

Mohaddeseh Mozaffari

Education

- Sep 2022 – Mar 2025 **M.Sc. in Statistical Physics and Complex Systems**, *Shahid Beheshti University*, Tehran, Iran
GPA: 18.5/20 (~4.00/4.00 WES, **Second Rank**)
- Sep 2018 – May 2022 **B.Sc. in Physics**, *Shahid Beheshti University*, Tehran, Iran
GPA: 17.3/20 (~3.63/4.00 WES, **First Rank**)

Research Interests

- **Biophysics**
- **Computational Neuroscience**
- **Brain Network Analysis**
- **Machine Learning and Deep Learning**

Research Experience

- Jul 2025 – Present **Coevolutionary and Structural Balance Network Analysis and Classification of ADHD**, *Center for Complex Networks (CCNet)*, Tehran, Iran, *Advisor: Prof. Reza Jafari*
- Applied structural and coevolutionary balance theory to brain networks.
 - Engineered balance-theoretic features for group differentiation.
 - Trained ML models to classify ADHD vs. control groups.
 - Contributed to manuscript drafting and review.
- Jan 2024 – Present **Master's Thesis – Analysis of Topological Features of Brain Networks in Autism Spectrum Disorder Using Persistent Homology**, *Shahid Beheshti University*, Tehran, Iran, *Advisor: Prof. Reza Jafari*
- Applied topological data analysis (TDA) and persistent homology on fMRI data.
 - Developed a node-removal-based approach to detect topological differences.
 - Investigated age-related variations in brain network topology.
 - Developed private Python package *NeuroPHorm* for TDA automation.

Publications

- Journal Articles Mohammadi, M.S., Shahrokhi, S., **Mozaffari, M.**, et al. (2022). Nonlinear optical response of IMIP ionic liquid-stabilized magnetic graphene oxide sheets. *Journal of Materials Science: Materials in Electronics*, 33, 13224–13233. DOI:10.1007/s10854-022-08262-1.
- Conference Papers Yousefzadeh, M., Shirzadeh Barough, S., Fakharifar, A., **Mozaffari, M.**, et al. (2025). Automated Noninvasive FFR Estimation from Biplane Coronary Angiography Using a Transformer-Based Deep Learning Framework. *The Second National Meeting on Artificial Intelligence in Medical Imaging* (Oral Presentation), Rajaee Heart Institute, Tehran, Iran.
- Manuscripts in Preparation **Mozaffari, M.**, Roshandel, S., Jafari, G.R. Persistent Homology Reveals Topological Alterations in Resting-State Brain Networks of Autism Spectrum Disorder.
- Yousefzadeh, M., Shirzadeh Barough, S., Fakharifar, A., Tayyarazad, Y., Eghbali, N., **Mozaffari, M.**, et al. Coronary Artery Segmentation and Vessel-Type Classification in X-Ray Angiography: Machine-Learning Generalized Image Processing and Deep Neural Networks.

Invited Talks

- Apr 2025 **Statistical Physics and Complex Systems** – Yasouj University, Iran. Introduced undergraduate physics students to complex systems in an invited Persian talk ([Recording available](#)).

Teaching & Mentorship Experience

- Jun 2023 – Present **Python Instructor (Freelance / Online Platforms)**, *Ostadbank & Picha Club*, Tehran, Iran
- Teach Python, data analysis, and ML to diverse learners.
 - Guide students through projects using NumPy, pandas, PyTorch.
 - Conduct lessons on algorithms, OOP, and GUI/game programming.
- Jan 2022 – Jul 2025 **Teaching Assistant**, *Department of Physics, Shahid Beheshti University*, Tehran, Iran
- Assisted under supervision of:
 - Prof. Reza Jafari – Complex Systems Physics; Complex Networks and Graph Theory.
 - Prof. S. Ali Hosseiny – Stochastic Processes; Numerical Simulations.
 - Prof. Marzieh Farhang – Analytical Mechanics.

Skills

- Programming
- **Python** – Data analysis, fMRI preprocessing, and machine learning (NumPy, pandas, scikit-learn, PyTorch)
 - **C++** – Simulation and algorithmic modeling in physics and complex systems
 - **Bash / Linux** – Environment setup, scripting, and automation
 - **Git** – Version control and collaborative research workflows
- Software and Tools
- **Gephi** – Brain network visualization and community analysis
 - **LaTeX** – Scientific writing and academic publishing
 - **Adobe Illustrator & Photoshop** – Figure design and research illustration
 - **Microsoft Office Suite** – Documentation, reporting, and presentation
- Languages
- **English** – Fluent (academic and professional)
 - **Persian** – Native

Certifications

- Aug 2025 Deep Learning (Python) for Neuroscience EEG Practical Course – Udemy ([Certificate](#))
- Sep 2023 Machine Learning Specialization – Coursera / Stanford Online ([Certificate](#))
- Aug 2022 Neural Networks and Deep Learning – DeepLearning.AI / Coursera ([Certificate](#))

Workshops & Conferences

- Nov 2024 fMRI Image Processing With CONN Toolbox – Shahid Beheshti University, Tehran, Iran
- Dec 2023 School of Evolutionary Dynamics of Cells and Viruses – IPM, Tehran, Iran
- Jul 2023 28th Special School on Topics in Physics – IASBS, Zanjan, Iran

References

Dr. Reza Jafari

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Dr. S. Ali Hosseiny Esfidvajani

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Dr. Marzieh Farhang

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