

# Jason T. Barkeloo

POSTDOCTORAL RESEARCH SCHOLAR

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## Experience

### DATA ANALYSIS

- Solo analyzer searching for very rare physics processes in one of the world's largest datasets
- Improved experimental reach by 30% through the design, optimization, and implementation of a neural network for signal-background discrimination
- Mined over 100 TB of ATLAS data to search for indications of rare processes using a C++ framework and distributed computing
- Created custom Python scripts to slim down datasets fully leveraging local computing cluster resources using HTCondor batch processing techniques
- Successfully implemented multiple data-driven background techniques for more accurate Monte Carlo modeling
- Set an upper 95% confidence level statistical limit on the production rate of the process  $t \rightarrow q\gamma$ , the world's best limit on  $t \rightarrow c\gamma$

### DETECTOR MODELING AND OPTIMIZATION

- Developed Geant4 Monte Carlo simulations for comparison to real world test beam studies
- Cost optimization of the electromagnetic calorimeter for the future International Linear Collider using machine learning methodologies, including predictive regression based on machine learning techniques

### SOFTWARE REPROCESSING EXPERT

- Developed and maintained infrastructure for large scale software validation following the Agile Software Development model
- Implemented tag-and-probe methods to develop monitoring algorithms for the ATLAS detector at the Large Hadron Collider

### OTHER EXPERIENCE

- Teaching Assistant for undergraduate laboratories and discussion sections for classes of 30 or more students
- Awarded the Weiser Senior Teaching Assistant Award (University of Oregon) and the American Association of Physics Teachers Outstanding Teaching Assistant Award (Miami University) for excellence in undergraduate education and mentoring

## Education

### University of Oregon

Eugene, OR

#### DOCTORATE OF PHILOSOPHY IN PHYSICS

June 2020

- **Dissertation:** Search for the Flavor-Changing Neutral Current,  $t \rightarrow q\gamma$ , in Top Pair Events Using the ATLAS Detector
- **CERN (European Organization for Nuclear Research)**, Geneva, Switzerland — July 2016- July 2017

### Miami University

Oxford, OH

#### MASTER OF SCIENCE IN PHYSICS

May 2012

- **Thesis:** Investigation of Electromagnetically Induced Transparency and Absorption in Warm Rb Vapor by Application of a Magnetic Field and Co-propagating Single Linearly Polarized Light Beam

### Wittenberg University

Springfield, OH

#### BACHELOR OF SCIENCE IN PHYSICS, MINOR IN MATHEMATICS AND COMPUTATIONAL SCIENCE

May 2010

## Select Publications

### Correcting for Leakage Energy in the SiD Silicon-Tungsten ECal

March 2020

ARXIV:2002.04100 [PHYSICS.INS-DET]

### A Silicon-Tungsten Electromagnetic Calorimeter with Integrated Electronics for the International Linear Collider

January 2019

J. PHYS.: CONF. SER. **1162** 012016

### 310 additional publications as a member of the ATLAS Collaboration

May 2017 - present

## Skills

<b>Computing and Software</b>	Python, C++, Linux, SQL, Mathematica, MATLAB, Rucio, HTCondor, Microsoft Office Suite, $\LaTeX$ , GIT, JIRA, TWIKI
<b>Frameworks and Libraries</b>	Pandas, Numpy, Scikit-learn, Keras, Matplotlib, ROOT Data Analysis Framework
<b>Competencies</b>	Big Data, Machine Learning, Data Analysis, Algorithm Development, Data Visualization, Applied Physics