

# 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: 3.61/4.0

## SKILLS & CERTIFICATIONS

**Programming Languages:** Python, SQL, JavaScript, Java, C, HTML/CSS

**Libraries & Frameworks:** NumPy, Pandas, Matplotlib, Plotly, Sklearn, Seaborn, SciPy, Statsmodels, React, Node.js, Flask, PyTorch

**Certifications:** Financial Analysis (Power BI), Akuna Capital Options 201 (ID: 92400251)

## RESEARCH EXPERIENCE

**Quantitative Research**, Dataism Lab for Quantitative Finance - Virginia Tech, Blacksburg, Virginia October 2024 – Present

- Benchmarked GPT-OSS 20B on FinanceBench to evaluate context-management strategies in financial LLMs; found that automated RAG and Model Context Protocol (MCP) pipelines matched manual curation quality while reducing latency, informing the lab's retrieval architecture decisions.
- Created a data-driven market simulator that successfully trained an agent on a 3-day historical Bitcoin dataset, demonstrating the model's ability to learn and exploit short-term liquidity patterns.
- Developed a Deep Reinforcement Learning agent in PyTorch and built a real-time visualizer using Streamlit; implemented Double Dueling DQN with Prioritized Replay to learn optimal execution policies from high-frequency data.

**Summer Research Intern**, MAOP - Virginia Tech, Blacksburg, Virginia May 2025 – July 2025

- Collected, cleaned, and analyzed a 24,500+ word corpus of instructional text from intro CS courses at MIT, Berkeley, and Caltech to identify pedagogical gaps.
- Designed and implemented an 8-category data coding framework utilizing LIWC-22 and LLM-based classifiers to extract patterns from unstructured text and classify programming examples by thematic focus.
- Delivered data-driven recommendations after finding a 57% prevalence of abstract examples, advocating for culturally-relevant, real-world applications; findings contributed to a peer-reviewed SIGCSE 2026 publication.

**Research Mentor & Assistant**, REACH Lab - Virginia Tech, Blacksburg, Virginia March 2024 – June 2025

- Synthesized 80+ articles on Rural CS Education to support a \$500,000 NSF grant proposal; built and maintained the lab's literature database and established search protocols adopted by the full team.
- Mentored 6 research assistants in systematic literature review and database search techniques, reducing onboarding time and improving source quality across the team.

## PROJECT WORK

**ShadeFinder | Software Engineering Project** December 2025

- Engineered a Python-based shadow calculation engine integrating OpenStreetMap and Pysolar to project shadow polygons using solar physics (altitude/azimuth) and building height metadata with Earth curvature compensation.
- Built an interactive Streamlit dashboard with Folium maps for shadow visualization and hourly simulation controls, pulling real-time climate data from OpenWeatherMap API; developed a React/FastAPI version with Mapbox GL JS for 3D building rendering.

**Undergraduate Commodities Competition** October 2025

- Constructed a suite of quantitative models to price a natural gas basis trade, including a multiple regression to identify market drivers ( $R^2 = 0.40$ ), an Ornstein-Uhlenbeck process for temperature, and a B-Spline volatility model for pricing weather derivatives.
- Structured and executed a multi-leg trade thesis (Short Jan '26 Waha Basis), using 10,000 Monte Carlo simulations to value the hedges (Henry Hub call spread and Dallas HDD options) and define a comprehensive risk-payoff profile.

## LEADERSHIP & 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

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

- Manage budget and financial operations supporting 100+ members; ensure accurate reporting and responsible resource utilization.
- Organize speaker events with industry professionals to create networking and career development opportunities.
- Led a faculty-advised research project replicating the foundational Evans & Archer (1968) paper on portfolio diversification.

**IMC Prosperity 3 | Top 0.005%** April 2025

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