

# Derek Lim

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AI researcher and engineer soon finishing PhD at MIT. Working on **efficient LLMs**, **post-training**, and **evaluations** at Liquid AI for a year. Worked on **theory and practice** of deep learning, especially focusing on **symmetries** in deep learning, at MIT, NVIDIA, and Meta AI.

## Education

### Massachusetts Institute of Technology (MIT)

8/2021-X

PhD student, Computer Science. GPA: 4.7. Advisor: Stefanie Jegelka.

Research focus: Symmetries in machine learning: neural network functions and weight spaces.

### Cornell University

8/2017-5/2021

BA, Mathematics and Computer Science double major. GPA: 3.99. Magna Cum Laude.

## Industry Experience

### Liquid AI, Machine Learning Scientist and Engineer

1/2024-X

- Mostly working on the post-training team, for efficient LLMs.
- Experience with many parts of LLM pipeline, from pretraining to evaluation.

### NVIDIA, Research Intern

5/2023-12/2023

- Machine learning research with Toronto lab, published ICLR paper on processing NN weights.

### Meta AI, Research Intern

5/2022-9/2022

- Machine learning research in Boston and NYC in graph and geometric deep learning.

## Honors and Awards

Best paper award, HiLD workshop (High-dimensional Learning Dynamics), ICML

2024

NSF Graduate Fellowship (GRFP)

2022

Honorable Mention, Computing Research Association Outstanding Undergrad Researcher.

2020

First-place winner, Cornell Mathematical Competition in Modelling (team of 3)

2019

Meritorious Winner (top 7%), Mathematical Competition in Modelling (team of 3)

2019

## Publications ([Google Scholar](#), 1200+ citations, h-index: 14)

\* Denotes equal contribution or alphabetical ordering.

### (16) The Empirical Impact of Neural Parameter Symmetries, or Lack Thereof.

Derek Lim\*, Theo Moe Putterman\*, Robin Walters, Haggai Maron, Stefanie Jegelka

*Advances in Neural Information Processing Systems (NeurIPS)*, 2024.

**Best paper award, HiLD workshop, ICML**

- (15) **Graph Metanetworks for Processing Diverse Neural Architectures.**  
 Derek Lim, Haggai Maron, Marc Law, Jonathan Lorraine, James Lucas.  
*International Conference on Learning Representations (ICLR)*, 2024.  
**Spotlight Paper**
- (14) **Structuring Representation Geometry with Rotationally Equivariant Contrastive Learning.**  
 Sharut Gupta\*, Joshua Robinson\*, **Derek Lim**, Soledad Villar, Stefanie Jegelka.  
*International Conference on Learning Representations (ICLR)*, 2024.
- (13) **Expressive Sign Equivariant Networks for Spectral Geometric Learning**  
**Derek Lim**, Joshua Robinson, Stefanie Jegelka, Haggai Maron  
*Advances in Neural Information Processing Systems (NeurIPS)*, 2023.  
**Spotlight Paper**
- (12) **Equivariant Polynomials for Graph Neural Networks**  
 Omri Puny\*, **Derek Lim\***, Bobak Kiani\*, Haggai Maron, Yaron Lipman  
*International Conference on Machine Learning (ICML)*, 2023.  
**Oral Presentation**
- (11) **Graph Inductive Biases in Transformers without Message Passing**  
 Liheng Ma\*, Chen Lin\*, **Derek Lim**, Adriana Romero-Soriano, Puneet K. Dokania, Mark Coates, Philip Torr, Ser-Nam Lim  
*International Conference on Machine Learning (ICML)*, 2023.
- (10) **Sign and Basis Invariant Networks for Spectral Graph Representation Learning**  
**Derek Lim\***, Joshua Robinson\*, Lingxiao Zhao, Tess Smidt, Suvrit Sra, Haggai Maron, Stefanie Jegelka.  
*International Conference on Learning Representations (ICLR)*, 2023.  
**Spotlight Paper**
- (9) **Counting Substructures with Higher-Order Graph Neural Networks: Possibility and Impossibility Results**  
 Behrooz Tahmasebi, **Derek Lim**, Stefanie Jegelka.  
*Artificial Intelligence and Statistics (AISTATS)*, 2023.  
**Oral Presentation (32/1689 submissions)**
- (8) **Understanding Doubly Stochastic Clustering.**  
 Tianjiao Ding, **Derek Lim**, René Vidal, Benjamin Haeffele.  
*International Conference on Machine Learning (ICML)*, 2022.
- (7) **Equivariant Subgraph Aggregation Networks.**  
 Beatrice Bevilacqua\*, Fabrizio Frasca\*, **Derek Lim\***, Balasubramaniam Srinivasan, Chen Cai, Gopinath Balamurugan, Michael M. Bronstein, Haggai Maron.  
*International Conference on Learning Representations (ICLR)*, 2022.  
**Spotlight Paper (176 / 3391 submissions)**
- (6) **Large Scale Learning on Non-Homophilous Graphs: New Benchmarks and Strong Simple Methods.**  
**Derek Lim\***, Felix M. Hohne\*, Xiuyu Li\*, Linda Huang, Vaishnavi Gupta, Omkar P. Bhalerao,

Ser-Nam Lim.

*Advances in Neural Information Processing Systems (NeurIPS)*, 2021.

(5) **Equivariant Manifold Flows.**

Isay Katsman\*, Aaron Lou\*, **Derek Lim\***, Qingxuan Jiang\*, Ser-Nam Lim, Christopher De Sa.

