




Parsa Rangriz

CONTACT	 prangriz@uwaterloo.ca	 www.rangriz.com	 +1 (548) 577 6360
INTERESTS	<ul style="list-style-type: none">• Probability Theory• Stochastic Analysis• High-Dimensional Probability• Random Matrices• Statistical Physics• Spin Glasses		
EDUCATION	<p>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)</p> <p>Sharif University of Technology, Tehran, Iran Sep 2018 - Feb 2023 Bachelor of Science in Physics GPA: 18.34/20 Minor in Mathematics</p>		
RESEARCH EXPERIENCES	<p>University of Waterloo, Ontario, Canada Sep 2023 - Current Graduate Research Student Supervisor: Prof. Aukosh Jagannath Master's Thesis: Scaling Limits of the Teacher Student Network via SGD</p> <ul style="list-style-type: none">• My ongoing thesis focuses on the functional central limit theorem of online stochastic gradient descent (SGD) for multi-index models, specifically the teacher-student network. Using the martingale problem approach, with random initialization, I proved that the dynamics of online SGD for the teacher-student network become diffusive near the fixed point, exhibiting the Ornstein-Uhlenbeck (OU) process. The remaining question is that, depending on the initialization, the OU process could either be mean-reverting or mean-repellent. <p>EPFL, Lausanne, Switzerland July 2022 - Sep 2022 Summer Research Intern Supervisor: Prof. Lenka Zdeborova Project: Assortative Partitions on Directed Dense Graphs</p> <ul style="list-style-type: none">• Assortative partitions on directed dense random graphs were 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. <p>Sharif University of Technology, Tehran, Iran June 2021 - Sep 2021 Undergraduate Research Student Supervisor: Prof. Amir Daneshgar Project: Belief Propagation for Graph Partitioning</p> <ul style="list-style-type: none">• The belief propagation algorithm was studied for the graph bi-partitioning problem, where I rebuilt a message-passing algorithm - known as belief propagation (BP) - and studied the heuristic high-dimensional solution for the partitioning problem via BP based on previous developments. <p>Sharif University of Technology, Tehran, Iran Feb 2021 - June 2021 Undergraduate Research Student Supervisor: Prof. Abolhassan Vaezi Project: Phase Transitions in the Transverse-Field Ising Model</p> <ul style="list-style-type: none">• 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 Awarded a silver medal (top 0.01%) among 10,000 high school student competitors.
SUMMER SCHOOLS	CRM-PIMS Summer School in Probability 2024 Centre de Recherches Mathematiques, Universite de Montreal, QC, Canada
TEACHING EXPERIENCES	University of Waterloo, Ontario, Canada Teaching Assistant <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • 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) <ul style="list-style-type: none"> • 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) <ul style="list-style-type: none"> • 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
SKILLS	Programming Skills and Tools <ul style="list-style-type: none"> • Experienced in C and Python • Familiar with Scikit-learn, Keras, and TensorFlow libraries. • Experienced in Wolfram Mathematica and \LaTeX.