Derek Lim

Email: dereklim@mit.edu
Github: cptq
Phone: +1 646-708-2919
Google Scholar: Derek Lim
Webpage: cptq.github.io

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

NVIDIA, Research Intern	2023
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.

(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 Papaer

(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 Aggregration 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.

Outreach / Organizing

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

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

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
3. Stanford University, Graph Machine Learning Reading Group 2022
4. TU Wien, Machine Learning Research Unit Seminar 2022
5. Twitter, on Equivariant Subgraph Aggregation Networks 2022