Reginald Bain, Ph.D.

Physics PhD | Data Science | AI/ML Engineering | Research + Education

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EDUCATION

Duke University
Ph. D., Physics | 2017

University of South Carolina
B.S., Physics & Mathematics,
summa cum laude | 2012

TECHNICAL SKILLS

Programming - Python, Pandas, Scikit-learn, Keras, TensorFlow, LangChain, Streamlit, Selenium, PyTorch, PySpark, SQL, Git, Bash, Tableau, AWS, MLOps, Apache Airflow, APIs, Docker, XGBoost

Other Skills - Data Science, Machine Learning, Deep Learning, Statistics, NLP, Data Visualization, Time Series, RAG, LLMs, Computer Vision, ETL, Data Analytics, Data Engineering, CI/CD

SKILLS & CERTIFICATIONS

The Erdos Institute (Ohio State) - *Intensive Data Science Bootcamp* - Top Project Award, *Deep Learning Bootcamp* **-** Top Project Award

Coursera - *Data Engineering Specialization, Deep Learning Specialization* , *Machine Learning*, *TensorFlow Developer Specialization, Google Project Management Certificate*

HackerRank - *Advanced SQL Certification, Python Certification*

HONORS & AWARDS

NSF Graduate Research Fellow

Barry M. Goldwater Scholar

Phi Beta Kappa

Mary Creason Memorial Teaching Award (Duke)

Nina and Frank Avignone Physics Award (UofSC)

PROFESSIONAL EXPERIENCE

Physics Instructor | SC Governor's School for Science & Math | 2019 - Present
- Designed 6+ college-level physics courses/labs, leveraged contemporary education research, emphasized data analysis skills
- Served as faculty senate officer for 4+ years. Devised and implemented new policies on curriculum, academic integrity, and faculty policies.
- Mentored dozens of students on communicating scientific research. Designed independent study on mathematical physics.

Data Science Project Mentor | The Erdos Institute | 2025-Present
- Mentored numerous data science projects for data science bootcamp. Provided project plans, delegated tasks, and set internal deadlines for group members.
- Advised groups on statistics, data science/ML/AI best practices, and programming/MLOps skills. Certification link here.

Instructional Assistant Prof. of Physics | U. of Houston | 2017 - 2019
- Taught 12+ large-enrollment introductory physics courses each with 300+ students. Supervised dozens of undergraduate and graduate TAs through courses and a drop-in tutoring center.
- Piloted innovative inquiry-based course in UH Active Learning Classroom facility. Designed innovative online materials.

RESEARCH EXPERIENCE

NSF Graduate Research Fellow | Duke University | 2012-2017
- Improved industry standard approach to modeling quark interactions using theoretical and ML/AI approaches. Leveraged programming, mathematics, large simulated data sets, numerical methods, and data visualizations.
- Published 3 papers, including one in the top physics journal, Physical Review Letters. Presented research at 6+ conferences in the US and abroad. Collaborated across multiple universities/national labs.

Undergraduate Researcher | U. of South Carolina | 2008-2011
- Implemented machine learning/AI algorithms and Monte Carlo simulations of particle collisions to develop techniques to help identify theorized new particles.
- Presented at 2 national conferences and won 2 national awards, Goldwater Scholarship and NSF GRFP.

DATA SCIENCE PROJECTS

Predicting Football Wins — Leveraged APIs/web scraping and compared regression models to predict wins/identify key features. Beat naive forecast by 40+ %. Deployed model via StreamLit. Received *Top Project* award from Erdos Institute.

Course Assistant Bots — Built 2 NLP-based course assistant tools: **Syllabus Analyzer** and **Course Review Analyzer**. Leverage RAG pipeline via LangChain that assesses course syllabi usingLLMs. Made pipelines for identifying meaningless course reviews and predicting review sentiment. Deployed both via StreamLit.

Song Similarity Detector — Built in PyTorch, that beats naive baseline by 80+% using 128-dim embeddings of songs. Explored CNN, fine-tuned pre-trained architectures such as ResNet-18/transformers. Leveraged various APIs and open source processed audio. Received *Top Project* award from Erdos Institute.