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

Research Experience

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

Independent Quantitative Research — *Remote*

Self-directed — *Jun 2025 – Jul 2025*

- **Monte Carlo Option-Pricing Simulator:** Built a Python/NumPy engine modeling geometric Brownian motion; validated <1% pricing error vs. Black–Scholes; pulled live-market data via yfinance and delivered interactive Jupyter dashboards
- **SMA Crossover Backtester:** Constructed a pandas-based backtester for SMA(20/50) on SPY; visualized signals and performance metrics in ipywidgets; accelerated runtime by 80% using Numba on minute-level data

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