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Michael Ray

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Experience

Data Scientist **September 2022 — Present**
Munich Re Specialty Insurance *New York, NY*

- Currently developing NLP models in Python to automatically encode property type and loss cause type based on text data, saving the company large sums of money by allowing risk and claims analysts to focus on higher value work.
- Performed ad-hoc analysis to inform contract negotiations with telematics data providers, providing crucial recommendations that saved the company from making a large investment in a service that showed little to no potential of adding value.

Graduate Research Assistant **May 2021 — August 2022**
Stony Brook University, supervised by Dr. Rosalba Perna *Stony Brook, NY*

- Developed data pipeline using Python (NumPy) to standardize transformation of input and output radiation flux into various quantities of interest (optical depth, luminosity, etc), improving reproducibility of results and reducing time-to-analysis.
- Through numerical simulation, successfully identified parameter-space where gamma-ray bursts are significantly absorbed by high-density media, leading to a publication in October 2022 as well as the completion of a master's thesis.

Graduate Teaching Assistant **August 2021 — May 2022**
Stony Brook University *Stony Brook, NY*

- Individually taught and mentored over 100 undergraduate students in an intermediate-level astronomy course.
- Taught weekly recitation, wrote and graded weekly quizzes, graded homework and exams.

Undergraduate Research Assistant **Mar 2020 — Aug 2021**
University of Cincinnati, supervised by Dr. Philip Argyres *Cincinnati, OH*

- Used novel approach to calculate the polarization of charge lattices of SU(N) quantum field theories, showing that these lattices are not necessarily principally polarized and leading to a publication in April 2022.
- Built an algorithm in Python (NumPy) to calculate the number of inequivalent points in a given charge lattice, resulting in radically reduced time spent on manual calculations and access to data in many more dimensions than was previously feasible.

Undergraduate Research Assistant **Jan 2018 — Mar 2020**
University of Cincinnati, supervised by Dr. Colin Bischoff *Cincinnati, OH*

- Independently built and maintained an algorithm in Python (NumPy, HealPy) to optimally filter out noise and foreground signals from astronomical data, leading to a logbook posting on the CMB-S4 collaboration internal website and a poster presentation.
- Reduced the variance in Monte-Carlo simulations, leading to error reduction on physical measurements of between 3% and 8%.
- Poster: https://journals.uc.edu/index.php/Undergradshowcase/article/view/4117/3124
- Logbook Posting: https://cmb-s4.uchicago.edu/wiki/index.php/PureB_by_Messenger_Method

Skills

Tools and Languages Python (5 years) - {Numpy, Pandas, Matplotlib, Seaborn, TensorFlow, Scikit-learn, XGBoost, Healpy}; MS SQL Server; Unix shell; Git; Github; Jupyter Notebooks; LaTeX; Databricks; Microsoft Azure - {DevOps, DSVM}; Microsoft Office Suite

Education

Master of Arts in Physics, *Stony Brook University* Aug 2021 - Aug 2022
- GPA: 3.75/4.0
- Thesis in computational astrophysics: https://michaelray1.github.io/assets/Masters_Thesis_FD.pdf

Bachelor of Science in Physics and Mathematics (double major), *University of Cincinnati* Aug 2017 - May 2021
- GPA: 3.98/4.0
- Physics thesis: https://michaelray1.github.io/assets/Senior_capstone_physics.pdf
- Mathematics thesis: https://michaelray1.github.io/assets/Math_Capstone_FD.pdf

Academic Publications

1. Ray, M., Lazzati, D., Perna, R. *The effects of Time-Variable Absorption due to Gamma-Ray Bursts In Active Galactic Nuclei Accretion Disks*, Arxiv (2022)

2. Arygres, P., Martone, M., Ray, M. *Dirac Pairings, one-form symmetries and Seiberg-Witten geometries*, Journal of High Energy Physics (2022).