# MICHAEL RAY

**I am a technical thinker with a unique mix of highly theoretical research experience, applied data modelling research experience, and expert level Python programming skills.**

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in https://www.linkedin.com/in/michael-ray3/

## EXPERIENCE

### Research Assistant

**Supervised by Dr. Rosalba Perna**

May 2021 – Present  Stony Brook University

- I analyze data and build data pipelines for high-performance astrophysical simulations in order to gain physical insights.
- Tools used: Python (NumPy, Matplotlib), Fortran

### Research Assistant

**Supervised by Dr. Philip Argyres**

March 2020 – Aug 2021  University of Cincinnati

- Contributed many creative ideas and performed many calculations by hand in the context of quantum field theory. One set of my calculations led to a result which is currently in the publication process (linked to under "Publications").
- Tools used: Python, Mathematica

### Research Assistant

**Supervised by Dr. Colin Bischoff**

Jan 2018 – March 2020  University of Cincinnati

- Built and maintained a data pipeline to filter noise out of cosmological data sets. This filter is capable of efficiently filtering data sets that are millions of data points in size. My data pipeline lowered the variance of estimated signal from simulations, effectively shrinking the error bar on physical measurements. See the code in this repository on GitHub: https://github.com/michaelray1/messenger_method.
- Tools used: Python (NumPy, HealPy, Matplotlib)

## PERSONAL PROJECTS (ALL ON GITHUB)

**Used Car Price Prediction**

- Performed regression analysis on a data set of used car prices to search for bargains. Achieved consistent accuracy of price prediction within 25%.
- Tools used: Python (Pandas, Numpy, Matplotlib, TensorFlow, Scikit-learn).

**Stock Market Predictor**

- Built a package that implements a neural network to predict stock price increases/decreases. Achieved 92% accuracy on S&P 500 stock predictions.
- Tools used: Python (TensorFlow, NumPy, Matplotlib, Robin-Hood API).

## SKILLS

- **Programming**
  *Python (5 years) - {Numpy, Pandas, Matplotlib, TensorFlow, Scikit-learn}; Linux/Command Line (4 years); C++(6 months); object-oriented programming; Monte-Carlo Simulations; Git/Github; Jupyter Notebooks*

## EDUCATION

### M.A. Physics

**Stony Brook University**

Aug 2021 – Aug 2022

### B.S. Physics; B.S. Mathematics (double major)

**University of Cincinnati**

Aug 2017 – May 2021

- 3.98/4.0 cumulative GPA

## PUBLICATIONS

- P. C. Argyres, M. Martone, and M. Ray, Dirac pairings, one-form symmetries and Seiberg-Witten geometries, (2022), [https://arxiv.org/abs/2204.09682]

## DOCUMENTED WORKS

- **Undergraduate Thesis in Mathematics**
  - https://michaelray1.github.io/assets/Math_Capstone_FD.pdf
- **Undergraduate Thesis in Physics**
  - Paper: https://michaelray1.github.io/assets/Senior_capstone_physics.pdf
  - Poster: https://michaelray1.github.io/assets/Capstone_poster_physics.pdf
- **CMB Data Analysis Poster**
  - https://journals.uc.edu/index.php/Undergradshowcase/article/view/4117/3124
- **CMB-S4 Internal Logbook Posting**
  - https://cmb-s4.uchicago.edu/wiki/index.php/PureB_by_Messenger_Method

## AWARDS

- **Fellowships:**
  *NDSEG Fellowship (2022, 4% acceptance rate, declined to pursue career in data science); SBU Fellowship (2021-22); Joiner Fellowship (2020)*
- **Selected Scholarships (I won 16 total merit-based scholarships between 2017 and 2021):**
  *Physics Alumni Endowed Scholarship (2019-20); UC Physics Scholarship (2018-21); Cincinnatus University Scholarship (2017-21)*
- **Miscellaneous:**
  *UC Sophomore Achievement Award in Physics; Dean's List; Second Place in UC Physics Poster Competition; Member of Sigma Pi Sigma physics honor society; Member of Phi Beta Kappa academic honor society; Eagle Scout*