Timothy Tarter

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EDUCATION

James Madison University Anticipated Graduation: December 2026

B.S. Mathematics Cumulative GPA: 3.6

Minors: Computational Analytics **Dean's List:** Fall 2023, 2024, 2025, Spring 2024, Summer 2024

PUBLICATIONS & PRESENTATIONS

Invited Conference Talk: Gannon University's Applied Intelligence Conference & Joint Mathematics Meetings 2026
  Title: "A Faster Attack on LFSR Recurrences: an Alternative to the Berlekamp-Massey Algorithm"

Invited Symposium Address: James Madison University, Department of Mathematics
  Title: "On Y-Delta and X-Square Graph Reductions and the Study of their Algebraic Properties"

Invited Conference Publication: Graduate Society for International Studies Conference 2025
  Title: "Modeling the Impact of NATO Policy Actions on Online Threat Populations via the Lotka-Volterra Framework"
  Link: https://arxiv.org/abs/2508.01904

Conference Publication: AMS Contributed Papers in Probability Theory at Joint Mathematics Meetings 2025
  Title: "Applications of Benford's Law Generalized to Geospatial Threats and Social Network Investigations"
  Link: https://arxiv.org/abs/2501.10460

Conference Talk: Shenandoah Undergraduate Mathematics Symposium Fall 2024
  Title: "Applications of Benford's Law for UAS Threat Classification from Variational Pathfinding Models"

PROFESSIONAL EXPERIENCE

Capital Markets and Index Solutions Intern, Annexus **May 2025 – August 2025**
- Researched proprietary mean-reversion and trend-following strategies for trading and index construction.
- Utilized the Pandas, Numpy, and MatPlotLib packages in Python and Excel to implement backtests.

Teaching Assistant, James Madison University **August 2024 – May 2025**
- Selected by professor recommendation to serve as a TA for Multivariable Calculus (Fall 2024) and Real Analysis (Spring 2025) by holding weekly office hours, hosting test prep seminars, and teaching material to students.
- Wrote practice exams and solutions guides in LaTeX / Overleaf.

Applied Mathematician, JMU Football **September 2024 – May 2025**
- Developed econometric models for player performance which impacted player lineups and scholarships. Notably, JMU was selected for the college football playoffs during the season which was impacted by my work.
- Met weekly with chief decisionmakers to provide progress updates and wrote a complete research report.

Applied Mathematician, Hacking for Defense **August 2024 – December 2024**
- Led the applied mathematics team in developing mathematical models for White Sands Missile Range to interpolate drone flight paths from extremely limited detection data using methods in measure theory, convex optimization, and stochastic optimization.
- Interview & Success Story: https://www.h4d.us/student-outcomes/timothy-tarter

LEADERSHIP EXPERIENCE & RESEARCH GRANTS

President, Lecturer, & Lead Quantitative Researcher, Madison Institute for Mathematical Finance **May 2025 – Present**
- Lead the Computational Algebraic Geometry research group in developing statistical arbitrage extraction algorithms. Currently researching the use of twisted cohomology on integer modules for recovering forcing functions from snapshots of integer density plots.
- Developed and taught introductory coursework in Calculus, Linear Algebra, Differential Equations, Numerical Analysis, Probability Theory, Real Analysis, Measure Theory, Stochastic Differential Equations, and Financial Derivatives. Also designed a class covering advanced topics in Group Theory, Galois Theory, Classical Cryptography, and Algebraic Geometry (Lecture recordings are available at https://www.youtube.com/@TimothyTarter) for higher level members.
- Manage all research teams and coordinate trade implementation on behalf of the Quantitative Trading group.

Brakke Mason Research Endowment **April 2025 - Present**
- Awarded $1,900 to research Bruhat Order on the finite automorphic group via the study of Schubert Varieties on F2n.

President, JMU Math Club **August 2024 – May 2025**
- Organized academic symposiums, problem solving events, fundraisers, and social mixers.

COMPUTATIONAL SKILLS & SELECTED PROGRAMMING PROJECTS

Python (Pandas, NumPy, sympy, matplotlib packages), R Studio for Econometrics, Grobner Basis in Maucalay2, Microsoft Excel, Kalman Filter and Bayesian Particle Filter Implementation (Python), Monte Carlos Simulation Implementation for Option Pricing, Elliptic Curve Miller-Rabin Test Implementation, Identity Based Encryption Implementation, Secret Sharing Signature Implementation, Numerical PDE Interpolation Implementation (Black-Scholes Merton)