

Yonatan Sverdlov

PhD in Mathematics | Machine Learning Researcher

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Research Profile

Machine learning researcher seeking full-time Research Scientist, Research Engineer, or Applied Scientist positions. Combines mathematical theory with hands-on deep learning experiments in graph and geometric learning, invariance and equivariance, representation stability, and learning from neural network weights. Six peer-reviewed conference papers at NeurIPS, ICLR, and LoG; LoG 2025 Best Paper Award.

Selected Research Contributions

- **Generalization and canonization (NeurIPS 2026):** Developed covering-number bounds comparing invariant, group-averaged, and canonized models; proved exponential complexity for lexicographic sorting versus polynomial bounds for Hilbert-curve canonization.
- **Expressive and stable graph learning (ICLR / LoG 2025):** Established generic expressivity guarantees for sparse geometric MPNNs under connectivity or global-rigidity assumptions; co-developed FSW-GNN, a bi-Lipschitz, 1-WL-equivalent architecture.
- **Weight-space learning (2026 preprint):** Studied finite-probe identifiability and universality and co-developed HIDDENPROBE, using hidden-layer responses for learning neural-network properties, with evaluations on MLPs and Transformers.

Education

Technion – Israel Institute of Technology

PhD in Mathematics (degree requirements completed)

Nov 2023 – 2026

Advisor: Prof. Nadav Dym

Weizmann Institute of Science

MSc in Mathematics and Computer Science, GPA: 93.5

Mar 2021 – Jul 2023

Advisor: Prof. Shimon Ullman

Tel Aviv University

BSc in Mathematics and Computer Science, GPA: 92

Oct 2017 – Dec 2020

Peer-Reviewed Conference Publications

- **When and How to Canonize: A Generalization Perspective.** Yonatan Sverdlov, Benjamin Friedman, Snir Hordan, Nadav Dym. *NeurIPS*, 2026 (accepted).
- **Monotone and Separable Set Functions: Characterizations and Neural Models.** Soutrik Sarangi, Yonatan Sverdlov, Nadav Dym, Abir De. *NeurIPS*, 2025.
- **Short-Range Oversquashing.** Yaaqov Mishayev, Yonatan Sverdlov, Tal Amir, Nadav Dym. *LoG (Oral)*, 2025.
- **FSW-GNN: A Bi-Lipschitz WL-Equivalent Graph Neural Network.** Yonatan Sverdlov, Yair Davidson, Nadav Dym, Tal Amir. *LoG*, 2025.
- **On the Expressive Power of Sparse Geometric MPNNs.** Yonatan Sverdlov, Nadav Dym. *ICLR*, 2025.
- **Revisiting Multi-Permutation Equivariance through the Lens of Irreducible Representations.** Yonatan Sverdlov, Ido Springer, Nadav Dym. *ICLR*, 2025.

Research Experience

Technion – Israel Institute of Technology

Nov 2023 – 2026

PhD Researcher

Graph Neural Networks and Geometric Deep Learning

- Developed mathematical results on graph expressivity, equivariant architectures, symmetry-aware distances, stability, and generalization; translated theory into testable neural architectures.
- Designed and implemented experiments in PyTorch and PyTorch Geometric, including graph-learning, point-cloud, oversquashing, and neural-network weight-space benchmarks.
- Collaborated on research leading to publications at NeurIPS, ICLR, and LoG, connecting theoretical guarantees with empirical evaluations.

Weizmann Institute of Science

Mar 2021 – Jul 2023

MSc Researcher

Computer Vision and Continual Learning

- Developed adaptive weight modulation for rehearsal-free continual learning with zero forgetting of previously learned tasks.
- Implemented and evaluated deep-vision models on continual-learning benchmarks.

Evrideo

Aug 2023 – Oct 2023

AI Consultant

Applied Computer Vision

- Built a computer-vision proof of concept to assess the technical feasibility of an early-stage machine learning product.

Preprints and Manuscripts

- **Finite Probes Suffice: Identifiability and Universality for Weight-Space Learning.** Soutrik Sarangi, Yonatan Sverdlov, Adir Dayan, Haggai Maron, Nadav Dym. *arXiv preprint; under review*, 2026.
- **Toward Bi-Lipschitz Geometric Models.** Yonatan Sverdlov, Eitan Rosen, Nadav Dym. *arXiv preprint*, 2025.
- **Efficient Rehearsal Free Zero Forgetting Continual Learning using Adaptive Weight Modulation.** Yonatan Sverdlov, Shimon Ullman. *arXiv preprint*, 2023.

Honors and Awards

Best Paper Award, Learning on Graphs Conference (LoG)

2025

Technical Skills

Programming	Python, Java, C++
ML / Scientific	PyTorch, PyTorch Geometric, NumPy
Research	Graph neural networks, geometric deep learning, equivariant models, optimization and ML theory
Tools	Git, GitHub, LaTeX
Languages	Hebrew (native), English (professional proficiency)