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Summary

I am a Mathematics B.S. student at Northeastern University currently working in the Geometric Learning Lab under Robin Walters. My current work combines geometric deep learning methods with problems in physics and math.

Work Experience

Research Assistant, Geometric Learning Lab 01/2024 – Present
Northeastern University, Advisor: Prof. Robin Walters *Boston, MA*

- Currently building $E(3)$-equivariant neural network architectures for catalyst-type material work function and cleavage energy property prediction, and generative inverse-design tasks.
- Designed MatrixNet, in collaboration with research mathematicians, to process complex algebraic information to aid mathematical research in an interpretable manner.
- Generated and refined large-scale synthetic datasets containing mathematical data to support math research.
- Processed geometric crystal data to provide statistical analysis in preparation for machine learning tasks.

CIQM Research Assistant, Kaxiras Group 06/2022 – 01/2024
Harvard University, Advisor(s): Daniel Larson & Prof. Efthimios Kaxiras *Cambridge, MA*

- Developed BlochNet, an equation-driven neural network for modeling periodic quantum systems.
- Utilized conventional quantum chemistry methods to benchmark and validate model predictions.
- Participated in science communication community outreach events at the Museum of Science.

Teaching Assistant 01/2021 – 06/2022
Bunker Hill Community College *Boston, MA*

- Served as course assistant for two sections of CSC-120 throughout spring 2022.
- Facilitated office hours and class discussions, assisted in preparation of course materials, and provided code assistance and reviews to over 60 students.

Education

Northeastern University Boston, MA
BS, Mathematics GPA: 3.3 *May 2025 (Expected)*

Bunker Hill Community College Boston, MA
AA, Mathematics GPA: 3.9 *2022*

Publications

Laird, L, **Hsu, C**, Bapat, A, Walters, R. 2024. *MatrixNet: Learning over symmetry groups using learned group representations.* The 38th Annual Conference on Neural Information Processing Systems [Paper]

Hsu, C, Mattheakis, M, Schleder, G, Larson, D. 2024. *Equation-driven Neural Networks for Periodic Quantum Systems.* ML4PS Workshop at NeurIPS [Paper]

Technical Skills

Languages: Python, C++, SQL, MATLAB, Mathematica
Applied Skills: PyTorch (w/ Torch-Geometric), Pandas, NumPy, SciPy, Scikit-Learn, MatplotLib, Anaconda, Slurm, Distributed Programming/HPC
Relevant Theory: Linear Algebra (Abstract/Numerical), Matrix Analysis, Probability/Statistics, Differential Equations (ODE/PDE, Time Series, Numerical Solutions), Graph Theory