

SUMMARY

I am a Mathematics B.S. student at Northeastern University currently working in the Geometric Learning Lab under Robin Walters, and a two-time recipient of Northeastern’s PEAK Summit research grant. My current work combines geometric deep learning methods with problems in physics and math.

WORK EXPERIENCE

Research Assistant, Geometric Learning Lab <i>Northeastern University, Advisor: Prof. Robin Walters</i>	01/2024 – Present <i>Boston, MA</i>
<ul style="list-style-type: none">Currently leading an 8 person interdisciplinary team, building $E(3)$-equivariant neural network architectures for crystal work function and cleavage energy property prediction, additionally exploring generative inverse-design applications leveraging diffusion and autoregressive models.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.	
CIQM Research Assistant, Kaxiras Group <i>Harvard University, Advisor(s): Daniel Larson & Prof. Efthimios Kaxiras</i>	06/2022 – 01/2024 <i>Cambridge, MA</i>
<ul style="list-style-type: none">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 <i>Bunker Hill Community College</i>	01/2021 – 06/2022 <i>Boston, MA</i>
<ul style="list-style-type: none">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 <i>BS, Mathematics</i>	Boston, MA <i>August 2025 (Expected)</i>
Bunker Hill Community College <i>AA, Mathematics</i>	Boston, MA <i>2022</i>

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] [Poster] [Code]

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

TECHNICAL SKILLS

Languages: Python, C++, SQL, MATLAB, Mathematica
Applied Skills: PyTorch (w/ Torch-Geometric), Pandas, NumPy, SciPy, Scikit-Learn, Weights & Biases, Matplotlib, Anaconda, Slurm, AWS, Distributed Programming/HPC
Mathematical Theory: Linear Algebra (Abstract/Numerical), Matrix Analysis, Probability/Statistics, Differential Equations, Time Series Analysis, Graph Theory

SELECTED TALKS & POSTERS

Conjecture Building with Interpretable Artificial Intelligence*

Northeastern ML for Mathematicians Summer School, Boston, MA, *May 2025*

Predictive & Generative Equivariant Models for Tuned Material Design

Boston Symmetry Day, Boston, MA, *April 2025* [Poster]

Developing Mathematical Intuition with Algebraically-Informed Neural Networks

Joint Mathematics Meeting, Seattle, WA, *Jan 2025* [Poster]

MatrixNet: Learning over symmetry groups using learned group representations

NeurIPS, Vancouver, CA, *Dec 2024* [Poster]

Predicting Electronic Band Structure with Physics-Informed Neural Networks

APS March Meeting, Las Vegas, NV, *March 2023*

Solving Partial Differential Equations: A Neural Network Approach

CIQM Colloquium, Cambridge, MA, *Aug 2022*

* indicates an invited talk.

AWARDS

Northeastern Merit Scholarship: Merit scholarship recognizing exceptional academic performance, providing up to \$60,000 over four years.

URF PEAK Summit Award: Research grant totaling \$6,000 over two semesters to support advanced research in machine learning.

AWM Symposium Travel Grant: Travel grant totaling \$4,000 (awarded separately in 2022 and 2024) to support travel to the Association for Women in Mathematics Symposium.

JMM Travel Grant: Travel grant totaling \$1,200 to support travel to the Joint Mathematics Meeting in Seattle, WA.

URF PEAK 'Shout-it-out' Award: Travel grant providing \$750 to support attendance at the NeurIPS 2024 conference in Vancouver, Canada.

Dean's List, NEU and BHCC: Academic distinction recognizing excellent academic term performance.

MISC

Machine Learning Outreach Program: Performed educational outreach to AP Computer Science students at the O'Bryant School of Mathematics and Science during Fall 2024.

BHCC Alumni Experience Panel: Participated in alumni speaking events with current STEM students at Bunker Hill Community College.

Northeastern REU Panel Speaker: Participated in the Northeastern math department REU info session as a speaker, sharing experiences with REU programs and research.

Commonwealth Honors Scholar: At Bunker Hill Community College I participated in the UMass Commonwealth Honors Program.