Saleh Shamloo Ahmadi

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Education

Sharif University of Technology, Tehran, Iran — Fall 2019 – Present (Expected February 2024)
Bachelor of Physics
GPA: 18.75/20.00 (Ranked 5th out of 55 in class)
GRE Subject Physics: 980/990 (96th Percentile)

Research Interests

Simulation of Materials, Computational Soft Matter Physics, Collective Behavior, Condensed Matter Physics, Biophysics, Computational Physics.

Research Experience

Monte Carlo Simulation of Polygonal Colloids in Various Geometries — Summer 2022 – Present
Supervisor: Prof. Mohammad Reza Ejtehadi — *Sharif University of Technology*

- Developed a new Julia package to allow for arbitrary geometries (HOOMD-blue, which is the package used for this kind of simulation, has limited ability for adding constraints).
- Introduced novel optimizations, including a new overlap detection method and parallelization of constraint enforcement.
- Utilizing CUDA GPU acceleration in a Monte Carlo parallelization scheme.

Exfoliation of Layered Materials into Nanosheets — Summer 2022 – Fall 2022
Supervisor: Dr. Naimeh Naseri — *Sharif University of Technology*

- Gathered testing data on the yield of Molybdenum disulfide nanosheets after sonication in several solvents (e.g. NMP) for the evaluation of a machine learning model.
- Created the samples using bath sonication with various parameters (power and time), then collected the solution after centrifugation at different speeds.
- Analyzed samples with UV-Vis tests.

Lab Assistant in the Health and Energy Lab — Winter 2022 – Fall 2022
Supervisors: Dr. Naimeh Naseri, Mr. Nikan Afsahi — *Sharif University of Technology*

- Helped with micro-supercapacitor projects.

Achievements

Ranked 8th in the Iranian Universities Physics Olympiad — Summer 2022

Ranked in the top 0.2% (284th out of 150666) in the national university entrance exam for physics and mathematics and 1st (out of 139131) for foreign languages. — Summer 2019

Awarded the bronze medal in the Iranian Physics Olympiad — Summer 2018

Projects

Ising Model, Argon MD, Percolation | GitHub repository — Fall 2021

- Supervisor: Prof. Mohammad Reza Ejtehadi. Computer Simulations in Physics course assigment projects (with 20.0/20.0 final grade).
- Other notable simulation include various deposition models, diffusion-limited aggregation and different random walks.

Simulating Electrodynamic Systems using the FDTD Method | GitHub repository — Spring 2021

- Supervisor: Prof. Mahmud Bahmanabadi. Electromagnetism II course project
- Implemented a numerical solver for the Maxwell equations using the FDTD method and simulated a few simple systems, like a parabolic mirror reflecting waves from a on a material with a different index of refraction.

Nonlinear Market Model Study Reproduction GitHub Repository — Spring 2023

- Supervisor: Dr. Saman Moghimi Araghi. Nonlinear Dynamics and Chaos course project. Joint work with Erfan Rahbari.
- Reproduced the result of this paper which discusses nonlinear asset-price dynamics and stabilization policies.

Astronomical Image Processing | GitHub repository Summer 2023
- Supervisor: Dr. Reza Rezaei. Astronomy Lab course assignment projects.
- Performed 9 amature astronomy experiments in teams of 3, involving observations and intensive image processing.

Measurement of Short Particle Lifetimes | Documents Spring 2022
- Supervisor: Dr. Amin Faraji Astaneh. Particle Physics course project. Joint work with Hossein Hatamnia.
- Used CERN tutorial data to demonstrate one of the methods (standard deviation in the uncertainty principal).

Sound Amplifier Circuit Design | Documents Fall 2020
- Supervisor: Dr. Seyed-Nader Seyed-Reihani. Electronics I course project
- Built a simple sound amplifier circuit, including controls for gain, volume, and bass.

Trajectory of Supersonic Projectile with Variable Air Resistance | GitHub repository Fall 2020
- Supervisor: Prof. Sohrab Rahvar. Analytical Mechanics I course project.
- Extracted the variable air resistance coefficient from a figure in the reference textbook (Marion) and used RK4 integration to solve equations numerically.

Simulating Wheel-Pendulum System with Lagrangian Mechanics | GitHub repository Winter 2021
- Supervisor: Prof. Sohrab Rahvar. Analytical Mechanics II course project.
- Derived the set of nonlinear differential equations describing the motion of the system, which exhibited chaotic behavior, and solved them using stiff numerical methods to minimize numerical stability.

Notable Courses

Advanced Programming | Course project GitHub | Assignments GitHub Spring 2021
Dr. Mohammad Amin Fazli *Grade: 20.0/20.0*

Data Science and HPC | Webpage | Assignments GitHub repository Spring 2022
Dr. Hamidreza Arian *Grade: 20.0/20.0*

Quantum Computation and Information I (Graduate) | Webpage Spring 2023
Prof. Vahid Karimipour *Grade: 17.6/20.0*

Teaching Experience

Teaching Assistant, Computer Simulations in Physics Spring 2023
Prof. Mohammad Reza Ejtehadi *Sharif University of Technology*

Teaching Assistant, Introductory Programming (in C) Spring 2021
Dr. Reza Fakouri *Sharif University of Technology*

Technical Skills

Programming Languages	Julia, Python, C/C++, Java, Octave/MATLAB, Mathematica
Tools & Frameworks	CUDA, Machine Learning, LaTeX, git, Parallel Computation, Blender, Inkscape, Microsoft/Libre Office
Machine Learning	scikit-learn, TensorFlow, Flux.jl, Keras

Language

English Fluent (C1∼C2 CEFR Level)
TOEFL Score: 111/120 (Reading: 30/30, Listening: 29/30, Speaking: 22/30, Writing: 30/30)

Persian Native

Community & Leadership

Head of Translation | Webpage August 2021 – September 2022
Zharfa Scientific Community *Sharif University of Technology*
- Translated parts of The Feynman Lectures on Physics (license for free electronic publication secured from The eFLP Group)

Member of the Lambda Study Circle | Webpage February 2020 – Present
Quanta Study Circles *Sharif University of Technology*