Linnea M. Wolniewicz

Computer Science Ph.D. Student at the University of Hawai‘i at Mānoa and National Science Foundation Fellow

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Education

University of Hawai‘i at Mānoa — *Honolulu, HI*

Ph.D. in Computer Science — **August 2024 - May 2027**

M.Sc. in Computer Science, GPA 3.95 — August 2022 - July 2024

Fourth year Ph.D. student in Dr. Peter Sadowski’s Machine Learning lab. Selected Coursework: Software Quality Assurance, Human-centered AI, Machine Learning, Deep Learning, AI for Dynamic Systems, Random Processes, Complexity Analysis, AI Seminar

University of Colorado Boulder — *Boulder, CO*

B.A. in Astrophysics and Minor in Music (Harp performance), GPA 3.86 — August 2018 - May 2022

Selected Coursework: *Astrophysics:* Classical Mechanics I, II, Electricity and Magnetism I, II, Quantum Mechanics I, Astrophysics I, II, Black Holes *Computer Science:* Algorithms, Principles of Programming Languages, Object-Oriented Programming, Data Structures, Scientific Programming I, II, III

University of Edinburgh — *Edinburgh, UK*

Study Abroad — August 2021 - December 2021

Coursework: Foundations of Quantum Mechanics, Scottish Studies, Celtic Civilizations

Technical Skills

Programming Languages *Proficient:* Python, C++, bash, LaTeX. *Working knowledge of:* SQL, Scala, JavaScript, HTML/CSS

Data Science *Proficient:* PyTorch, TensorFlow, HPC, Pandas, Matplotlib, SLURM, GCP. *Working knowledge of:* MATLAB, Mathematica

Employment and Research

University of Hawai‘i at Mānoa — *Honolulu, HI*

Graduate Research Assistant — August 2022 - May 2027, full-time

I research the application of **probabilistic machine learning methods** to scientific data with Dr. Peter Sadowski. I am currently exploring the use of **Gaussian Processes** in **Python** to perform anomaly detection in stellar time series data with **PyTorch**. I have presented my work on accelerating **simulation-based inference** with **neural likelihood models** at NeurIPS and SPAICE [2], which enables efficient Bayesian inference for the heliospheric transport of galactic cosmic rays.

Frontier Development Lab — *Remote*

Researcher at HelioLab — June 2025 - October 2025, full-time

My team and I developed a novel dataset and suite of ML models in **PyTorch** to accurately forecast the state of the ionosphere, presented at NeurIPS [3, 4].

Striveworks, Inc — *Austin, TX*

Data Science Intern — May 2023 - August 2023, full-time

I researched the application of **large language models** to solve natural language tasks, and explored various improvement strategies such as LoRA.

Laboratory for Atmospheric and Space Physics — *Boulder, CO*

Undergraduate Research Assistant — August 2020 - July 2022, part-time

I implemented K-means and **convolutional neural networks** in **Python** with **PyTorch** to segment polar coronal holes in images of the Sun [9].

Massachusetts Institute of Technology’s Haystack Observatory — *Westford, MA*

Research Experience for Undergraduates — May 2021 - August 2021, full-time

I applied a Gaussian mixture model and **convolutional neural networks** to detect ocean wave events in seismic data from Antarctica’s Ross Ice Shelf.

Institute for Astronomy at the University of Hawai‘i at Mānoa — *Honolulu, HI*

Research Experience for Undergraduates — May 2020 - August 2020, full-time

I analyzed the entire Kepler Space Telescope dataset using **Python** statistical tools such as **Pandas** to evaluate the biases in its selection function [8].

University of Colorado Boulder — *Boulder, CO*

Physics Learning Assistant — August 2019 - May 2020, part-time

I taught students in an Introductory Experimental Physics and an Introductory Electricity and Magnetism Tutorial course.

Northern Colorado Harp Workshop — *Fort Collins, CO*

Harp Internship — July 2019 - August 2019, full-time

I facilitated a summer workshop for harpists, delivering instructional sessions, conducting rehearsals, and orchestrating the operation of the entire program.

Gamers Guild Boulder *Boulder, CO*

Store Manager August 2017 - May 2018, part-time

I addressed the needs of up to 20 customers simultaneously while overseeing the overall operations and responsibilities of the entire store.

