

Miles Cochran-Branson

PHD STUDENT · PHYSICS

University of Washington, Seattle, WA

✉ milescb@uw.edu | 🏠 <https://milescb.github.io> | 📧 milescb | 📁 mcochran | 📺 mgcb

Education

University of Washington

Seattle, WA

PHD IN PHYSICS

September 2023 - present

- Courses taken and in progress: Deep Learning, Quantum Field Theory
- Advisor: Quentin Buat

University of Washington

Seattle, WA

MASTERS IN PHYSICS

September 2023 - June 2023

- Courses taken: Quantum Mechanics, Electricity and Magnetism, Statistical Physics, Mechanics

Lawrence University

Appleton, WI

BA IN PHYSICS AND MATHEMATICS

September 2019 - June 2023

- Independent research in scientific machine learning and physics-informed neural networks
- Developed physics-informed neural network to solve Einstein's field equations to numerically obtain the Schwarzschild metric
- Advisors: Megan Pickett, Alexander Heaton

Professional Experience

- 2024-2025 **Pre-doctoral Gradutate Research Associate**, Physics Department, University of Washington
- 2023-2024 **Graduate Research Assistant**, Physics Department, University of Washington
- 2023 **Gradutate Teaching Assistant**, Physics Department, University of Washington
- 2021-2023 **Undergraduate Teaching Assistant**, Physics and Math Departments, Lawrence University
- 2022 **REU Student**, Physics Department, University of Washington
- 2021 **REU Student**, Physics Department, University of California, Davis
- 2020 **Undergraduate Research Fellow**, Physics Department, Lawrence University

Publications

PUBLISHED

The ATLAS Collaboration (2024). "Differential cross-section measurements of Higgs boson production in the $H \rightarrow \tau^+\tau^-$ decay channel in pp collisions at $\sqrt{s} = 13$ TeV with the ATLAS detector". In: arXiv: 2407.16320 [hep-ex].

Awards, Fellowships, & Grants

- 2024 **Western Advanced Training for Computational High-Energy Physics (WATCHEP) Fellowship**, Department of Energy (DOE) \$ 65,000 / year
- 2023 **Provost Award**, University of Washington \$ 10,000
- Physics Department Fellowship**, University of Washington \$ 5,000
- 2022 **J. Bruce Brackenridge Prize for excellence in physics**, Lawrence University \$ 500
- Mauruce Cunningham Phi Beta Kappa Prize for highest GPA in junior class**, Lawrence University \$ 100
- 2021 **Sir Isaac Newton (SIN) award for creativity in computational physics problem-solving**, Lawrence University \$ 100
- Ralph White Prize in Mathematics**, Lawrence University \$ 100

Presentations

M. Cochran-Branson, Q. Buat, M. Foresi, C. Young. 2024. Search for CP violation in the $Z \rightarrow \tau\tau$ channel. Presentation: US-ATLAS conference, University of Washington, Seattle, WA

M. Cochran-Branson, M. Calderon de La Barca Sanchez. 2021. A Model for the Production of Double Quarkonium in PbPb Collisions at $\sqrt{s_{NN}} = 5.02$ TeV. Poster: APS Division of Nuclear Physics conference.

Teaching Experience

Fall 2023	Electricity and Magnetism , Teaching Assistant	University of Washington
Winter 2024	Waves, Light, and Heat , Teaching Assistant	University of Washington

Research Experience

University of Washington — Department of Physics

Seattle, WA

ADVISOR: QUENTIN BUAT

Sep. 2023 - Present

- Search for CP violation in $Z \rightarrow \tau\tau$ events with the ATLAS detector
- Measurement of the $H \rightarrow \tau\tau$ cross-section in the boosted regime

University of Washington and Berkeley National Lab

Seattle, WA and Berkeley, CA

ADVISORS: XIANGYANG JU AND SHIH-CHIEH HSU

Jun. 2024 - Present

- Tracking as-a-service for the ATLAS detector

Lawrence University - Department of Physics

Appleton, WI

ADVISORS: ALEXANDER HEATON AND MEGAN PICKETT

Sep. 2023 - Feb. 2024

- Using Scientific Machine Learning to solve Partial Differential Equations

University of Washington — Department of Physics

Seattle, WA

ADVISOR: QUENTIN BUAT

Jun. 2023 - Sep. 2023

- Tau lepton energy scale calibration using Mixture Density Networks

University of California, Davis - Department of Physics

Davis, CA

ADVISOR: MANUEL CALDERON DE LA BARCA SANCHEZ

Jun. 2022 - Sep. 2022

- Estimating production of double quarkonium in PbPb collisions with the CMS detector

Outreach & Professional Development

SERVICE AND OUTREACH

- 2024 **Exploring the Quantum Universe with Artificial Intelligence**, Undergraduate Symposium
Moderator and Mentor

DEVELOPMENT

Machine Learning for Fundamental Physics School. *Lawrence Berkeley National Lab, Summer 2024.* This workshop focused on tools to deploy machine learning models for a variety of computing needs. Most relevant topics included deployment of models on FPGAs, Differential Programming, Transformers, and Unfolding using machine learning.

MEMBERSHIPS

Phi Beta Kappa (National Honors Society)
Sigma Pi Sigma (Physics Honors Society)
American Physical Society