*Advances in Neural Information Processing Systems (NeurIPS)*, 2021.

(4) **Neural manifold ordinary differential equations.**

Aaron Lou\*, **Derek Lim\***, Isay Katsman\*, Leo Huang\*, Qingxuan Jiang, Ser-Nam Lim, Christopher De Sa.

*Advances in Neural Information Processing Systems (NeurIPS)*, 2020.

(3) **Expertise and dynamics within crowdsourced musical knowledge curation: A case study of the genius platform.**

**Derek Lim**, Austin R. Benson.

*International AAAI Conference on Web and Social Media (ICWSM)*, 2021.

(2) **Spectra of convex hulls of matrix groups.**

Eric Jankowski\*, Charles R. Johnson\*, **Derek Lim\***.

*Linear Algebra and its Applications*, 2020.

(1) **The doubly stochastic single eigenvalue problem: A computational approach.**

Amit Harlev\*, Charles R. Johnson\*, **Derek Lim\***.

*Experimental Mathematics*, 2020.

## Workshop Papers

(w3) **Sign and Basis Invariant Networks for Spectral Graph Representation Learning**

**Derek Lim\***, Joshua Robinson\*, Lingxiao Zhao, Tess Smidt, Suvrit Sra, Haggai Maron, Stefanie Jegelka.

*ICML Workshop on Topology, Algebra, and Geometry in Machine Learning (TAG-ML)*, 2022.

**Spotlight Presentation (4/41 submissions)**

(w2) **Counting Substructures with Higher-Order Graph Neural Networks: Possibility and Impossibility Results**

Behrooz Tahmasebi, **Derek Lim**, Stefanie Jegelka.

*ICML Workshop on Topology, Algebra, and Geometry in Machine Learning (TAG-ML)*, 2022.

(w1) **New Benchmarks for Learning on Non-Homophilous Graphs.**

**Derek Lim\***, Xiuyu Li\*, Felix Hohne\*, Ser-Nam Lim.

*WWW Workshop on Graph Learning Benchmarks (GLB)*, 2021.

## Preprints / Submissions

(p2) **Learning on LoRAs: GL-Equivariant Processing of Low-Rank Weight Spaces for Large Finetuned Models.**

Theo Moe Putterman\*, **Derek Lim\***, Yoav Gelberg, Stefanie Jegelka, Haggai Maron

*arXiv:2410.04207*, 2024.

(pi) **Doubly Stochastic Subspace Clustering.**  
**Derek Lim**, René Vidal, Benjamin Haeffele.  
*arXiv:2011.14859*, 2020.

## Outreach / Organizing

Weight Space Learning Workshop, ICLR, Organizer	2025
Learning on Graphs NYC Meetup, Organizer	2024
Boston Symmetry Day, Founder Member + Organizer	2023-X
Learning on Graphs Conference (LoG), Founding Member + Organizer	2022
The Gradient, Editor	2022-2023
MIT Graduate Application Assistance Program (GAAP), Mentor	2021-2022
Cornell SoNIC Workshop for underrepresented minorities in CS, Instructor	2021

## Teaching

Instructor, MIT Splash!, Cornell Splash! and Rainstorm	2019-2022
Instructor, Inspirit AI	2021
Instructor, SoNIC Summer Research Workshop, Cornell University	2021
CS Teaching Assistant, Cornell University	2018-2021

## Reviewing

### Conferences

Artificial Intelligence and Statistics (AISTATS)	2024-X
Learning on Graphs Conference (LoG)	2023-X
International Conference on Learning Representations (ICLR)	2023-X
Neural Information Processing Systems (NeurIPS)	2022-X
International Conference on Machine Learning (ICML)	2022-X

### Workshops

AI for Science, ICML 2024 (AI4Science)	2024
Symmetry and Geometry in Neural Representations, NeurIPS 2023-2024 (NeurReps)	2023-2024
Topology, Algebra and Geometry-Pattern Recognition, CVPR 2023 (TAG-PRA)	2023
New Frontiers in Graph Learning Workshops, NeurIPS 2022-2023 (GLFrontiers)	2022-2023
Temporal Graph Learning Workshop, NeurIPS 2022-2023 (TGL)	2022-2023
Geometric Deep Learning in Medical Image Analysis Workshop (GeoMedIA)	2022
Workshop on Graph Learning Benchmarks (GLB), WWW	2022
GroundedML Workshop, ICLR	2022

## Miscellaneous

Software: Python (PyTorch), Julia, MATLAB, R, Linux, Git, Bash, L<sup>A</sup>T<sub>E</sub>X  
 Skills: Deep learning, optimization, graph neural networks, equivariant neural networks

## Invited Talks

1. [LMU Munich, Chair for Mathematical Foundations of AI](#), on Parameter Symmetries 2024
2. [Pacific Northwest Seminar TAG-DS](#), on Graph Metanetworks 2024
3. [MIT MLTea](#), on Equivariant Polynomials for GNNs 2023
4. Macro-Eyes ML Seminar, on Graph Positional Encodings 2022
5. Huawei AI4Sec Research Seminar Series, on GNNs 2022
6. Ecole Polytechnique, Laboratoire d'informatique, on SignNet and BasisNet 2022
7. Stanford University, [Graph Machine Learning Reading Group](#), on SignNet and BasisNet 2022
8. TU Wien, Machine Learning Research Unit Seminar, on SignNet and BasisNet 2022
9. Twitter, on Equivariant Subgraph Aggregation Networks 2022