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: Deep Learning, Computer Systems, Quantum Field Theory, Theory of Solids
- 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 Gratudate 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

Kondratyev, Dmitry et al. (2025). "SuperSONIC: Cloud-Native Infrastructure for ML Inferencing". In: *PERC '25: Practice and Experience in Advanced Research Computing*, pp. 1–5. DOI: 10.1145/3708035.3736049.

Zhao, Haoran et al. (2025). "Track reconstruction as a service for collider physics". In: *Journal of Instrumentation* 20.P06002. DOI: 10.1088/1748-0221/20/06/P06002.

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

Awards, Fellowships, & Grants

2025	**Graduate Research Fellowship Program, Honorable Mention**, National Science Foundation	
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 exlleence 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

Invited Talks

Miles Cochran-Branson. 2025. Standard Model Physics in tau-tau final states. Invited talk: ATLAS Standard Model Workshop, University of Science and Technology, Hefei, China.

Contributed Talks

Miles Cochran-Branson, Xiangyang Ju, Yuan-Tang Chou, Haoran Zhao. 2024. GPU-Accelerated Particle Tracking as-a-Service. Oral presentation: US LHC Users Association Annual Meeting, SLAC National Accelerator Laboratory, Menlo Park, CA.

Miles Cochran-Branson, Xiangyang Ju, Yuan-Tang Chou, Haoran Zhao. 2024. Implementation of `traccc` as-a-service. Oral presentation: A3D3 All-Hands Meeting and Fast Machine Learning Conference, Purdue University, Lafayette, IN.

Miles Cochran-Branson, Quentin Buat, Matt Foresi, Chris Young. 2024. Search for CP violation in the $Z \to \tau\tau$ channel. Oral presentation: US-ATLAS Annual Meeting, University of Washington, Seattle, WA.

Miles Cochran-Branson, Xiangyang Ju. 2025. Integrating GNN4ITk into GPU tracking pipelines. Oral presentation: EF-Tracking Workshop, Chateau de Bossey, Switzerland.

Miles Cochran-Branson. 2025. R_{QCD} fake estimation in $Z \to \tau\tau$ spin measurement. Oral presentation: Tau Combined Performance Group Workshop, CERN, Switzerland.

Miles Cochran-Branson, Manuel 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 Fall Meeting.

Teaching Experience

2023	**Electricity and Magnetism**, Teaching Assistant	*University of Washington*
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 $Z \to \tau\tau$ events with the ATLAS detector
- Measurement of the $H \to \tau\tau$ 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

2024 **IMOD outreach with Rainier Prep. Middle School**, Introduced experimental science to 90 fifth grade students through fun interactive activities

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.

WATCHEP Summer School. *Lawrence Berkeley National Lab, Summer 2025*. This joint summer school with other computing physics groups in cosmology and particle physics, focused on the breadth of physics and computing currently being explored around the globe.

Mentoring

As a PhD student, I have mentored three undergraduates in research techniques, introducing the ATLAS experiment to them, as well as instilling an excitement for physics research and discovery. I organized weekly meetings and check-ins, as well as fielded questions and provided mentorship.

Memberships

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