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 2024*

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

Lawrence University *Appleton, WI*

Bachelor of Arts in Physics, Summa Cum Laude *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

2026-2027	**DOE SCGSR Research Fellow**, U.S. Department of Energy
2024-2026	**WATCHEP Graduate Student Fellow**, U.S. Department of Energy
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

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

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

The ATLAS Collaboration. "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". *Journal of High Energy Physics* **2025** (2025) 10 arXiv:arXiv: 2407 . 16320 (hep-ex)

Contributions: Systematics validation and implementation in data fitting

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

Contributions: Pipeline testing and manuscript editing.

Awards, Fellowships, & Grants

2026	**Office of Science Student Research (SCGSR) Fellowship**, U.S. Department of Energy	*$ 21,600*
	Analysis Fellowship, IRIS-HEP	*$ 10,000*

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. (2025). *R_{QCD} fake estimation in $Z \to \tau\tau$ spin measurement*. *Oral presentation*: Tau Combined Performance Group Workshop, CERN, Switzerland.

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

Miles Cochran-Branson, Quentin Buat, et al. (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, Yuan-Tang Chou, et al. (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, et al. (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 and 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 *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*

- 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.

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

2026 **AI Future Lab Lecturer and Lab Leader**, Prepared lab exercises on introductory AI coding concepts for 30 high-school students from Taiwan, and gave a lecture on AI ethics.

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

Accelerated AI Algorithms for Data-Driven Discovery (A3D3)

Phi Beta Kappa (National Honors Society)

Sigma Pi Sigma (Physics Honors Society)