Ryan Cooley

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Education

Tufts University — *Medford, MA*

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

Minor in Applied Computational Science

- GPA: 3.89/4.00, Dean's List (All Semesters)

Mathematics: Calculus I–III; Linear Algebra | **Physics:** Physics 11–12; Modern Physics; Galactic & Extragalactic Astrophysics | **Chemistry:** General; Organic; Physical Chemistry | **Computer Science:** Introduction to Computer Science

Skills

Programming & Automation: Python (PCEP), C++, Git, VBA | **Molecular Simulation:** OpenMM, VMD | **Astronomical Data:** CIAO, DS9 | **Web & Document:** HTML/CSS/JavaScript, LaTeX | **Linux & Security:** Command-line (OverTheWire Bandit)

Professional Experience

Entegris — *Billerica, MA*

Metrology Retention Intern — *May 2025 - August 2025*

- Conduct retention tests using ICP-MS, dynamic light scattering, and fluorescence spectroscopy on a Hitachi F-7000.
- Develop and maintain VBA macros for automated data transformation, statistical analysis, and formatted report generation.
- Reduce end-to-end processing time by over **1200%** (from 38 min to under 3 min) through workflow automation.
- Author SOP documentation and deliver training sessions to lab personnel for sustainable adoption of new methods.

Chestnut Hill Realty — *West Roxbury, MA*

Administrative Assistant — *May 2024 - August 2024*

- Managed office tasks, organized property tours, and handled calls with prospective and current tenants
- Coordinated maintenance requests enhancing tenant satisfaction

Research Experience

Independent Project (GitHub: Ryan-Cooley/quant-option-pricer) — *Remote*

Monte Carlo Option Pricer — *July 2025*

- Built a modular Python toolkit combining a Numba-accelerated Monte Carlo engine with the Black-Scholes model for European call pricing.
- Integrated live market data ingestion, performance benchmarking (>50× speedup), and publication-quality visualizations.
- Ensured full reproducibility with Docker containerization, pytest-based CI pipelines, and versioned releases (v0.1.0).

Ding Lab at Tufts University — *Medford, MA*

Undergraduate Research Assistant — *May 2024 – Present*

- Simulate TIP3P and bundled water models in OpenMM/Python and process trajectories with NumPy to validate force-field parameters.
- Integrate new coarse-grained force-field parameters into test simulations, collaborating on model development.
- Analyze simulation outputs with Matplotlib to assess energy convergence and structural metrics.
- Initiate free-energy calculation research using alchemical methods to probe solvation energetics.

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

Honors & Awards

Sigma Pi Sigma (Physics & Astronomy Honor Society) — *Tufts University*

Inducted Member — *April 2025 - Present*

- Recognized for exceptional academic performance and leadership in physics