Ryan Cooley

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GitHub: https://github.com/Ryan-Cooley | Portfolio: https://ryan-cooley.github.io/RCPortfolio/

EDUCATION

Tufts University **Medford, MA**
Bachelor of Science in Chemical Physics; Minor in Applied Computational Science *Expected May 2027*
GPA: 3.89/4.0 | Dean's List (All Semesters) | Sigma Pi Sigma (Physics Honor Society)
Relevant Coursework: Introduction to Computer Science, Mathematical Modeling, Linear Algebra, Calculus I-III

EXPERIENCE

Programming: Python, C++, SQL
Data & ML: pandas, NumPy, Matplotlib, Numba (JIT), PyTorch
Systems & DevOps: Linux, Bash, Docker, Git, GitHub Actions (CI), pytest, Black, Flake8, uv
HPC & Domain: Slurm (salloc/srun), OpenMM, VMD, molecular dynamics workflows

EXPERIENCE

Ding Group at Tufts University **Medford, MA**
Scientific Computing Researcher *May 2024 – Present*

- Benchmark the Boltz-2 PyTorch framework (uv-managed) by predicting protein-ligand conformations and binding affinity, and evaluating performance against baseline methods
- Develop Python workflows in OpenMM to simulate TIP3P water systems, validate force-field behavior with NumPy, and document methods to ensure reproducible molecular dynamics studies
- Run molecular dynamics jobs using Slurm (salloc/srun); monitor status and manage basic CPU/time requests
- Standardize research workflows by maintaining experiment notebooks, adding lightweight unit tests, and documenting methods to ensure reproducible scientific results

Entegris **Billerica, MA**
Metrology Retention Intern (Data Automation and Simulation) *May 2025 – Aug 2025*

- Automated reporting with VBA macros, cutting workload by 90% and saving 3+ hours weekly
- Improved analysis speed from 38 minutes to under 3 minutes, enabling same-day client turnaround
- Built a prototype particle-tracking simulation to visualize membrane transport for clients
- Performed 2+ daily retention tests with ICP-MS and fluorescence spectroscopy, reducing backlog

SOFTWARE PROJECTS

Open Source - GitHub (Ryan-Cooley) **Remote**
High-Performance Simulation Engine: Monte Carlo Option Pricer (Python / Numba) *Jun 2025 – Present*

- Build a Numba Monte Carlo pricer: 10x vs NumPy on 1M+ paths; RMSE ≤ 5e-4 (vs Black–Scholes)
- Develop IV calibration (Brent/bisection, no-arbitrage) and a delta-hedging simulator with costs; map cost–error frontiers and log P&L
- Ship a reproducible harness with CLI: seeded RNG, profiling, unit tests, automated benchmarks (CSV/plots)

Open Source - GitHub (Ryan-Cooley) **Remote**
SMA Crossover Backtester (Python) *Jun 2025 – Present*

- Implement a pandas-based SMA engine with dual data sources (Stooq, yfinance), rolling metrics, and full performance analysis
- Design an interactive dashboard with real-time parameter tuning and grid search; generate visualizations for returns, drawdown, and risk
- Provide a CLI and modular architecture with unit tests, docs, and notebooks for reproducible strategy evaluation across market regimes

LEADERSHIP

Tufts SEDS - CubeSat Team **Medford, MA**
Communications & Ground Station Lead *Sep 2024 – Present*

- Assess uplink/downlink protocols for CubeSat operations, leveraging FCC Amateur Radio Technician License
- Perform orbital mechanics analysis; simulate trajectories with "42" and model space debris with MASTER
- Develop data-analysis methods and contribute to team mission-performance proposals

INTERESTS

Activities: American Chemical Society, Society of Physics Students, Club Squash, Club Rock Climbing
Hobbies: Amateur Radio (FCC Technician License), Chess, Strategy Games, Running