ALEXANDRA V. SAVINO

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TECHNICAL SKILLS

Proficient: Python (NumPy, SciPy, Pandas, Plotly, Matplotlib), Java, HTML, CSS, GitHub, VSCode, LaTeX, AutoCAD, UI/UX, Agile methodologies
Knowledgeable: Linux/Unix/macOS, JavaScript, PyCharm, Intellij, MIPS, iOS development (Xcode, Swift, SwiftUI, MapKit), SQL (mySQL)
Some Familiarity: PyTorch, Sklearn, Three.js, Node.js, React.js, Postman, PostgreSQL, noSQL (MongoDB), PyMongo, RESTful APIs, Matlab, Figma
Languages: English (Native), French (Intermediate)

EDUCATION

Columbia University,
Columbia Engineering, M.Sc. in Mechanical Engineering, Robotics and Control Concentration — **Expected December 2025**
Barnard College, B.A. in Astrophysics, minor in Math-Computer Sciences — **September 2020 - May 2024**

- **GPA: 3.8/4.0**
- **Dean's List: 2020, 2021, 2022, 2023, 2024**
- **Relevant Coursework:** Computational Aspects of Robotics, Artificial Intelligence, Introduction to Databases, Modeling & Numerical Methods, Computer Graphics & Design, Fundamentals of Computer Systems, Data Structures in Java, Introduction to Java, Introduction to Python
- **Key Achievement:** Was a primary contributor to the MicroChas project; won NASA funding to be launched into permanent orbit aboard its own satellite.

EXPERIENCE

Barnard College Department of Physics — **New York, NY**
Head Tutor of Physics Help Room — **September 2022 - January 2024**

- Dedicated 180 hours to mentoring approximately 30 students, helping them grasp fundamental physics principles—classical mechanics, electrostatics, magnetostatics—and course-appropriate mathematics. Assisted with homework and textbook questions in both one-on-one and group settings.
- Managed the schedules of four other tutors, served as the go-to person for problem-solving, and trained an incoming tutor.

CERN | DESY — **Geneva, Switzerland | Berlin, Germany**
Detector Physics Engineering Intern — **July 2023 - September 2023**

- Developed two Python-based simulations for the ATLAS experiment at the world's largest particle accelerator in Switzerland, modeling the behaviors and detecting capabilities of state-of-the-art, experimental detectors specifically designed for the ATLAS Experiment.
- Enhanced my models to allow for user interactivity, increasing flexibility, allowing users to adjust the model's geometry.
- Collaborated with two PhD students to design and calibrate an experimental setup that successfully validated the accuracy of my simulation models, using hardware and equipment such as oscilloscopes, multimeters, power supplies, and FPGA technology.
- Developed and implemented seven streamlined command-line tools using batch scripting on a Windows computer to automate and simplify experimental procedures, including positioning and moving physical components, data readout, and connections to other data analysis tools.

American Museum of Natural History — **New York, NY**
Software Development Intern — **May 2023 - August 2023**

- Created a data pipeline using Python to organize and process raw stellar cluster evolution simulation time series data.
- Used Sklearn's DBSCAN with customized parameters to identify and analyze cluster distributions; developed statistical methods to track clusters over time.
- Developed an interactive 3D model to visualize the distribution of clusters, with dynamic color-coding and a framework for tracking changes over time.
- Mentored one junior research intern; provided advice for structuring code, debugging support, and suggestions to guide their research interests.

Columbia University Department of Astronomy — **New York, NY**
(MicroChas) Instrumentation Research Intern — **April 2022 - August 2022**

- Led a team of three undergraduates to perform lens quality testing during production of MicroChas, a spectrograph optimized to observe diffuse gas.
- Independently designed and engineered a rail system that streamlined the placement and precise alignment of components during design testing.
- Iteratively designed and manually manufactured two components using AutoCAD, improving user experience and troubleshooting through four design iterations for precise component alignment.
- Led initial testing of a completed MicroChas at Rutherfurd Observatory where it successfully detected spectra from three confirmed astronomical sources.
- Produced a research poster detailing project motivation, methodology, and results, (1st Place at Columbia University's Annual Physics Research Competition).

PROJECTS

The Robot Astronomer — Software Developer | github.com/alexsavino/OA_RobotAstro

- Collaborated to develop web scraping scripts to efficiently identify relevant articles about astronomical objects to ultimately determine the most searched astronomical objects on a given day.
- Integrated JavaScript APIs to determine user location and local time, allowing the application to determine whether the top astronomical objects were visible from a given user's location.
- Independently designed and implemented the project's front end: a 5-page website with fully animated transitions, featuring a welcome page, dynamic displays of the day's top three objects, information on each object, the user's location and time, and whether each object is visible from the user's location.
- Technologies used: Python (Beautiful Soup, Requests, Astropy), HTML, CSS, JavaScript (Geolocation and TimeZone APIs)

Interactive Gravitational Lensing Simulator — Sole Developer | github.com/alexsavino/gravitational-lensing-simulator

- Developed an interactive simulator that aids users in visualizing the complex astronomical phenomena of light deflection caused by black holes, having no prior experience with graphics packages or knowledge of the physics of gravitational lensing.
- Implemented user-friendly interfaces and error-handling mechanisms to guide users through adjusting simulation parameters and to ensure realistic input, including black hole mass, star radius, and star positioning relative to the user.
- Engineered a sophisticated N-body simulator within the program to generate geodesics in space-time influenced by the mass of the black hole.
- Technologies used: Python (Turtle graphics package, re, itertools)

HONORS & GRANTS

NASA CubeSat Launch Initiative (as part of a team) — **2023**
1st Place Columbia University Annual AstroFest Research Poster Session Winner (as part of a team) — **2022**
Barnard College SRI Research Grant Recipient - *$6,000* — **2021, 2022**
NHED Scholarship Winner - *$10,000* — **2020, 2021**