

# Derek Lim

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## Education

### Massachusetts Institute of Technology (MIT)

8/2021-X

PhD student, Electrical Engineering and Computer Science. GPA: 4.7.

Advisor: Stefanie Jegelka.

Research focus: Algorithms and theory for graph neural networks and equivariant neural networks.

### Cornell University

8/2017-5/2021

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

Magna Cum Laude in Math, Magna Cum Laude in Computer Science. Distinction in all subjects.

## Honors and Awards

NSF Graduate Fellowship (GRFP)

2022

Phi Beta Kappa

2021

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

## Research Experience

Meta AI, Research Intern

2022

Cornell University Artificial Intelligence, Team Lead

2020-2021

Johns Hopkins University Vision Lab, REU Researcher

2020

College of William and Mary, REU Researcher

2019

## Publications

\* Denotes equal contribution or alphabetical ordering.

### (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*

- (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

(p1) **Doubly Stochastic Subspace Clustering.**

Derek Lim, René Vidal, Benjamin Haeffele.

*arXiv:2011.14859*, 2020.

## Teaching

Instructor, MIT Splash!, Cornell Splash! and Rainstorm

2019-

Instructor, Inspirit AI

2021

Instructor, SoNIC Summer Research Workshop, Cornell University

2021

CS Teaching Assistant, Cornell University

2018-2021

## Outreach

[Boston Symmetry Day](#), Organizer

2023-X

[Learning on Graphs Conference \(LoG\)](#), Organizer

2022

[The Gradient](#), Editor

2022-X

MIT Graduate Application Assistance Program ([GAAP](#)), Mentor

2021-X

Cornell [SoNIC Workshop](#) for underrepresented minorities in CS, Instructor

2021

## Reviewing

### Conferences

Neural Information Processing Systems (NeurIPS)

2022-X

International Conference on Machine Learning (ICML)

2022-X

### Workshops

Topology, Algebra and Geometry-Pattern Recognition, CVPR 2023 (TAG-PRA)

2023

New Frontiers in Graph Learning Workshops, NeurIPS 2022 (GLFrontiers)

2022

Temporal Graph Learning Workshop, NeurIPS 2022 (TGL)

2022

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,  $\LaTeX$

Skills: Deep learning, optimization, graph neural networks, equivariant neural networks

## Invited Talks

1. Huawei AI4Sec Research Seminar Series

2022

2. Ecole Polytechnique, Laboratoire d'informatique

2022

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| 3. Stanford University, <a href="#">Graph Machine Learning Reading Group</a> | 2022 |
| 4. TU Wien, Machine Learning Research Unit Seminar                           | 2022 |
| 5. Twitter, on Equivariant Subgraph Aggregation Networks                     | 2022 |