# Amirhossein Rezaei

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## EDUCATION

**Shahid Beheshti University**                                                     Tehran, Iran
*B.Sc. in Physics;* **GPA: 3.54/4.00**                          *Sep 2019 – Jun 2023 (Expected)*

**Shahid Madani High School, NODET**                                               Tabriz, Iran
*National Organization for Development of Exceptional Talents*          *Sep 2013 – Jun 2017*

## RESEARCH EXPERIENCE

### Research Papers

- Abbaslu, S., S. Rostam Zadeh, A. Rezaei, and S. S. Gousheh. 2021. "Effects of Nonhelical Component of Hypermagnetic Field on the Evolution of the Matter-Antimatter Asymmetry, Vorticity, and Hypermagnetic Field." Physical Review D 104 (5).
- M. Zarrin and A. Rezaei. "A Deep Learning Framework for Collapse Prediction of Structures Using 1D-CNN for Earthquake Time Series Classification with Bayesian hyperparameter optimization". (*Under review in Engineering Structures. For the full text, please contact me.*)

### Pre-Prints

- Rezaei, A. and Mokhtari, P., A new method for predicting the behavior of the COVID-19 epidemic in Italy.
- Rezaei, A. A review on Gödel's incompleteness theorem, its simple proof, and its connection to quantum gravity.

### Teaching Assistant

- Physics I, Assistant to Dr. Sadeghi

## RELEVANT COURSES AND GRADES

| | |
|---|---|
| Introduction to Artificial Intelligence | $17.5/20$ |
| Quantum information and computations | $16.8/20$ |
| Complex Systems | $19/20$ |
| Biophysics | $20/20$ |
| Foundations of Numerical Simulations | $20/20$ |
| Physics Project | $20/20$ |
| Nuclear and Elementary Particle Physics | $17.51/20$ |

*You can also find the full transcript of my academic record here.*

## SKILLS

**Programming:** Python, C, C++, MATLAB, Mathematica, Maple
**Tools and Technologies:** TensorFlow, Keras, PyTorch, Scikit, SciPy, Pandas, MNE, Matplotlib, NumPy, GitHub
**Languages:** Persian (Native), English, Azerbaijani, Turkish

## OUTREACH

### Physics Student Association of Shahid Beheshti University

- Elected Member, Main Council of Physics Student Association, Shahid Beheshti University (2022-2023)
- Volunteered and campaigned for the position, receiving support from students through votes.
- Coordinated events and activities for students interested in physics and related fields.
- Organized weekly seminars and workshops featuring guest speakers from academia and industry.
- Collaborated with other student organizations to promote science education and outreach in the community.

## PROJECTS

**A Numerical Recipes Project** | *GitHub*
- A Numerical Recipes Project: Solving a Stiff System of ODEs using Rosen- Brock Method in C++.

**Cerebrum Atlas** | *GitHub*
- This package can generate a 3D representation of the brain and plot MNI or TAL coordinates onto it, while also returning the corresponding area names.

**Complex-Systems** | *GitHub*
- A repository of Complex Systems ideas and codes.

**Comprehensive Database of Pollen Grains** | *Medium*
- This project leverages the vast amount of data available on the PalDat website to create a valuable resource for deep learning.

**Optimizing the Ising model in Python** | *Medium*
- This project involves simulating a 2D ISING model using various techniques such as utilizing the fast Numba JIT Compiler, implementing parallel processing with Numba's prange, performing branch-less computation, utilizing a lookup table for the exponential function, and optimizing further with a custom random number generator.

**Ideas Under Development**
- A highly accurate semi-automatic deep learning procedure based on confidence score to reduce the overburden pressure of medical staff for screening COVID-19 from CT scan images (on hold).
- Classification of Intracranial Field Potentials in Human Visual Cortex via Convolutional Deep Neural Network