

## Professional Overview

Research Scientist with **5+ years** of experience applying advanced mathematical, statistical, and machine learning techniques to multi-terabyte datasets, extracting high-impact scientific results. Proven track record of turning complex data problems into accurate and meaningful insights to guide data-driven decisions.

## Technical Skills

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

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

## Experience

### Research Scientist — Physics Dept.

January 2021–February 2026

*University of Cincinnati*

- Led instrumental systematic-error studies in a cross-disciplinary team of PIs, postdoctoral scholars, engineers, and project managers within the BICEP/Keck Collaboration—an experimental cosmology team, leading the field in measurements of the Cosmic Microwave Background (CMB) polarization.
- Designed and implemented scalable algorithms using advanced mathematical methods (PCA/SVD, GPs, FFTs/SHTs), improving end-to-end pipeline runtime by  $8\times$  and enabling near real-time data quality reporting.
- Built end-to-end calibration data analysis pipelines using physical models and domain-specific expertise, fully resolving previously unaddressed instrumental systematic errors.
- Conceived and executed novel calibration measurements that reduced calibration-based detector time-constant measurement uncertainty by 50%.
- Extended the CMB simulation pipeline to directly quantify previously unmeasured systematics, leading to new constraints on polarization leakage in modern CMB instruments.
- Set the standard for polarized mapmaking using calibration data, with [published formalism and results](#).
- Architected a Retrieval-Augmented Generation (RAG) LLM to provide collaboration-specific answers, leveraging principles of transfer learning to mitigate the small-training-set problem.
- Served as subject-matter expert in detector 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.