Thien Le

550 Memorial Drive, #16A1
Cambridge, MA 02139
USA

Email: thienle@mit.edu
Github: steven-le-thien
Linkedin: thienle2

Education

Massachusetts Institute of Technology (MIT), EECS-CSAIL Jegelka Group Sep 2019 - May 2024
Master of Science (SM) and Doctor of Philosophy (PhD) in EECS GPA: 5.0/5.0
Master thesis: Training invariance and the low-rank phenomenon: beyond linear networks

University of Illinois at Urbana-Champaign (UIUC) Sep 2016 - May 2019
Bachelor of Science in Mathematics & Computer Science GPA: 3.93/4.00
Awarded 'Most Outstanding Undergraduate Major Award in Mathematics & CS'

Research Interests

Deep Learning Theory. Optimization. Computational Biology. Inference on Biological Structure.

Projects (MIT)

Graduate researcher under Stefanie Jegelka

Learning with complex (non-manifold) biological structure Sep 2019 - Ongoing

- Studying the algebraic geometry and combinatorics of tree space (a non-manifold moduli space)
- Implemented a new algorithm in Haskell for tree inference based on continuous optimization of that space
- Gave a seminar talk at VinAI research day

Bounds for reproducing kernel Hilbert space (RKHS) norms Apr 2020 - Apr 2021

- Studied the Fourier-Stieltjes transform on LCA groups and Young's inequality for convolutional integrals
- Proved an upper bound for RKHS norm of product of functions beyond the Gaussian kernel with application to generalization bounds and optimization algorithm for kernel ridge regression.

Implicit regularization of deep ReLU neural network Sep 2020 – Oct 2021

- Generalizing theoretical results on margin and low rank bias in linear network to deep ReLU architectures
- Established a family of invariants during late-stage training of said architectures under gradient flow/descent
- Publish to ICLR2022 (Spotlight)
- Extend framework to characterize implicit bias of mean field limit for deep neural networks (beyond NTK regime)

Learning theory for invariant/equivariant concept classes Jul 2022 - Ongoing

- Study learning theory of deep neural network architectures designed to be invariant/equivariant under certain group actions such as CNN, DeepSets, SignNets, etc
- Show learnability of DeepSets under correlated statistical queries (CSQ) model via classical symmetric functions
- Under preparation for to NeurIPS 2023

Transferability of graph neural network via graph limits (graphops) October 2022-Ongoing

- Study limits, approximation and transferability of finite graph neural networks via theory of graph limit
- Improve on results for graphons to include graph sequences that are not dense (grid, stars,. . .)
- Submitted to COLT 2023

Projects (UIUC)

Statistical Phylogeny Gene Tree Estimation Jun 2018 – Ongoing

- Implementing a scalable phylogeny estimation algorithm with strong statistical guarantees
- Implemented parallelism and algorithmic optimization (e.g. LCA in $O(1)$ query and $O(n)$ preprocessing)
- Maintaining 5000 lines of C code at constraint_inc, tested with BlueWaters supercomputer
- Three papers published in conference and journal, in submission to Nature (2022)

Teaching and interest

- Appointed course staff for both core algorithm classes in UIUC CS Department
- Reviewer for ICLR, AISTATS, ICML,NeurIPS, ECML-KPDD.
- Graduate math courses @MIT: Stochastic Calc., Geom. of Manifolds, AG I, Intro to Representation Thr.

Technical Skills

Programming: C, C++, Python, Pytorch, R, Haskell