

Miles Cochran-Branson

PHD CANDIDATE · PHYSICS

University of Washington, Seattle, WA

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Education

University of Washington

Seattle, WA

PHD IN PHYSICS

September 2023 - present

- Courses taken: Deep Learning, Computer Systems, Quantum Field Theory, Theory of Solids
- Research interests: Physics analysis, GPU acceleration, scientific machine learning
- Advisors: Quentin Buat, Xiangyang Ju (LBNL)

University of Washington

Seattle, WA

MASTER OF SCIENCE IN PHYSICS

September 2023 - June 2023

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

Lawrence University

Appleton, WI

BACHELOR OF ARTS 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 Graduate Research Associate**, Physics Department, University of Washington

2023-2024 **Graduate Research Assistant**, Physics Department, University of Washington

2023 **Graduate 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

Select Publications

PUBLISHED

K. Dmitry et al. (2025). *SuperSONIC: Cloud-Native Infrastructure for ML Inferencing*. In: PERC '25, pp. 1-5

Contributions: Development of tools for GPU metric monitoring; deployment on test sites.

Zhao, Haoran et al. (2025). *Track reconstruction as a service for collider physics*. In: Journal of Instrumentation 20.P06002

Contributions: Implementation of custom C++ inference pipeline; manuscript editing.

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: J. High Energ. Phys. 2025, 10 (2025)

Contributions: Systematics validation and implementation including data fitting.

Awards, Fellowships, & Grants

2026 **Analysis Fellowship**, IRIS-HEP \$ 10,000

2026 **Funding to develop a transformer for tau reconstruction**, ATLAS Center (ATC) \$ 11,000

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 excellence in physics , Lawrence University	\$ 500
	Maurice 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

Select 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. 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 $Z \rightarrow \tau\tau$ spin measurement. Oral presentation: Tau Combined Performance Group Workshop, CERN, Switzerland.

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 $Z \rightarrow \tau\tau$ channel. Oral presentation: US-ATLAS Annual Meeting, University of Washington, Seattle, WA.

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

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

Research Experience

University of Washington – Department of Physics

ADVISOR: QUENTIN BUAT

- 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.

Seattle, WA

Sep. 2023 - Present

University of Washington and Berkeley National Lab

ADVISORS: XIANGYANG JU AND SHIH-CIEH HSU

- GPU-accelerated tracking as-a-service for the ATLAS detector.
- Implemented custom C++ backend to run inferences.
- Implemented ATLAS-specific (ATHENA) client to interface with server.
- Developed deployment system on Kubernetes clusters.

Seattle, WA and Berkeley, CA

Jun. 2024 - Present

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. Currently being implemented in ATLAS reconstruction chain.

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

- 2025 **U.W. A3D3 Machine Learning Hackathon**, Organized an ML hackathon at University of Washington for more than 30 students on AI prediction tasks using scientific data.
- 2025 **U.S. LHC Users Association D.C. Trip**, High-Energy Physics funding ambassador, advocating for funding in Congress directly with House and Senate members.
- 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 engaging interactive activities.

DEVELOPMENT

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 in science and industry.

Deep Learning at Scale Training. NERSC facility at Lawrence Berkeley National Lab, 2025. This training focused on distributed training and data parallelization techniques for training models on high-performance computing systems.

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.

MENTORING

As a PhD student I have mentored four undergraduates in research techniques by introducing the ATLAS experiment to them, as well as instilling an excitement for physics research and discovery. In this role I organize weekly meetings and check-ins, as well as field questions and provide academic guidance.

MEMBERSHIPS

Phi Beta Kappa (National Honors Society)

Sigma Pi Sigma (Physics Honors Society)

American Physical Society