Ryan **Cooley**

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Education

Tufts University — *Medford, MA*

B.S. in Chemical Physics — *Expected Graduation May 2027*

Minor in Applied Computational Science

- GPA: 3.89/4.00, Dean's List (All Semesters), Sigma Pi Sigma (Physics & Astronomy Honor Society)

  Mathematics: Calculus I–III; Linear Algebra; Mathematical Modeling | **Physics:** Physics 11–12; Modern Physics; Quantum Theory I | **Chemistry:** General; Organic Chemistry; Physical Chemistry | **Computer Science:** Introduction to Computer Science

Skills

Programming: Python (NumPy, pandas, Numba), C++, SQL (basic), Git | **Testing/DevOps:** pytest, GitHub Actions (CI), Docker, Black/Flake8 | **Numerical Methods:** Monte Carlo simulation (GBM), Black–Scholes pricing, benchmarking/profiling | **Data & Vizualization:** Jupyter, Matplotlib | **Molecular Simulation:** OpenMM, VMD (MD setup, trajectories/analysis) | **HPC:** Linux/macOS command line, Slurm job scheduling (salloc, srun) | **Astronomy:** CIAO, DS9 | **Web & Documentation:** HTML/CSS/JavaScript, LaTeX

Professional Experience

Entegris — *Billerica, MA*

Metrology Retention Intern (Data Automation & Simulation) — *May 2025 - August 2025*

- Implemented and maintained VBA macros to automate data transformation, statistical analysis, and report generation
- Reduced end-to-end processing time by over **1200%**, from 38 minutes to under 3 minutes, through workflow automation
- Designed a particle-tracking simulation to model membrane transport and validate experimental retention data
- Performed retention tests using ICP-MS, dynamic light scattering, and fluorescence spectroscopy (Hitachi F-7000) to ensure data accuracy

Chestnut Hill Realty — *West Roxbury, MA*

Administrative Assistant — *May 2024 - August 2024*

- Managed administrative tasks, tenant communications, property tours, and maintenance coordination, boosting efficiency and satisfaction

Research Experience

Independent Quantitative Research — *Remote*

Self-directed — *June 2025 – Present*

- **Monte Carlo Option Pricer:** Engineer a Python Monte Carlo pricer (Numba-accelerated) with hedged P&L, Greeks, VaR/CVaR, and IV surface calibration; maintain Dockerized CLI, pytest suite, CI/CD pipeline, and performance benchmarks
- **SMA Crossover Backtester:** Build a production-ready Python backtester for SMA(20/50) strategies with dual data sources (Stooq/yfinance); include CLI + Jupyter dashboard, comprehensive metrics (Sharpe, drawdown), and full test suite

Ding Group at Tufts University — *Medford, MA*

Undergraduate Research Assistant — *May 2024 – Present*

- Simulate TIP3P water models in OpenMM/Python and process trajectories with NumPy to validate force-field parameters
- Research bundled water models as part of ongoing studies in solvation and molecular dynamics
- Meet weekly with PI to discuss progress, methods, and next steps for project development
- Prepare to initiate free-energy calculations using alchemical methods to probe solvation energetics (Fall 2025)

Harvard-Smithsonian Center for Astrophysics — *Cambridge, MA*

Astrophysics Intern — *June 2022 - August 2023*

- Created astronomical images from Chandra data using CIAO and DS9 under the mentorship of Dr. Felipe Andrade-Santos
- Learned to use LaTeX for scientific paper creation and publication

Extracurricular Activity

Students for the Exploration and Development of Space (SEDS) — *Tufts University*

CubeSat Communications & Ground Station Lead — *November 2023 - Present*

- Apply FCC Amateur Radio Technician License knowledge to research ground-station hardware and uplink/downlink protocols for CubeSat operations
- Support orbital mechanics analysis in MATLAB, using "42" for trajectory simulations and MASTER for space-debris analysis
- Develop data-analysis methodologies and contribute to team proposals on CubeSat mission performance

Additional Memberships — *Tufts University*

American Chemical Society; Society of Physics Students; Club Squash; Club Rock Climbing