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Christos Giannakopoulos
Research Scientist

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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, reducing uncertainty in 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, crucial to collaboration goals.
- Identified data-collection needs, conceived and executed data-aquisition plans, and built mathematical tools generating data products used to cross-validate existing analyses.
- Extended existing simulation framework to directly quantify previously unmeasured systematic errors, leading to new constraints on modern cosmological instruments.
- Led a cross-disciplinary team for six months delivering new data products that quantified the performance of our internal processes, translating into actionable metrics for stakeholders
- Set the standard for industry-wide analysis methods 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 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.