

HENRY LI

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EDUCATION

Yale University MS 2020, PhD (est.) 2025
Advisors: Ronald Coifman and Yuval Kluger
Department of Applied Mathematics, Specialization: Machine Learning

Yale University BS 2017
Departments of Computer Science and Mathematics

EXPERIENCE

Yale University 2018-Present
PhD Student

- Researching various topics in generative modeling and harmonic analysis, including:
 - A framework for learning eigenfunctions of a Laplace-Beltrami operator using a variational deep learning technique (ICLR 2018).
 - A manifold-based generative model that samples by estimating a diffusion process (ECCV 2020).
 - A density estimation method for fast, differentiable sampling and likelihood evaluations with universal approximation guarantees. Achieves state-of-the-art results on density estimation with tabular datasets (ICML 2022).
 - A generalization of diffusion probabilistic models with non-Gaussian timesteps (ICML 2023 Structured Probabilistic Inference and Generative Modeling).
 - A framework for hierarchical generative modeling with exact likelihood computation and state-of-the-art performance on density estimation, out-of-distribution detection, and neural compression benchmarks on image datasets (*In submission to ICLR 2024*).

Elucid 2024 (Spring)
Machine Learning Research Intern

- Exploring the usage of multimodal image and language models to aid in generating, augmenting, segmenting, and analyzing arterial CT imagery.

Bosch Center for Artificial Intelligence 2023-Present
Machine Learning Research Intern

- Researching (1) robust training-free approaches to CLIP-guided diffusion models using optimal control and (2) image-to-image translation using algebraically reversible solvers for the Schrödinger Bridge problem.

Center for Computational Mathematics at the Flatiron Institute 2020
Machine Learning Research Intern

- Developed deep image prior-based techniques for enhancing phase retrieval in low-photon settings at the Center for Computational Mathematics (CCM) at Flatiron Institute. Published results at MSML 2021.

Lab126, Amazon.com 2016
Software Engineering Intern

- Developed an experimental app prediction algorithm for pre-emptively loading apps to reduce user-perceived latency on Amazon FireOS (their tablet and smartphone operating system) that halved memory usage and run-time compared to the pre-existing implementation.

Institute for Computational Engineering and Sciences, UT Austin

2015

Research Intern

- Designed and implemented an image segmentation method (a combination of normalized cuts, convolutions, and a modified watershed segmentation) to label TEM imagery.

PUBLICATIONS

Likelihood Training of Cascaded Diffusion Models via Hierarchical Volume-preserving Maps Henry Li, Ronen Basri, Yuval Kluger, *International Conference on Learning Representations (ICLR)* 2024 (In Submission).

Exponential weight averaging as damped harmonic motion Jon Patsenker*, Henry Li*, Yuval Kluger, *ICML Workshop on New Frontiers in Learning, Control, and Dynamical Systems* 2023.

Non-normal Diffusion Models Henry Li, *ICML Workshop on Structured Probabilistic Inference & Generative Modeling* 2023.

Support recovery with stochastic gates: Theory and application for linear models Soham Jana, Henry Li, Yutaro Yamada, Ofir Lindenbaum, *IEEE Letters in Signal Processing* 2023.

Noise-conditional Maximum Likelihood Estimation with Score-based Sampling Henry Li, Yuval Kluger, *NeurIPS Workshop on Score-Based Methods* 2022.

Neural Inverse Transform Sampler Henry Li, Yuval Kluger, *International Conference on Machine Learning (ICML)* 2022.

Phase retrieval with holography and untrained priors: Tackling the challenges of low-photon nanoscale imaging Hannah Lawrence, David Barmherzig, Henry Li, Michael Eickenberg, Marylou Gabrie, *Mathematical and Scientific Machine Learning (MSML)* 2021.

Detection of differentially abundant cell subpopulations in scRNA-seq data Jun Zhao, Ariel Jaffe, Henry Li, Ofir Lindenbaum, Xiuyuan Cheng, Richard Flavell, Yuval Kluger, *Proceedings of the National Academy of Sciences (PNAS)* 2020.

Variational Diffusion Autoencoders with Random Walk Sampling

Henry Li*, Ofir Lindenbaum*, Xiuyuan Cheng, Alexander Cloninger, *European Conference on Computer Vision (ECCV)* 2020.

SpectralNet: Spectral Clustering Using Deep Neural Networks

Uri Shaham*, Kelly Stanton*, Henry Li*, Boaz Nadler, Ronen Basri, and Yuval Kluger, *International Conference on Learning Representations (ICLR)* 2018.

SERVICE

Reviewing

ICML [2023, 2022 Outstanding Reviewer (top ~10%)], NeurIPS [2023, 2022, 2021], ICLR [2024, 2023, 2022], Nature (Biotechnology, Methods), TMLR [2024, 2023]