Samuel Evans

Astrophysicist | Software Developer

+1-845-636-9273 @sevans7@bu.edu blogs.bu.edu/sevans7 Boston, MA

SKILLS

Python

NumPy Xarray TensorFlow
SciPy Astropy scikit-learn
Keras pygsheets requests

Coding

GitLab CI/CD C++ Fortran
Unix Bash Java Excel
Mathematica Google Sheets
PBS Slurm Google Sheets API
Godot Markdown LaTeX

Communication

Public speaking / presentations

Teaching experience

Spanish (moderate)

EDUCATION

Ph.D. in Astronomy
Boston University
Expected, 2025 Boston, MA

M.A. in Astronomy
Boston University
2022 Boston, MA

B.A. in Physics, Mathematics
Cornell University
2019 Ithaca, NY
Graduated *cum laude* in Physics, *magna cum laude* in Mathematics

PUBLICATIONS

Multifluid Simulation of Solar Chromospheric Turbulence and Heating Due to Thermal Farley-Buneman Instability
Samuel Evans et al.
2023 The Astrophysical Journal

SUMMARY

Software developer with over five years of experience analyzing astrophysical data with Python, collaborating to develop and run supercomputer simulations in C++ and Fortran, and researching fundamental questions in solar physics. Built a specialized computer algebra system relying heavily on abstraction, encapsulation, and multiple/multilevel inheritance in Python. Studied and implemented various machine-learning algorithms. Highly skilled at exploring and improving large codebases.

EXPERIENCE

Graduate Student Researcher | PhD Candidate
Boston University
2019 — Present Boston, MA

- Contributed to pre-existing Fortran simulation codebase of >170,000 lines, in collaboration with Lockheed Martin Solar and Astrophysics Laboratory (LMSAL).
  - Fixed critical bugs, added new modules and unit tests.
- Enhanced LMSAL's simulation analysis routines.
  - Implemented caching system, causing >10x speedup in common calculations.
  - Encapsulated thousands of lines of repetitive code.
  - Documented hundreds of quantities; added a user-friendly documentation system.
- Ran simulations on supercomputers at NASA & TACC, efficiently MPI-parallelized across thousands of processors, 100,000s of compute-hours, producing 100s of GB of data.
- Created a specialized computer algebra system in Python, with 30,000 lines of code across 160 files, including tests in Gitlab CI/CD.
  - Planned and implemented multiple layers of abstraction, multiple & multilevel inheritance, and object-oriented programming best-practices.
  - Published results from applying this code to differential vector equations in linear plasma theory, manipulating 20th-order polynomials with variable coefficients.
- Created a clean, object-oriented, consistent interface for plasma calculations in Python. Collaborated with coworkers to add compatibility for a variety of input data sources.
- Studied machine learning, scraped 5117 images from 879 webpages, used that data to train convolutional neutral network, in collaboration with coworker, as a class project.
- Led discussion sections and graded exams for an introductory astronomy course.
- Presented results at various conferences in the U.S. and Japan.

Undergraduate Student Researcher
Cornell University
2015 — 2019 Ithaca, NY

- Explored a breadth of research fields, including:
  - Combinatorial Geometry – analyzed millions of objects, in the specialized "Groups, Algorithms, Programming" language.
  - Numerical Cosmology – manipulated large simulation datasets, using Python.
  - Ultracold Atomic Physics – worked with optics, electronics, and signal processing.

Head Tutor | Tutor
Cornell University, Math Support Center
2015 — 2019 Ithaca, NY

- Helped students on a walk-in basis to understand concepts in any level of math.
- Conducted interviews to assist in the hiring process; coordinates tutor schedules.