Aaron M. Miller

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https://aa-mill.github.io/

EDUCATION

Harvard University – *Cambridge, MA* *Present*
Ph.D. Student in Applied Mathematics
- Computational Science and Engineering Lab; Advised by Dr. Petros Koumoutsakos
- DOE Computational Science Graduate Fellowship (2024-2028)

May 2023

The University of North Carolina at Chapel Hill – *Chapel Hill, NC*
B.S. in Astrophysics, B.S. in Applied Mathematics, Minor in Statistics and Analytics
- GPA: 4.0/4.0; Class Rank 1/6650; SAT 1580/1600 (800 Math, 780 Reading)

London School of Economics – *London, UK (Remote)* *Jul 2021*
Virtual Summer Study Abroad
- Coursework: Computational Methods in Financial Mathematics (A+); Machine Learning in Practice (A+)

AWARDS

- Paul E. Shearin Award (highest-level award in Senior class of UNC Department of Physics and Astronomy, sole recipient out of ~50 majors based on scholarship, scientific insight, and professional seriousness)
- Daniel C. Johnson Award (highest-level academic and research award in Junior class of UNC Department of Physics and Astronomy, sole recipient out of ~50 majors)
- Churchill Scholarship Nominee (1 of 2 UNC students and 1 of 119 selected nationally based on academic achievement and proven research talent to compete for the Churchill Scholarship in science, mathematics, and engineering)
- Honors Carolina (competitive 4-year academic program enrolling 10% of each class)
- Accelerated Research Scholar (awarded to select cohort of incoming students showing promising research potential)
- Bob and Teresa Scheppegrell BSBA Study Abroad Endowment

ACADEMIC INTERESTS

- Computational Science
- Artificial Intelligence
- High-Performance Computing
- Fluids and Turbulence
- Partial Differential Equations

PREPRINTS AND PUBLICATIONS

- **Miller, A.M.**, Drut, J.E., 2023. Calculating the classical virial expansion using automated algebra. Phys. Rev. E 108, 065307. https://doi.org/10.1103/PhysRevE.108.065307
- **Miller, A.M.**, 2023. Classical virial expansion engine (Undergraduate honors thesis). The University of North Carolina at Chapel Hill.

RESEARCH EXPERIENCE

Department of Physics and Astronomy Undergraduate Honors Thesis – *Chapel Hill, NC* *Aug 2022 – May 2023*
Student Researcher Advised by Dr. Joaquín E. Drut
- Developed an open-source computational engine to numerically calculate the coefficients of the virial expansion of the classical grand-canonical partition function
- Implemented a combinatorial and graph-theoretic framework that economically expands and evaluates the partition function configuration integral assuming symmetric two-particle interaction potentials
- Applied Padé-Borel resummation methods to investigate the convergence properties of the virial expansion of thermodynamic quantities such as the pressure, number density, and isothermal compressibility

Computational Quantum Matter Lab – *Chapel Hill, NC* *Dec 2020 – May 2022*
Undergraduate Student Researcher
- Wrote a quasi-classical molecular dynamics N-body simulation in Python (600+ lines) with a team of two others to extract thermodynamic and transport properties of polarized quantum matter in strongly coupled regimes
- Designed and implemented a function to model the unequal time pair-correlation function based on data from three-dimensional solution matrices containing 400M+ total data points

PROFESSIONAL EXPERIENCE

Bank of America – *New York, NY* *Jun 2022 – Aug 2022*
Global Markets Sales & Trading Rotational Summer Analyst

- Applied computational techniques such as curve fitting and Monte Carlo in Python to infer quantified estimates of parameters characterizing dynamic hedging outcomes on the single-stock flow derivative trading desk
- Authored a trade research report detailing the use of vanilla and exotic equity options to execute an overwrite strategy
- Initiated independent study of equity options theory, using tools from probability, calculus, and analysis to interpret relevant literature and provide detailed solutions for theoretical questions posed by mentors

Leedon Park Capital – *Charlotte, NC (Remote)* *May 2021 – Aug 2021*
Private Equity Analyst

- Analyzed 1K+ rows of financial data in Excel during a live deal with a $14M revenue company to generate essential benchmark comparisons and performance visualizations for the firm's investor presentation
- Conducted extensive industry research for six projects in the acquisition pipeline to present assessments of growth drivers, risk exposure, and valuation precedents to the managing director throughout the bidding timeline

Simetra Operator Fund – *Raleigh, NC (Remote)* *Sep 2020 – Dec 2020*
Private Equity Analyst

- Sourced and screened 80-100 acquisition candidates per week (800+ total) based on investment criteria such as ownership structure, business model, and company financials, leading to 350+ potential targets generated for the firm
- Assessed confidential information memorandums and developed financial models in Excel to facilitate managing partner evaluations of candidates with whom discussions were opened
- Formulated target-specific pitch material for each viable acquisition target, providing the content for 300+ outreach campaigns commenced by the managing partners

LEADERSHIP AND COMMUNITY INVOLVEMENT

Super Cooper's College Buddies – *Chapel Hill, NC* *May 2020 – Dec 2021*
Vice President of Fundraising

- Arranged fundraisers, collected donations, and planned events to emotionally and financially support the pediatric cancer patients of Super Cooper's Little Red Wagon Foundation receiving care at UNC and Duke Hospitals
- Controlled organization finances by tracking member dues, event expenditures, and charity inflow and led bimonthly meetings with 60+ members to coordinate future events and develop crafts for dozens of patients

OneBook – *Pittsburgh, PA* *Sep 2017 – Aug 2019*
Co-Founder

- Launched a 501(c)(3) nonprofit organization with a team of two peers to collect and distribute children's books with the mission of spreading English literacy and cultural awareness in developing countries
- Organized local drives to gather 6K+ books and arranged international transport to reach 25+ schools in 3 countries

ADDITIONAL INFORMATION

- Experienced in Python, PyTorch, Julia, MATLAB, Mathematica, and Java
- Interested in Pittsburgh sports, ice hockey, Formula 1, strength training, hiking, drumming