashboard in **Python** to programmatically isolate systematic risk via high-dimensional random asset sampling and hyperbolic curve-fitting (**NumPy, Pandas, SciPy**).

**Student Summer Ambassador, MAOP**, Virginia Tech, Blacksburg, Virginia Fall 2026

- Advocated for undergraduate research and enrollment at university career fairs, serving as the primary liaison for the Mentorship & Academic Outreach Programs (MAOP).
- Delivered actionable seminars to incoming engineering cohorts in partnership with CEED, providing peer mentorship on securing faculty research roles and navigating project selection.