Jason T. Barkeloo

Data Analysis, Machine Learning, Predictive Analytics

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
- Successfully implemented multiple data-driven background techniques for more accurate Monte Carlo modeling
- Set an upper 95% confidence level limit on the production rate of the process $t \to q\gamma$, the world's best limit on $t \to c\gamma$

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, $t \to q\gamma$, 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

282 additional publications as a member of the ATLAS Collaboration — *May 2017 - present*

Skills

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