Parsa Rangriz

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Education

- **Sharif University of Technology, Tehran, Iran** GPA: 18.55/20
  B.Sc. in Physics - Minor B.Sc. in Mathematics *Sep 2018 - Dec 2022*

  Selected Courses: *Quantum Information, Quantum Computation, Open Quantum Systems, Machine Learning in Physics, Statistical Mechanics III, Quantum Mechanics III, Electromagnetism III, Complex Systems, Entropy Maximization and Variational Optimization, Advanced Statistics, Information Theoretic Methods in High-Dimensional Probability*

Research Interests

Probability Theory, Statistical Physics, Spin Glasses, Graphical Models, Random Graphs and Matrices

Research Experiences

- **EPFL** Lausanne, Switzerland
  Summer Research Intern, SPOC Laboratory - ***Prof. Lenka Zdeborová*** *July 2022 - Sep 2022*
  - **Assortative Partitions of Fully Connected Graphs**: The replica symmetric solution for the dense assortative partitions was studied. The project aims to understand the phase transitions and compares the partition of the fully connected in the limit of thermodynamics with the metastable states in diluted Hopfield networks.
- **Sharif University of Technology** Tehran, Iran
  Undergraduate Research Assistant - ***Prof. Amir Daneshgar*** *Oct 2021 - June 2022*
  - **Properties of a New Random Regular Graph Generator**: In this project, the properties of a new random regular graph generator called the pi-lift method was studied. The goal of the project was to obtain the combinatorial properties of the generated graph by using the message-passing algorithms. In other words, we computed the partition function of the Ising model associated with the min-cut of the graph to show the differences between this method and other traditional methods of generating random graphs.
- **The University of Manchester** Manchester, England
  Remote Research Intern, Noisy Quantum Systems Group - ***Dr. Ahsan Nazir*** *Jul 2021 - Mar 2022*
  - **Non-Conjugate Quantum Subsystems**: working on the thermodynamics of the non-conjugate quantum subsystems, an alternative way to decompose quantum systems into interacting parts. Using the second law of thermodynamics as a guide, we were able to confirm the law in the introduced representation with the coarse-grained entropy.

TA Experiences

- **Statistical Mechanics III:** Prof. Shahin Rouhani (‘22), Prof. Vahid Karimipour (‘21), Prof. Ali Rezakhani (‘21)
- **Statistical Mechanics II:** Prof. Vahid Karimipour (‘21)
- **Statistical Mechanics I:** Prof. Vahid Karimipour (‘20)
- **General Physics III:** Prof. Omid Akhavan (‘19)
- **Fundamentals of C Programming:** Dr. Marjan Nikbin (‘18)

Honors and Awards

- Awarded the **Summer@EPFL 2022 Fellowship** (Summer 2022)
- Ranked 5th in the **26th Iran Universities Physics Olympiad**, Sanjesh Organization, Iran. (Summer 2021)
- Silver Medal in the **30th Iran National Physics Olympiad**, Young Scholars’ Club, Iran. (Summer 2017)
- Awarded Scholarship from **Iran’s National Elites Foundation**. (2018 - Current)

Computer Skills

- **Languages**: C, C++, Python, Wolfram Mathematica, LaTeX
- **Data Tools**: Keras, Sci-Kit Learn

Attended Schools

- **ETH Zurich** — Zurich, Switzerland
  Quantum Thermodynamics Summer School 2021 - Certificate — *Aug 2021*
- **University of Sao Paulo** — Sao Paulo, Brazil
  Mini-Course in Quantum Thermodynamics 2020 - Certificate — *Dec 2020*

Course Projects

- **Variational Inference in LDPC Codes** — Report PDF
  Course : Information Theoretic Methods in High-Dimensional Probability — *Fall 2021*
- **Belief Propagation for Graph Partitioning** — Report PDF
  Course : Entropy Maximization and Variational Optimization — *Spring 2021*
- **Phase Transition of the Transverse-Field Ising Model** — Report PDF
  Course : Machine Learning in Physics — *Spring 2021*
- **An Introduction to Quantum Thermodynamics**
  Course : Quantum Mechanics III — *Fall 2020*

Academic References

- **Prof. Lenka Zdeborová**
  Statistical Physics of Computation Laboratory, Department of Physics, EPFL, Switzerland
- **Prof. Amir Daneshgar**
  Department of Mathematical Sciences, Sharif University of Technology, Iran
- **Dr. Ahsan Nazir**
  Theoretical Physics Group, Department of Physics & Astronomy, The University of Manchester, England