

## Professional Overview

Research Scientist with **5+ years** of experience applying advanced mathematical, statistical, and machine learning techniques to multi-terabyte datasets to develop production-level predictive models for simulation and optimization of analysis systems, empowering data-driven decision-making.

## Technical Skills

**Programming Skills** Proficient: Python, MATLAB  
Advanced: JavaScript, HTML, CSS, Bash

**Tech Stack** TensorFlow, Keras, sklearn, Pandas, Matplotlib, Git/Github, SciPy, SymPy, Docker, LaTeX  
Inkscape, SLURM

## Experience

### Research Scientist — Physics Dept.

January 2021–February 2026

*University of Cincinnati*

- Designed and implemented scalable algorithms using advanced mathematical models (PCA/SVD, GPs, FFTs/SHTs), improving pipeline runtime by  $8\times$  and enabling near real-time data quality reporting.
- Mined complex, unstructured data composed of various data types (time series, point clouds, maps) by building predictive models that delivered powerful insights to further detection of primordial gravitational waves.
- Maintained and improved large-scale data analysis pipelines processing multi-terabyte datasets on High Performance Computing (HPC) clusters, producing publication quality results.
- Proposed and executed novel data-collection strategies, and built mathematical tools generating data products used to cross-validate existing analyses.
- Optimized simulation frameworks to quantify previously unmeasured systematic errors, placing constraints on modern cosmological instrument achieved performance.
- Led a cross-disciplinary team on a six-month project delivering novel actionable metrics to stakeholders that redefined the data analysis standard.
- Set the standard for program-wide analysis methods with [published mathematical formalism and results](#).
- Architected a Retrieval-Augmented Generation (RAG) LLM to provide subject-specific answers, leveraging principles of transfer learning to mitigate the small-training-set problem.
- Served as subject-matter expert in instrument optical characterization and mentored collaborators in measurement and analysis best practices.

### Teaching Assistant — Physics Dept.

August 2019–January 2021

*University of Cincinnati*

- Taught recitations for 200+ students, implementing active-learning techniques to improve engagement and outcomes.

## Education

### Ph.D. in Physics

August 2019–February 2026

*University of Cincinnati*

Cincinnati, OH

### Bachelor of Science: Physics

August 2015–May 2019

*Hillsdale College*

Hillsdale, MI

## Professional Development

### Machine Learning Specialization — DeepLearning.AI

- Completed a 3-course ML specialization covering advanced supervised and unsupervised learning algorithms, including Neural Networks, CNNs, Random Forests, Reinforcement Learning, Anomaly Detection, and Clustering.

### Control Systems and Instrumentation — Harvard University

- Built and characterized calibration equipment used to probe systematic errors in measuring primordial gravitational waves.

### Receiver Testing — California Institute of Technology

- In-lab testing of a state-of-the-art instrument for experimental cosmology, the BICEP Array 150GHz receiver.