

# Snir Hordan



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Snir Hordan

## Education

2022-Present

**Technion** - Israel Institute of Technology, Direct Ph.D. **Applied Mathematics**

- *Research:* My research focuses on the expressive power, universality, and the role of equivariance in machine learning models for graphs and 3D point clouds. I work on proving the theoretical limitations of current methods and constructing novel, provably more powerful architectures to overcome them.
- *Advisor:* Asst. Prof. Nadav Dym.
- *Awards:* Dept. of Applied Mathematics Excellence Scholarship, Research Excellence Award in memory of Prof. Lior Markin, and Gloria and Ken Levy Foundation Fellowship Recipient.
- *GPA:* 94/100.

2017-2021

**Technion** - Israel Institute of Technology, B.Sc. **Mathematics**

- *Awards:* Dean's Excellence Award.
- *GPA:* 89/100.
- *Relevant CS courses:* Intro to CS, Machine Learning, Deep Learning on Computational Accelerators, and Systems Programming in C++.

## Publications

2024-2025

- *Spectral Graph Neural Networks are Incomplete on Graphs with a Simple Spectrum.* [NeurIPS 2025 \(Spotlight\)](#).  
**Snir Hordan**, Maya Bechler-Speicher, Gur Lifshitz, Nadav Dym.
  - Initiated the core research idea, proved the main theorems, and independently designed and constructed a novel spectral GNN architecture using custom CUDA kernels.
  - Implemented models in PyTorch and trained on large-scale datasets for molecular property prediction with 0.5M molecules, hundreds of nodes, including the popular ZINC and MOLPCBA molecular property prediction benchmarks.
- *Weisfeiler Leman for Euclidean Equivariant Machine Learning.* [ICML 2024](#).  
**Snir Hordan**, Tal Amir, Nadav Dym.
  - Constructed the first universal and equivariant 3D point cloud network with polynomial complexity, solving a key open problem in the field.
  - Developed the practical GNN implementation (PyTorch/PyG) and achieved State-of-the-Art (SOTA) results on molecular conformation generation (GEOM-QM9, dataset of small organic molecules) on both COV and MAT metrics.
- *Complete Neural Networks for Complete Euclidean Graphs.* [AAAI 2024](#).  
**Snir Hordan**, Tal Amir, Steven J. Gortler, Nadav Dym.
  - Constructed a universal invariant 3D point cloud network with polynomial time complexity.
  - Managed the workflow of our group's GNN architecture in collaboration with Harvard University.

## Skills

- **Programming:** Python (Expert), C++, SQL.
- **ML/DL Frameworks:** PyTorch, PyTorch Geometric (Expert).
- **Scientific Computing:** NumPy, SciPy, Pandas, OpenBabel, Matplotlib, Seaborn, RDKit (Expert).
- **Tools & Technologies:** CUDA, HPC, Parallel Computing, Git.

## Teaching

2024-2025

Technion, Electrical and Computer Engineering Faculty, **Head Teaching Assistant**  
Co-wrote a new course, "Deep Learning and Groups", with Asst. Prof. Haggai Maron.