

# Sepideh Abdollahi Hashjin

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Webpage

## Education

2012–2018 **Diploma**, *Tehran Farzanegan 1 High School* .  
2018–present **BSc. Physics**, Sharif University of Technology - SUT.

## Honors

2017 **Silver Medal**, in *National Olympiad Astronomy and Astrophysics*.  
since 2017 **Members of Iran's National Elites Foundation**.

## Research Interests

### Academic Research Interests.

- Quantum Information Theory and Quantum Communication
- Complex Systems
- Neuronal Dynamics
- Nonlinear Dynamics and Chaos
- Computational Physics
- Stochastic processes
- Spreading Phenomena
- Agent Based Modeling

## Academic Research Experience

February 2020–Now Undergraduate Research Assistant Under supervision of Dr. Fakhteh Ghanbarnejad

- *How observation reflects reality of SIR dynamics.*  
*On collaboration with Dr. Farnoush Farahpour*

January 2022–Now Undergraduate Research Assistant Under supervision of Prof. Vahid Karimipour

- *Capacity of covariant and symmetric pauli channels*

July 2021–Now Undergraduate Research Assistant Under supervision of Dr. Saman Moghimi Araghi

- *The effect of longer links' existence in the 2d-grid for abelian sandpile*

## Related Courses

### Courses Related to my Research Interests.

- Quantum computation (PhD) - Prof. Vahid Karimipour
- Information Theory (MSc) - Prof. Mohammad R. Aref
- Quantum mechanics I and II - Dr. Abolhassan Vaezi
- Quantum mechanics III (MSc) - Dr. Amin Faraji Astaneh
- Neuroscience (MSc)-Dr. Saman Moghimi Araghi
- Complex systems (MSc) -Dr. Saman Moghimi Araghi
- Nonlinear Dynamics and Chaos (MSc)-Dr. Fakhteh Ghanbarnejad
- Computational physics (MSc) -Dr. Fakhteh Ghanbarnejad
- Statistical Modeling (MSc) -Dr. Fakhteh Ghanbarnejad
- Game theory (MSc) -Dr. Mohammad Hossein Rahmati
- Stochastic processes - Dr. Mostafa Esfahani Zadeh

## Projects

### Winter-Spring 2020 **Modeling Infectious Diseases.**

- SIR, SEIR and SIRD models and phase transitions
- Simulation of epidemics on networks (SIR, SEIR, SIS dynamics)
- Simulation of epidemics in metapopulations
- Agent Based Modeling
- How observation reflects reality of SIR, SEIR, SIRD dynamics

under supervision of Dr. Fakhteh Ghanbarnejad

### Fall-Winter 2020-21 **Computational physics.**

- Simulation of cellular automata
- Monte Carlo simulation
- Fractal growth simulation
- Random walk simulation (human mobility)
- Ising model and phase transitions simulation
- Molecular dynamics simulation

under supervision of Dr. Fakhteh Ghanbarnejad

### Fall-Spring 2020-21 **Quantum Mechanics.**

- Discrete element method simulation for different potentials

under supervision of Dr. Abolhassan Vaezi

- February **Complex systems.**  
2021–Now
  - Analysing stock data (price return, ...)
  - BTW abelian sandpile simulation
  - Manna abelian sandpile simulation
  - Percolation simulation on networks (grids, complex networks, ...)
  - Lorenz system simulationunder supervision of Dr .Saman Moghimi Araghi

## Academic Teaching Assistant Experience

Statistical Modeling (MSc) -Dr.Fakhteh Ghanbarnejad

Game theory(MSc) -Dr.Mohammad Hossein Rahmati

Stochastic Processes in Bioinformatics(MSc) -Dr.Mohammad Hossein Rohban

## Computer Skills

Programming Languages Python (Advanced), Matlab (Advanced), Mathematica

Libraries Python: SciPy (Advanced), NetworkX (Advanced), Pandas (Advanced)  
Matplotlib (Advanced), Seaborn (Advanced)

## Languages

Persian Native

English Advanced

## Work Experience

2017–Present **Olympiad Instructor.**

I'm teaching Astronomy and Astrophysics to students.

Topics I have taught so far:

- Classical Mechanics, Astrophysics, Cosmology, Spherical Astronomy, Data analysis

Places I've worked so far:

- Salam High school, Farzanega1, Farzanegan2, Summer school of Astronomy and Astrophysics  
National Olympiad (also observational astronomy test writer)