Mohammad Moshtaghifar

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Education

University of British Columbia — Vancouver, Canada
M.Sc. In Computer Science — 2025 - Ongoing
Supervisors: Porf. **Mark Schmidt** and Prof. **Christos Thrampoulidis**

Sharif University of Technology — Tehran, Iran
B.Sc. In Computer Engineering, GPA: 19.53/20 (top 5%) — 2020 - 2025

Research Interests

Machine Learning
Machine Learning Theory
Optimization
Distributed Optimization
Federated Learning
Implicit Bias

Publications

[1] **Mohammad Moshtaghi**, Anton Rodomanov, Daniil Vankov, Sebastian U. Stich, "DADA: Dual Averaging with Distance Adaptation." *Proceeding of NeurIPS Workshop in Optimization for Machine Learning.* 2024. [arXiv] [openreview] [poster]

Research Experiences

Implicit Bias of Modern Optimizers — Oct 2025 - Ongoing
University of British Columbia - **Prof. Christos Thrampoulidis**

- We study the implicit regularization of modern optimizers used in large-scale training (e.g., Muon and Shampoo), with the goal of characterizing the max-margin solutions they select and developing a unified geometry-based framework.

Adaptive SGD Methods[1] — Feb 2024 - Jul 2025
CISPA Helmholtz Center for Information Security (remote) - **Prof. Sebastian U. Stich**

- We present a novel parameter-free universal gradient method for solving convex optimization problems. Our algorithm–Dual Averaging with Distance Adaptation (DADA)–adapts dynamically to problem structures using gradient observations and distances between iterates.
- It works across a wide range of optimization problems, including Hölder-smooth functions, (L_0, L_1)-smooth functions, and quasi-self-concordant functions. This method is applicable to both constrained and unconstrained problems without prior knowledge of iterations or accuracy requirements.

Effects of Sparsity on Saliency Maps Consistency — Jul 2023 - Sep 2023
Chinese University of Hong Kong - **Prof. Farzan Farnia**

- We explored how sparsity influences the consistency of saliency maps, aiming to demonstrate that pixels with higher saliency map values are crucial to model predictions and are independent of the training dataset. Experiments were conducted using classification models like ResNet and VGGNet.

Honors And Awards

Silver Medal	International Mathematical Olympiad **(IMO)**	Russia, Saint Petersburg 2020
Gold Medal - First Prize	European Mathematical Cup (EMC)	2019
Gold Medal	National Mathematical Olympiad	Tehran, Iran 2019
Silver Medal	National Mathematical Olympiad	Tehran, Iran 2018

Work Experiences

Software Engineer May 2024 - Mar 2025
Smartech - Tehran, Iran

- Developed and maintained backend services using Java, Spring, Hibernate, and JPA, designing and integrating new APIs.
- Refactored legacy codebases to improve performance and maintainability, and worked with PostgreSQL and other DBMSs.
- Collaborated on distributed systems using Kafka, Redis, and Elasticsearch to ensure scalability and reliability.

Backend Developer Aug 2021 - Sep 2022
Freelance (Self-Employed) - Tehran, Iran

Teaching Experience

Math Olympiad Teacher March 2020 - Jun 2021

I taught Olympiad topics and problem-solving to prepare students for national and international Math Olympiad exams.

Voluntary Teaching Assistant

Work such as designing and correcting exercises and holding practice classes in the following courses:

- Convex Optimization:	Prof. Amir Najafi
- Convex Optimization:	Prof. Maryam Babazadeh
- Artificial Intelligence:	Prof. Mohammad Hossein Rohban
- Modern Information Retrieval:	Prof. Mahdieh Soleymani Baghshah
- Probability and Statistics:	Prof. Ali Sharifi-Zarchi
- Design of Algorithms:	Prof. Hamid Zarrabi

Courses

Machine Learning: 20/20	Convex Optimization: 20/20	Design of Algorithms: 20/20
Probability and Statistics: 20/20	Artificial Intelligence: 20/20	Numerical Analysis: 20/20
Linear Algebra: 20/20	Game Theory: 20/20	MIR: 20/20

Extra-Curricular Activities

Iranian Mathematical Olympiad Committee

Participating in the working groups for the design and grading the exams of the Iranian Mathematical Olympiad exams.

Rasta Summer School - Game Theory Workshop Jul 2022 - Sep 2022

We were responsible for designing and holding this workshop for high school students so that we could present some of the basic concepts of game theory in an attractive way for them. In this workshop, we covered three sections (Market Sharing, Braess's Paradox, and Development of Trust), and I was primarily active in the market section.

Winter Seminar Series 2022 (WSS) Feb 2022

Assisted in organizing the Winter Seminar Series at Sharif University of Technology, a four-day international event featuring invited talks on computer science and engineering. Managed logistics, coordinated speaker schedules, and facilitated discussions.