

RESEARCH INTERESTS

Statistical Learning Theory, High Dimensional Statistics, Non-Convex Optimization and Sampling.

EDUCATION

- University of Toronto** Toronto, ON
Ph.D. in Computer Science Sept. 2021 - Present
– Supervisor: Prof. Murat A. Erdogdu
- Sharif University of Technology** Tehran, Iran
B.Sc. in Computer Engineering Sept. 2017 - July 2021
– GPA: 19.76 / 20

RESEARCH EXPERIENCE

- École Polytechnique Fédérale de Lausanne** Lausanne, Switzerland
Visiting PhD Student Sept. 2023 - Nov. 2023
– Project: Kernel learning via mean-field Langevin dynamics (work in progress).
– Supervisor: Prof. Lénaïc Chizat
- Sharif University of Technology** Tehran, Iran
Undergraduate Research Assistant Feb. 2020 - July 2021
– Project: Studying the tradeoff between natural and adversarial accuracy in robust machine learning.
– Supervisor: Prof. Mohammad Hossein Rohban
- IST Austria** Vienna, Austria
Research Intern July 2020 - Dec. 2020
– Project: Using second-order information for neural network weight quantization.
– Supervisor: Prof. Dan Alistarh
- École Polytechnique Fédérale de Lausanne** Lausanne, Switzerland
Summer Research Intern July 2019 - Sept. 2019
– Project: Designing an RNN-based system for efficient approximation of real-world simulation behavior.
– Supervisor: Prof. Christoph Koch

HONORS AND AWARDS

- Department of Computer Science 50th Anniversary Graduate Scholarship, University of Toronto 2023-2024
- C.C. Gotlieb (Kelly) Graduate Fellowship in the Department of Computer Science, University of Toronto 2021-2023
- Vector Institute Research Grant 2021-2026
- Ranked 5th among 130 Computer Engineering entrants of 2017 at Sharif University of Technology 2021
- International Physics Olympiad Silver Medalist 2017
- National Physics Olympiad Gold Medalist 2016

PUBLICATIONS

1. **Alireza Mousavi-Hosseini**, Denny Wu, Taiji Suzuki, Murat A. Erdogdu. “Gradient-Based Feature Learning under Structured Data.” **NeurIPS**, *Advances in Neural Information Processing Systems*, 2023.
2. **Alireza Mousavi-Hosseini***, Tyler Farghly*, Ye He, Krishnakumar Balasubramanian, Murat A. Erdogdu. “Towards a Complete Analysis of Langevin Monte Carlo: Beyond Poincaré Inequality.” **COLT**, *Proceedings of the Thirty Sixth Conference on Learning Theory*, 2023.
3. **Alireza Mousavi-Hosseini**, Sejun Park, Manuela Girotti, Ioannis Mitliagkas, and Murat A. Erdogdu. “Neural Networks Efficiently Learn Low-Dimensional Representations with SGD.” **ICLR**, *Proceedings of the Eleventh International Conference on Learning Representations*, 2023. (**Spotlight**)
4. **Alireza Mousavi Hosseini***, Amir Mohammad Abouei*, and Mohammad Hossein Rohban. “The interplay between distribution parameters and the accuracy-robustness tradeoff in classification.” **ICML Workshop on Adversarial Machine Learning**, 2021.

*Equal contribution.

PREPRINTS

1. Ye He, **Alireza Mousavi-Hosseini**, Krishnakumar Balasubramanian, Murat A. Erdogdu. “A Separation in Heavy-Tailed Sampling: Gaussian vs. Stable Oracles for Proximal Samplers.” 2024.

INVITED TALKS

- *Gradient-Based Feature Learning under Structured Data.*
Foundations of Learning and AI Research (FLAIR) Seminar, EPFL, October 2023.
- *Gradient-Based Feature Learning of Neural Networks.*
Institute of Applied Mathematics, UBC, June 2023.
- *Neural Networks Efficiently Learn Low-Dimensional Representations with SGD.*
Mila - Quebec AI Institute, October 2022.

SERVICE

- **Reviewer for Journals:**
 - Transactions on Machine Learning (TMLR)
- **Reviewer for Conferences:**
 - Neural Information Processing Systems (NeurIPS), International Conference on Machine Learning (ICML), International Conference on Learning Representations (ICLR), Conference on Learning Theory (COLT), International Conference on Artificial Intelligence and Statistics (AISTATS)

TEACHING EXPERIENCE

University of Toronto

Toronto, ON

Teaching Assistant

- STA 414/2104: Statistical Methods for Machine Learning II 2023
- CSC 311: Introduction to Machine Learning 2022-2023
- CSC 412/2506: Probabilistic Learning and Reasoning 2022-2024
- CSC 110: Foundations of Computer Science I 2021

Sharif University of Technology

Tehran, Iran

Teaching Assistant

- Machine Learning (Graduate Course) 2020
- Probability and Statistics 2018-2019
- Data Structures and Algorithms 2019
- Artificial Intelligence 2019
- Computer Networks 2020

Allameh Helli High School

Tehran, Iran

Physics Olympiad Mentor

Nov. 2016 - Jan. 2018