# Samantha Lomuscio

samanthalomuscio2@gmail.com | (201) 566-8404 | slomuscio.github.io | Github | LinkedIn

## EDUCATION

**University of Virginia** — Charlottesville, VA
*M.S. Physics* — Expected: May 2023

**New Jersey Institute of Technology**, Albert Dorman Honors College — Newark, NJ
*B.S. Applied Physics with concentration in Astronomy, Minor in Applied Mathematics, Magna Cum Laude* — May 2020

## SKILLS/CERTIFICATIONS

**Skills:** Python (Matplotlib, pandas, NumPy, scikit-learn, TensorFlow, Astropy, SunPy), Mathematica, MATLAB, Git/Github, Emacs, Linux command-line, supercomputing clusters/high-performance computing, parallelization, Statistical Modeling, Logistic Regression
**Certifications:** Neural Networks and Deep Learning, Improving Deep Neural Networks, Structuring Machine Learning Projects

## EXPERIENCE

**Graduate StatLab Associate** — **UVA Research Data Services** — August 2021 - Present
- Write articles on statistical/data science topics that reach a global audience and have had 10,000+ reads each in the last year
- Wrote Python sections in open source *Python and R* ebook that provides parallel data analysis examples in both languages
- Contributed sections on logisitc regression to website demonstrating various statistical modeling examples in R
- Provide free statistics and data science consultations and workshops with an emphasis on making data science accessible

**Graduate Researcher** — **UVA Department of Physics** — May 2021 - Present
- Develop a realistic model of black holes that fits features beyond General Relativity with Mathematica
- Fine tune parameters and employ new expansions on this model to remove mathematical pathologies
- Utilize root-mean-square error statistics to quantify how well the model fits to various quantum gravity theories
- Scheduled to present results at the American Physical Society 2023 April Meeting

**Graduate Researcher** — **National Radio Astronomy Observatory** — August 2020 - May 2021
- Used high-performance supercomputing cluster to analyze the correlation between the magnetic field strength and chemical composition of the solar atmosphere using the Common Astronomy Software Applications (CASA) Python package with radio wave data from the Very Large Array (VLA)
- Cleaned, flagged, and filtered data that may have been corrupted by antenna malfunctions or radio frequency interference
- Used image and signal processing techniques, including Fast Fourier Transforms, to produce images of the Sun in radio waves
- Conducted an image analysis on other wavelengths of light to investigate this correlation across the electromagnetic spectrum
- Paper submitted to the Astrophysical Journal to publish findings

**NSF REU Student** — **American Museum of Natural History** — May 2019 - May 2020
- Developed custom software in Python to track any solar system object over a specified time range and cadence, and to filter out bright gamma-ray sources that may drown out the solar system object
- Analyzed several gigabytes of all-sky gamma-ray photon data from the Fermi Large Area Telescope to detect gamma-rays from Jupiter
- Performed a maximum likelihood analysis and determined Jupiter is not a statistically significant gamma-ray source
- Presented work at the 235th Meeting of the American Astronomical Society

**Undergraduate Research Intern** — **NASA Goddard Institute for Space Studies** — May 2018 - August 2018
- Assessed the performance of NASA's new ocean mixing model that models ocean temperature and salinity
- Compared new model outputs to old models and true ocean temperature and salinity measurements, and created maps of the new model's performance across selected ocean regions using MATLAB
- Conducted root-mean-square error analysis and found the new model is more accurate everywhere except in the Arabian Sea
- Presented work at the American Geophysical Union Fall Meeting 2019

**Undergraduate Researcher** — **NJIT Center for Solar Terrestrial Research** — October 2017 - June 2020
- Utilized supercomputing cluster to analyze VLA solar radio data with Python to investigate the cause of solar flares for the purposes of forecasting space weather to better protect technology and people in space from intense flare radiation
- Cleaned and self-calibrated the data by producing a model of radio sources to reduce errors and improve signal-to-noise ratio
- Flagged and filtered data corrupted by antenna malfunctions and radio frequency interference
- Used similar techniques as above along with CASA imaging processing pipelines to produce radio images of the Sun and flares

## AWARDS/HONORS

Goldwater Scholarship, Lanzerotti Prize in Applied Physics (NJIT), Outstanding Undergraduate Student Award (NJIT), Dean's Fund for Student Development Grant (NJIT), Drexler Honors College Astrophysics/Physics/Chemistry Scholarship (NJIT)