Neil He

(646) 617-5101 | Email: neilhe2.illinois.edu | Linkedin: neil-he-3760a4230 | Personal Website: https://heneil.github.io/

Education

University of Illinois Urbana-Champaign — Urbana, Il
PhD Student in Computer Science; advised by Prof.Ge Liu — *9/25-present*

Yale University — New Haven, CT
M.S. in Mathematics; advised by Prof.Rex Ying — *9/21-5/25; GPA: 3.8/4.0*

Yale University — New Haven, CT
B.S. in Mathematics — *9/21-5/25; GPA: 3.8/4.0*

Awards

Amazon AI PhD Fellowship (2025-2026)

NSF Research Experience for Undergraduates (REU), High Power Computing (2024)

Research Experience

University of Illinois Urbana-Champaign — June 2025 - Present
PhD student of Prof. Ge Liu — *Urbana, IL*

- Geometric deep learning. Combining tools from differential geometry, probability theory, and random matrix theory to develop algorithms and frameworks for deep generative modeling for biological applications, particularly on manifolds.

Graph and Geometric Learning Group at Yale — April 2023 - Present
Undergraduate Researcher, Advised by Prof. Rex Ying — *New Haven, CT*

- Geometric deep learning. Develop algorithms and frameworks in geometric deep learning for building geometry-aware foundation models, including large language model (LLMs), vision-language models (VLMs), and generative modeling.
- Lead organizer of tutorial at SIGKDD 25' and co-organizer of workshop at NeurIPS 25' for non-Euclidean foundation models.

High Power Computing REU — May 2024 - July 2024
Undergraduate Researcher, advised by Prof. Yu Liu and Prof. Ming-Cheng Cheng — *Potsdam, NY*

- Designing and implementing a GPU-accelerated program that uses mathematical modeling grounded in physical properties to accurately and efficiently simulate temperature behavior on chips with tens of thousands of cores, to predict hotspots in real time for task management on GPU and CPU chips, Project Link

Efficient Computing Lab — May 2022 - August 2022
Undergraduate Research Assistant — *New Haven, CT*

- Use Rust and surface code to create a comprehensive and intuitive research tool for quantum error correction simulation Project Link

Michaelson Lab at Harvard Medical School — December 2018 - September 2021
Research Assistant — *Remote*

- Using tools from differential geometry to analyze the geometry of cellular division and phylodynamics.

Industry and Work Experience

Scale AI
LLM Consultant — *Feb 2024 - Sept 2024*

- Oversee the training and deployment of large language models (LLMs) by providing strategic solutions and correction to over 5 large-scale training projects to meet customer needs.

Yale University
Teaching Assistant — *Sept 2022 - Dec 2023*

- Hold office hours and grade problem sets for the Data Structure, Set Theory, and Real Analysis courses at Yale

Talks and Other Academic Experience

Organizer for Non-Euclidean Foundation Models and Geometric Learning Workshop at **NeurIPS 2025**

Lead Organizer for tutorial on Hyperbolic Foundation Models at **KDD 2025**

President (2022-2024) for the Yale Math Competition held twice annually in 8 locations across the US and China.

Selected Publications

Lorentzian Residual Neural Networks
Neil He, Menglin Yang, and Rex Ying. **KDD 2025**.

Efficient Diffusion Models for Symmetric Manifolds
Oren Mangoubi, **Neil He**, and Nisheeth K. Vishnoi. **ICML 2025**.

Hyperbolic Deep Learning for Foundation Models: A Survey
Neil He, Hiren Madhu, Ngoc Bui, Menglin Yang, and Rex Ying. **KDD 2025**.

PyPOD-GP: Using PyTorch for accelerated chip-level thermal simulation of the GPU
Neil He, Ming-Cheng Cheng, Yu Liu. **SoftwareX. Vol.30, p.102147**.

HyperCore: The Core Framework for Building Hyperbolic Foundation Models with Comprehensive Modules **Neil He**, Menglin Yang, and Rex Ying. **TheWebConf NEGEL Workshop. 2025**.

HELM: Hyperbolic Large Language Models via Mixture-of-Curvature Experts
Neil He, Rishabh Anand, Hiren Madhu, Ali Maatouk, Smita Krishnaswamy, Leandros Tassiulas, Menglin Yang, and Rex Ying. *under peer review 2025.*

Position: Beyond Euclidean – Foundation Models Should Embrace Non-Euclidean Geometries
Neil He, Jiahong Liu, Buze Zhang, Ngoc Bui, Ali Maatouk, Menglin Yang, Irwin King, Melanie Weber, and Rex Ying. *under peer review 2025.*