SHERVIN KHALAFI

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RESEARCH INTERESTS

My main research interest lies in the intersection of generative models and optimization theory. Currently, I am developing constrained optimization frameworks for training generative models (diffusion models in particular) under requirements. I am also exploring how constrained fine-tuning of diffusion models can be employed to improve diffusion model watermarking schemes.

EDUCATION

University of Pennsylvania Philadelphia, PA

- Doctor of Philosophy, **Electrical and Systems Engineering** 2023 - Present
  School of Engineering and Applied Sciences
  Advisor: Prof. Alejandro Ribeiro

Sharif University of Technology Tehran, Iran

- Bachelor of Science, **Electrical Engineering** 2018 - 2022
  GPA: 19.22/20.00, Highest Distinctions

PUBLICATIONS

Published Papers

[1] *Constrained Diffusion Models via Dual Training*
Shervin Khalafi, Dongsheng Ding, and Alejandro Ribeiro
International Conference on Neural Information Processing Systems (NeurIPS 2024)

[2] *Neural Tangent Kernels Motivate Graph Neural Networks with Cross-Covariance Graphs*
Shervin Khalafi, Saurabh Sihag, and Alejandro Ribeiro
International Conference on Machine Learning (ICML 2024)

HONORS AND AWARDS

- **Silver Medal**, *International Physics Olympiad (IPhO 2018, Lisbon)*, 2018
- **Gold Medal**, *National Physics Olympiad (Iran)*, 2017
- **The Dean's Fellowship**, ESE Department, *University of Pennsylvania*, 2023
- **Academic Achievement Award**, EE Department, *Sharif University of Technology*, 2022

TEACHING EXPERIENCES

University of Pennsylvania, Philadelphia, PA

- **Undergraduate Courses**: *Signals and Systems* (Spring 2024)
- **Graduate Courses**: *Graph Neural Networks* (Fall 2023, Fall 2024)

Sharif University of Technology, Tehran, Iran

- **Undergraduate Courses**: *Electrical Circuit Theory* (Fall 2020), *Signals and Systems* (Spring 2021), *Numerical Methods in Eng.* (Spring 2021)

INDUSTRY EXPERIENCES

- **Summer Intern** @ Hamrah e Aval R&D Group (MCI Lab), Tehran, Iran — Summer 2022
  Supervisor: Dr. Mohammad Fakharzadeh

TALKS AND PRESENTATIONS

- Poster presentation on "Neural Tangent Kernels Motivate Graph Neural Networks with Cross-Covariance Graphs". *NSF Annual Site Visit, The Institute for Learning-enabled Optimization at Scale (TILOS), June 2024*

SKILLS

Python (Pytorch, Huggingface), Matlab, C/C++

RELEVANT COURSEWORK

University of Pennsylvania: Random Matrix Theory, Probability Theory, Graph Neural Networks, Geometric Deep Learning, Deep Generative Models, Algorithms for Big Data, Convex Optimization

Sharif University of Technology: High Dimensional Probability, Theory of Machine Learning, Algorithms, Numerical Optimization, Computational Neuroscience, Graph Signal Processing