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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.

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

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.

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).

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, Department of Physics and Institute for Cognitive Science and Brain, Shahid Beheshti University, Tehran, Iran.

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Dr. S. Ali Hosseiny Esfidvajani Faculty of Physics, Shahid Beheshti University, Tehran, Iran.

alihd22@gmail.com Homepage

Dr. Marzieh Farhang Faculty of Physics, Shahid Beheshti University, Tehran, Iran.

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