
CONTACT INFORMATION

Department of Biomedical Engineering, Amirkabir University of Technology (Tehran Polytechnic), Tehran, Iran

Center for Mathematical and Computational Biology (Supervisor: [Dr. Sajad Jafari](#))

[Google Scholar](#) | [Linkedin](#) | [ResearchGate](#)

RESEARCH INTERESTS

- ❖ Nonlinear Dynamics
- ❖ Synchronization
- ❖ Complex Networks
- ❖ Deep Learning & Machine Learning
- ❖ Computer Vision
- ❖ Virtual Reality & Augmented Reality

EDUCATION

2017 – 2021	<p>B.Sc. in Biomedical Engineering – Bioelectric Amirkabir University of Technology (Tehran Polytechnic), Tehran, Iran</p> <p>GPA: 18.05/20 (3.81/4) - Ranked 4 among 45 students Thesis Topic: “<i>Real-Time Simulation of Soft Tissue Deformation, Tissue Cutting, and Brain Tumor Suction for Minimally Invasive Surgery Simulation based on Virtual Reality</i>” Supervisors: Dr. Hamed Azarnoush & Ms. Reyhaneh Daneshmand, Department of Biomedical Engineering, Amirkabir University of Technology</p>
2021 – now	<p>M.Sc. in Biomedical Engineering – Bioelectric Amirkabir University of Technology (Tehran Polytechnic), Tehran, Iran</p> <p>GPA: 19.61/20 (4/4) - Ranked 1 among 30 students Thesis Topic: “<i>Mathematical Analysis of Synchronization Incidence Possibility in the Networks Consisting of Neuronal Maps</i>” Supervisors: Dr. Sajad Jafari & Ms. Mahtab Mehrabbeik, Department of Biomedical Engineering, Amirkabir University of Technology</p>

HONORS & AWARDS

2021	Accepted as a talented student to the Master Program in Biomedical Engineering at University of Tehran, without any entrance exam
2021	Accepted as a talented student to the Master Program in Biomedical Engineering at Amirkabir University of Technology, without any entrance exam
2017	Top Rank of University Entrance Exam Ranked 210 among 148000 in National Mathematics Entrance Exam for B.Sc. Ranked 453 among 6400 in National English Entrance Exam for B.Sc.

PUBLICATIONS

2022	“Equivalent Synchronization Patterns in Chaotic Jerk Systems” Simin Mirzaei, Fatemeh Parastesh, Sajad Jafari, Eckehard Schöll and Jürgen Kurths Europhysics Letters Published on 20 July 2022.
2022	“Synchronization of a Higher-Order Network of Rulkov Maps” Simin Mirzaei, Mahtab Mehrabbeik, Karthikeyan Rajagopal, Sajad Jafari, Guanrong Chen Chaos: An Interdisciplinary Journal of Nonlinear Science Published on 16 December 2022.
2022	“Synchronization in Repulsively Coupled Oscillators” Simin Mirzaei, Md Sayeed Anwar, Fatemeh Parastesh, Sajad Jafari, Dibakar Ghosh Physical Review E Published on 2 December 2022.
2022	“The Simplest Multilayer Network of Rulkov Neuron Maps: A Dynamical Analysis Under Different Neuronal Interactions” Gayathri Vivekanandhan, Simin Mirzaei, Mahtab Mehrabbeik, Karthikeyan Rajagopal, Sajad Jafari Europhysics Letters Accepted on 2 December 2022.
2022	“Statistical Analysis of Master Stability Function's Characteristics on a Group of Chaotic Dynamical Systems” Simin Mirzaei, Fahimeh Nazarimehr, Sajad Jafari In Preparation.
2022	“Synchronization Analysis in the Network Consisting of Braun Neuron Models by Applying External Current Stimuli” Simin Mirzaei, Fahimeh Nazarimehr, Sajad Jafari In Preparation.

WORK EXPERIENCES

2021-now	Research Assistant in Center for Mathematical and Computational Biology Department of Biomedical Engineering, Amirkabir University of Technology
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SELECTED ACADEMIC PROJECTS

- ❖ **Video and Image Processing**
 - Instructor: Dr. Hamed Azarnoush
 - *“Developing a Real-Time Motion Detector based on the Computer Camera, Using Fourier Transform and Phase Correlation Algorithms”*
 - *“Restoration and Reconstruction, Feature based Registration, Split and Merge Segmentation, Seeded Region Growing Image Segmentation, Spatial Filtering and Other Image Processing”*
- ❖ **Magnetic Resonance Imaging**
 - Instructor: Dr. Abbas Nasiraei Moghaddam
 - *“Simulation of Blood Flow Artifacts based on K-Space Analysis and FFT Method”*
- ❖ **Digital Signal Processing**
 - Instructor: Dr. Farshad Almasganj
 - *“Audio Signal Processing and Denoising based on Fast Fourier Transform and Wavelet Analysis”*
- ❖ **EEG Signal Processing**
 - Instructor: Dr. Golnaz Baghdadi
 - *“EEG Signal Feature Extraction for Clustering the Patients with Different Brain Disorders”*
 - *“EEG Signal Denoising for Localization of Active Brain Sources Using ICA Algorithm”*

❖ **Deep Learning and Machine Learning**

- Instructor: Dr. S. Ali Seyyedsalehi
- *“Deep Learning for COVID-19 Detection Based on Chest CT Images and DenseNet 169 Architecture”*
- *“Training Two Classifiers based on Gaussian Naive Bayes and Logistic Regression Algorithms”*
- *“Implementing the Logic of Sudoku Solving by Using Genetic Algorithm”*

❖ **Neural Networks**

- Instructor: Dr. S. Ali Seyyedsalehi
- *“Speaker and Speech Recognition by Training a Two- and Three-Layer Neural Networks based on Forward and Backward Propagation Algorithms and Analyzing the Attractors”*
- *“Implementing Tic-tac-toe Game with Alpha-Beta pruning Algorithm”*

❖ **Artificial Intelligence**

- Instructor: Dr. S. Ali Seyyedsalehi
- *“Simulating a Tournament for the Pentago Game with the Ability to Write Custom Functions by Each Player based on Graph Search Algorithms”*

❖ **Virtual Reality and Haptics**

- Instructor: Dr. Hamed Azarnoush & Ms. Reyhaneh Daneshmand
- *“Real-Time Simulation of Soft Tissue Deformation, Tissue Cutting, and Brain Tumor Suction based on FEM and MSD Models and Using Haptic Device for Developing a Real Simulation of Minimally Invasive Surgery”*

❖ **Electrophysiology**

- Instructor: Dr. Mehrdad Saviz
- *“Modeling of Ion Channels with Nonlinear Behavior based on Ion Concentrations, to Investigate the Changes of Cell Voltage in Different Solutions”*

❖ **Systems Methodology & Engineering Cybernetics**

- Instructor: Dr. S. MohammadReza Hashemi Golpayegani
- *“Map-based Modelling of Coronavirus Death Rates to Predict the Next Variants of Covid”*

COMPUTER SKILLS

Programming	C++, C#, Python, MATLAB, Verilog
Simulators	Unity Framework, Maya, Simulink, EEGLAB, LTspice/ORCAD, Altium Designer, Proteus
Applications	Microsoft Office (Word, PowerPoint, Excel), LaTeX

LANGUAGE SKILLS

English	Fluent
Persian	Native

HOBBIES

- ❖ **Reading Books;** History, Science, Psychology, Poetry
- ❖ **Sports;** Fitness, TRX, Boxing, Running