Publications

[1] Yang, K.E., Sun, X., Tarr, L.A., Liu, J., Sadowski, P., Dodds, S.C., Rempel, M., Jaeggli, S.A., Schad, T., Cunnyngham, I., Glaser, Y., **Wolniewicz, L.**. *The Astrophysical Journal*, Volume 995, Number 2. [Link]

[2] **Wolniewicz, L. M.**, Sadowski, P., Corti, C., 2025. "Neural Surrogate HMC: On Using Neural Likelihoods for Hamiltonian Monte Carlo in Simulation-Based Inference" *JGR Machine Learning and Computation*. In Review. [Link]

[3] **Wolniewicz, L.M.**, Kelebek, H.S., Mestici, S., Vergalla, M.D., Acciarini, G., G., Poduval, B., Verkhoglyadova, O., Guhathakurta, M., Berger, T., Baydin, A.G., Soboczenski, F., 2025. "Connecting the Dots: A Machine Learning Ready Dataset for Ionospheric Forecasting Models"[Paper presentation]. Machine Learning for the Physical Sciences. Thirty-ninth Conference on *Neural Information Processing Systems*. [Link]

[4] Kelebek, H.S., **Wolniewicz, L.M.**, Vergalla, M.D., Mestici, S., Acciarini, G., Poduval, B., Verkhoglyadova, O., Guhathakurta, M., Berger, T., Soboczenski, F., Baydin, A.G., 2025. "Ioncast: A deep learning framework for forecasting ionospheric dynamics"[Paper presentation]. Machine Learning for the Physical Sciences. Thirty-ninth Conference on *Neural Information Processing Systems*. [Link]

[5] Acciarini, G., Mestici, S., Kelebek, H.S., **Wolniewicz, L.M.**, Vergalla, M.D., Guhathakurta, M., Verkhoglyadova, O., Berger, T., Poduval, B., Baydin, A.G., Soboczenski, F., 2025. "Forecasting the Ionosphere from Sparse GNSS Data with Temporal-Fusion Transformers"[Paper presentation]. Machine Learning for the Physical Sciences. Thirty-ninth Conference on *Neural Information Processing Systems*. [Link]

[6] Glaser, Y., Stopa, J. E., **Wolniewicz, L. M.**, Foster, R., Vandemark, D., Mouche, A., Chapron, B., Sadowski, P., 2024. "WV-Net: A Foundation Model for SAR Ocean Satellite Imagery" *American Meteorological Society: Artificial Intelligence for the Earth Systems*, Volume 4, Issue 4. [Link]

[7] **Wolniewicz, L. M.**, Sadowski, P., Corti, C., 2023. "NeuralHMC: Accelerated Hamiltonian Monte Carlo with a Neural Network Surrogate Likelihood"[Paper presentation]. Machine Learning for the Physical Sciences. Thirty-seventh Conference on *Neural Information Processing Systems*. [Link]

[8] **Wolniewicz, L. M.**, Berger, T., Huber, D., 2021. "The Stars Kepler Missed: Investigating the Kepler Target Selection Function Using Gaia DR2" *The Astronomical Journal*, Volume 161, Number 5. [Link]

[9] Tiwari, A. J., Hu, A., Tremblay, B., Smith, B., **Wolniewicz, L. M.**, Penn, M., Kirk, M., Guidoni, S., Samanta, T., 2020. "SEARCH: SEgmentation of polAR Coronal Holes"[Paper presentation]. Machine Learning for the Physical Sciences. Thirty-fourth Conference on *Neural Information Processing Systems*. [Link]

Posters and Talks

37th Conference on Neural Information Processing Systems (NeurIPS) Machine Learning for the Physical Sciences Workshop *San Diego, CA*

Poster Presentation December 2025

Connecting the Dots: A Machine Learning Ready Dataset for Ionospheric Forecasting Models [3]; Ioncast: A deep learning framework for forecasting ionospheric dynamics [4]; Forecasting the Ionosphere from Sparse GNSS Data with Temporal-Fusion Transformers [5].

Center for Decoding the Universe Annual Conference *Stanford, CA*

Scheduled Talk June 2025

Dipper Detector: Probabilistic Detection of Anomalous Dimming in Stellar Light Curves.

