Parsa Rangriz

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INTERESTS Probability Theory, High Dimensional Statistics, Random Matrices, Spin Glasses

EDUCATION

University of Waterloo, ON, Canada Sep 2023 - Dec 2024 (Expected)
Master of Mathematics in Statistics (Thesis-Based)
(Supervisor: **Aukosh Jagannath**)

Sharif University of Technology, Tehran, Iran Sep 2018 - Feb 2023
Bachelor of Science in Physics
Minor in Mathematics

RESEARCH EXPERIENCES

University of Waterloo, Ontario, Waterloo
Graduate Research Assistant Sep 2023 - Current
Supervisor: **Aukosh Jagannath**

- As my thesis project, I am working on the high-dimensional limit theorems for SGD that lead to ballistic (ODE) or diffusive (SDE) limits using non-convex losses such as the multi-index model.
- An individual reading course on Random Matrix Theory and High Dimensional Probability was completed, covering topics such as concentration concepts, the semicircle law, and the Marchenko-Pastur law.

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EPFL, Lausanne, Switzerland
Summer Research Intern July 2022 - Sep 2022
Supervisor: **Lenka Zdeborova**
Project: Assortative Partitions on Directed Dense Graphs

- Assortative partitions on directed dense random graphs was studied using replica-symmetric solutions in order to expand on the heuristic results of assortative partitions on regular graph from the earlier published work .

Sharif University of Technology, Tehran, Iran
Undergraduate Research Student June 2021 - Sep 2021
Supervisor: **Amir Daneshgar**
Project: Belief Propagation for Graph Partitioning

- The BP algorithm was studied for the graph bi-partitioning problem, which corresponds to finding the ground state of the ferromagnetic Ising model with a fixed magnetization. Additionally, phase diagrams of the bi-partitioning problem on random graphs were determined.

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Sharif University of Technology, Tehran, Iran
Undergraduate Research Student Feb 2021 - June 2021
Supervisor: **Abolhassan Vaezi**
Project: Phase Transitions in the Transverse-Field Ising Model

- The phase diagrams of the correlation function and the entanglement entropy of the one-dimensional transverse-field Ising model were determined and different phases were classified using machine learning and neural network techniques.

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Honors and Awards

Graduate Research Studentship, University of Waterloo, 2023-2024
Received a scholarship of 18,000 CAD for the entire 16-month program.

International Master's Award of Excellence, University of Waterloo, 2023
Received an award of 12,500 CAD for one year.

Master of Mathematics Entrance Scholarship, University of Waterloo, 2023
Selected as one of top eight new graduate students to receive a 1,000 CAD award.

Summer@EPFL Fellowship, 2022
Ranked top 1.5% among 4,000 applicants and awarded a 4,800 CHF fellowship.

Silver Medal in the 30th Iran National Physics Olympiad, 2018
Received a silver medal, ranking 14th out of 42 medalists, among nearly 10,000 high school student competitors.

Summer Schools

CRM-PIMS Summer School in Probability 2024
CRM, Universite de Montreal, QC, Canada, 2024

- The four-week summer school featured two main courses: Random Matrix Theory of High-Dimensional Optimization, given by Elliot Paquette, and Branching Random Walks, given by Perla Sousi.

Teaching Experiences

University of Waterloo, Ontario, Canada
Teaching Assistant

- STAT 433: Stochastic Processes 2 (Fall 2024)
- STAT 330: Mathematical Statistics (Spring 2024, Fall 2023)
- STAT 231: Probability (Spring 2024)
- STAT 333: Stochastic Processes 1 (Winter 2024)
- STAT 230: Statistics (Spring 2024)
- STAT 202: Introductory Statistics for Scientists (Fall 2023)

Sharif University of Technology, Tehran, Iran
Teaching Assistant

- Advanced Statistical Mechanics (Fall 2022, Fall 2021, Spring 2021)
- Statistical Mechanics 2 (Spring 2021)
- Statistical Mechanics 1 (Fall 2020)

Selected Courses

University of Waterloo, Ontario, Canada (2023-2024)

- STAT 946: Topics in Statistics (Mathematical Foundations of Deep Learning)
- STAT 902: Theory of Probability 2 (Stochastic Calculus and Brownian Motion)
- STAT 891: Topics in Probability (Random Matrix Theory and HDP)
- STAT 908: Statistical Inference
- STAT 901: Theory of Probability 1 (Probability and Measure Theory)

Sharif University of Technology, Tehran, Iran (2018-2023)

- Advanced Theory of Statistics
- Information-Theoretic Methods in High Dimensional Statistics
- Graphical Models, Variational Inferences, and Entropy Maximization
- Quantum Computation and Quantum Information
- Advanced Quantum Mechanics