## Parsa Rangriz


CONTACT prangriz@uwaterloo.ca www.rangriz.com +1 (548) 577 6360


INTERESTS

- Probability Theory
- Stochastic Analysis
- High-Dimensional Probability
- Random Matrices
- Statistical Physics
- Spin Glasses

EDUCATION

**University of Waterloo**, Ontario, Canada — Sep 2023 - Apr 2025 (Expected)
Master of Mathematics in Statistics (Thesis-Based) — GPA: 91.33/100
(Supervisor: **Prof. Aukosh Jagannath**)

**Sharif University of Technology**, Tehran, Iran — Sep 2018 - Feb 2023
Bachelor of Science in Physics — GPA: 18.34/20
Minor in Mathematics
(Supervisor: **Prof. Amir Daneshgar**)

RESEARCH EXPERIENCES

**University of Waterloo**, Ontario, Canada
Graduate Research Student — Sep 2023 - Current
Supervisor: **Prof. Aukosh Jagannath**
Master's Thesis: Scaling Limits of the Teacher Student Network via SGD

- My thesis focuses on the functional central limit theorem for multi-index models, specifically the teacher-student network via the online Stochastic Gradient Descent algorithm. Based on the martingale problem with random initialization, I study the stochastic dynamics (diffusion process) of the corresponding summary statistics near fixed points, revealing the Ornstein-Uhlenbeck process.

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

- Assortative partitions on directed dense random graphs was studied using the replica-symmetric approach to analyze phase transitions, and to interpret partitions in the high-dimensional limit which involved a message-passing algorithm known as belief propagation.

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

- The belief propagatiom 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.

**Sharif University of Technology**, Tehran, Iran
Undergraduate Research Student — Feb 2021 - June 2021
Supervisor: **Prof. 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 studied and different thermodynamical phases were identified using machine learning classification and neural networks.

## Honors and Awards

**Graduate Research Studentship (GRS), UWaterloo, 2023-2024**
Received a scholarship of 22,973 CAD for the entire 20-month master's program.

**International Master's Award of Excellence (IMAE), UWaterloo, 2023-2024**
Received an award of 16,500 CAD for the entire 20-month master's program.

**Master of Mathematics Entrance Scholarship, UWaterloo, 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 14/42 medalists, among nearly 10,000 high school student competitors.

## Summer Schools

**CRM-PIMS Summer School in Probability 2024** July 2024
Centre de Recherches Mathematiques, Universite de Montreal, QC, Canada

- 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 (Math Foundations of Deep Learning)
- STAT 902: Theory of Probability 2 (Stochastic Calculus)
- STAT 891: Topics in Probability (Random Matrix Theory and HDP)
- STAT 908: Statistical Inference
- STAT 901: Theory of Probability 1 (Probability 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
- Advanced Statistical Physics
- Machine Learning in Physics