AI in and for Space (SPAICE) Conference *Oxford, UK*

Scheduled Talk September 2024

Neural Surrogate HMC: Accelerated Hamiltonian Monte Carlo with a Neural Network Surrogate Likelihood [2].

Science Understanding through Data Science (SUDS) Conference *Pasadena, CA*

Poster Presentation August 2024

Neural Surrogate HMC: Accelerated Hamiltonian Monte Carlo with a Neural Network Surrogate Likelihood [2].

Information and Computer Science Department Research Showcase *Honolulu, HI*

Poster Presentation May 2024

NeuralHMC: Accelerated Hamiltonian Monte Carlo with a Neural Network Surrogate Likelihood (Masters Project) [7].

37th Conference on Neural Information Processing Systems (NeurIPS) Machine Learning for the Physical Sciences Workshop *New Orleans, LA*

Poster Presentation December 2023

NeuralHMC: Accelerated Hamiltonian Monte Carlo with a Neural Network Surrogate Likelihood [7].

Information and Computer Science Department Research Showcase *Honolulu, HI*

Poster Presentation May 2023

EINN: Evolutionary-Informed Neural Networks.

Machine Learning in Heliophysics *Virtual*

Poster Presentation March 2022

SEARCH: Segmentation of Active Regions and Coronal Holes.

National Conference on Undergraduate Research *Virtual*

Scheduled Talk April 2021

The Stars Kepler Missed: Investigating the Kepler Target Selection Function Using Gaia DR2 [8].

Cambridge Workshops of Cool Stars, Stellar Systems, and the Sun *Virtual*

Poster Presentation March 2021

SEARCH: Segmentation of polAR Coronal Holes [9].

237th American Astronomical Society (AAS) Meeting *Virtual*

Scheduled Talk No. 211.04 January 2021

The Stars Kepler Missed: Investigating the Kepler Target Selection Function Using Gaia DR2 [8].

34th Conference on Neural Information Processing Systems (NeurIPS) Machine Learning for the Physical Sciences Workshop *Virtual*

Poster Presentation December 2020

SEARCH: Segmentation of polAR Coronal Holes [9].

Science Undergraduate Research Experience Symposium *Honolulu, HI*

Poster Presentation July 2020

The Stars Kepler Missed: Investigating the Kepler Target Selection Function Using Gaia DR2 [8].

Awards and Honors

Jan. & May 2024	Catalyst Award for Science Advancement (CASA) Grant
April 2022	National Science Foundation Graduate Fellowship
February 2022	T9Hacks Hackathon Outstanding Beginner
January 2019	University of Colorado Women in Physics Scholarship
Undergraduate	University of Colorado Boulder Boulder Dean's List
Undergraduate	University of Colorado Boulder Honors Scholarship
June 2018	Winner of the Harp Colorado Workshop Competition
May 2018	International Baccalaureate Diploma, GPA: 4.67

Service and Outreach

Graduate Women in Science Hawai'i *Honolulu, HI*

Vice President August 2024 - present

Outreach Coordinator August 2023 - present

I am the Vice President of Graduate Women in Science Hawai'i (GWISH) and coordinate all outreach efforts within our organization. In January 2024 and again in May 2024, I was awarded a CASA grant to lead the "Exploring Beyond: Inspiring Future Planetary Explorer-Scientists" outreach program. This program is dedicated to engaging high school students across all the Hawaiian islands to foster an interest in science and higher education, particularly among female and underrepresented students. Since the Fall of 2023, GWISH has visited four Hawaiian islands and over 25 science classes to deliver workshops that expose high school students to coding and scientific research.

Information and Computer Science Department *Honolulu, HI*

Graduate Student Community Engagement Co-Chair August 2023 - present

My co-chair and I regularly apply for university funding to organize weekly Coffee Hours for graduate students and faculty to foster community within the Information and Computer Science (ICS) department at UH Mānoa. We also organize and maintain a communal space for ICS graduate students.

Graduate Student Organization *Honolulu, HI*

Information and Computer Science (ICS) Representative August 2022 - August 2024

I was the representative for the ICS Department at UH Mānoa for two years. I held this role within the Graduate Student Organization to develop a healthy environment for ICS graduate students, communicate graduate student needs with UH administration, and award funding to ICS graduate students.

Phi Beta Kappa Honors Society *United States of America*

Member May 2020 - present