Samantha Lomuscio

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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

EXPERIENCE

Graduate StatLab Associate   **UVA Research Data Services**   August 2021 - Present
- Write articles (link) 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 *Python and R* ebook (link) that provides parallel data analysis examples in both languages
- Contributed sections on logisitc regression to site demonstrating various statistical modeling examples (link)
- Provide free statistics and data science consulting and workshops (link) to UVA community members

Graduate Researcher   **UVA Department of Physics**   May 2021 - Present
- Refine a parameterized black hole spacetime to remove pathologies including non-physical divergences and singularities while preserving desired mathematical symmetries using Mathematica
- Utilize RMS error statistics to quantify the parameterized metric's ability to recover existing theories of gravity
- Scheduled to give an oral presentation of this work at the American Physical Society 2023 April Meeting

Graduate Researcher   **National Radio Astronomy Observatory**   August 2020 - May 2021
- Analyzed non-linearities in the correlation between chemical composition of the solar corona and solar magnetic activity
- Produced full disk mosaic images of the Sun with a focus on data calibration and flagging using the Common Astronomy Software Applications Python imaging processing routines
- Created and compared radio data maps from the Very Large Array with ultraviolet maps from the Interface Region Imaging Spectrograph, and extreme ultraviolet maps from Hinode
- Paper submitted to the Astrophysical Journal

NSF REU Student   **American Museum of Natural History**   May 2019 - May 2020
- Analyzed 12 years of all-sky gamma-ray photon data from the Fermi Large Area Telescope to detect gamma-rays from Jupiter
- Developed custom tracking routine in Python to track any solar system object over a specified time range and cadence
- Built a custom filtering routine in Python to prevent detecting gamma-rays from bright-sky sources other than Jupiter
- Performed 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 (link)

Undergraduate Research Intern   **NASA Goddard Institute for Space Studies**   May 2018 - August 2018
- Visualized temperature and salinity outputs of the new GISS ocean Mesoscale mixing model, the GISS Model E Ocean, across various regions of the ocean using MATLAB
- Utilized root-mean-square error to quantify the new model's performance compared to true ocean temperature and salinity and previous ocean models; found the new model is more accurate everywhere except in the Arabian Sea
- Presented work at the American Geophysical Union Fall Meeting 2019 (link)

Undergraduate Research Intern   **NJIT Center for Solar Terrestrial Research**   October 2017 - June 2020
- Analyzed the Sun in radio waves using data from the Very Large Array with Python to determine the spatial and temporal origin of solar flares and thus the origin of accelerated particles in the solar atmosphere
- Flagged and filtered data that may have been corrupted by antenna malfunctions or radio frequency interference
- Self calibrated the data by producing a model of the radio sources to reduce errors and improve signal-to-noise ratio
- Visualized spectra as a function of time and produced radio maps of the Sun using Matplotlib and VLA imaging software

SKILLS/CERTIFICATIONS

Technical Skills: Python (including matplotlib, pandas, numpy, scikit-learn, TensorFlow), Mathematica, MATLAB, Git/Github
Soft Skills: Research, Statistical Modeling, Written and Verbal Communication, Critical Thinking, Problem Solving
Certifications: Deep Learning Specialization (Coursera)

AWARDS/HONORS

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