**Mehdi Borjkhani**

**Computational Neuroscientist**  
**Email:** mborjkhani@ichf.edu.pl | borjkhani@gmail.com  
**Phone:** +48 577 065 980  
**Location:** Warsaw, Poland

**Languages:** Azerbaijani, Turkish, English, Persian, Polish  
**GitHub:** [borjkhani](https://github.com/borjkhani)  
**Google Scholar:** [Google Scholar Profile](https://scholar.google.com/citations?user=QQbQnuMAAAAJ&hl=en)

**Professional Summary**

A computational neuroscientist with extensive experience in biophysical modeling, mathematical analysis, and neural networks. Currently researching at the International Center for Translational Eye Research (ICTER) with a focus on retina modeling and cortical column studies. Expertise in combining computational techniques with biological data to understand neural mechanisms underlying sensory processing and synaptic plasticity. Proficient in Python, C++, MATLAB, and various neuroscience simulation tools, with a passion for bridging computational models with experimental data.

**Education**

* **M.Sc. Biomedical Engineering** – Tehran Polytechnic, Iran (2009)
* **B.Sc. Electronic and Electrical Engineering** – Urmia University, Iran (2005)

**Work Experience**

**Researcher**  
*International Center for Translational Eye Research (ICTER), Polish Academy of Sciences – Warsaw, Poland (2021–Present)*

* Developing biophysical models of the retina, focusing on direction selectivity and the role of inhibitory neurons.
* Leading projects involving realistic cortical column modeling in the primary visual cortex, using the NEURON simulator, BMTK, Matlab, and Python.
* Collaborating on data analysis with experimentalists to explore orientation selectivity and task-dependent neural mechanisms.

**Research Associate**  
*Nanyang Technological University – Singapore (2019–2020)*

* Conducted experiments with rodents and developed computational models of addiction, analyzing how drugs of abuse impact synaptic plasticity.
* Designed experiments and signal acquisition systems for biomedical research.

**Research Assistant**  
*University of Tehran – Iran (2012–2018)*

* Developed computational models of opioid-induced synaptic plasticity and its impact on memory formation.
* Analyzed fMRI and EEG data for neuroimaging projects related to addiction and schizophrenia.

**Lecturer**  
*Urmia University of Technology – Iran (2010–2011)*

* Taught graduate and undergraduate courses in biomedical signal processing, system identification, and control systems.

**Research Interests**

* **Computational Neuroscience:** Neural networks, biophysical modeling, synaptic plasticity, visual processing.
* **Mathematical Modeling:** Dynamical systems, chaos theory, signal processing, and machine learning.
* **Neurophysiological Data Analysis:** EEG, fMRI, fNIRS, handwriting kinematics.

**Technical Skills**

* **Programming Languages:** Python, C++, MATLAB
* **Neuroscience Tools:** NEURON, pySONATA, Brain Modeling Toolkit (BMTK), Visual Neuronal Dynamics (VND), Xppaut, Matcont
* **Signal Processing Software:** EEGLAB, FSL, ICALAB, Kubios
* **Hardware/Design:** CW-NIRS systems, HRV analyzers, robot arm, and autonomous vehicle design
* **Other Tools:** Git, Arduino

**Publications**

(*Selected peer-reviewed articles*)

1. **Investigating the role of inhibitory interneurons in shaping orientation selectivity in the primary visual cortex** – *M. Borjkhani, B. Bałamut, A. Posłuszny, A.T. Foik* (Submitted to PLoS One, 2024).
2. **Amplified hybrid surface plasmon polaritons in partially reduced graphene oxide supported on gold** – *S. Mohajer, M.A. Sharif, A. H. Aghdam, M. Borjkhani, M.H.N. Assadi* (Applied Surface Science, 2023).
3. **Computational modeling of opioid-induced synaptic plasticity in hippocampus** – *M. Borjkhani, F. Bahrami, M. Janahmadi* (PloS One, 2018).
4. **Formation of opioid-induced memory and its prevention: A computational study** – *M. Borjkhani, F. Bahrami, M. Janahmadi* (Frontiers in Computational Neuroscience, 2018).
5. **Chaotic fractional‐order model for muscular blood vessel and its control via fractional control scheme** – *MP. Aghababa, M. Borjkhani* (Complexity, 2014).

*For a full list of publications, please visit* [*Google Scholar*](https://scholar.google.com/citations?user=QQbQnuMAAAAJ&hl=en)*.*

**Conference Presentations**

(*Selected*)

* **A biophysical computational model of a cortical column in the primary visual cortex** – *M. Borjkhani, A. T. Foik* (5th Neurons in Action Conference, Warsaw, 2023).
* **Investigating the role of PV-related lateral connections in shaping orientation tuning curves** – *M. Borjkhani, A. T. Foik* (Annual IPC PAS Micro-symposium, Warsaw, 2022).

**Design and Implementations**

* Developed a **24-channel NIRS system** for light propagation studies (2020).
* Implemented **HRV analyzers** for stress assessment (2018).
* Designed robotic arms and systems for competitive robotics (2014).

**Teaching Experience**

* **Graduate Courses:** Biomedical Signal Processing, Dynamical Systems in Neuroscience, System Identification, Digital Signal Processing, Intelligent Control Systems, Pattern Recognition, Artificial Neural Networks.
* **Undergraduate Courses:** Electrical Circuits, Process Control, Physics, Advanced Engineering Mathematics.

**References**

* **Prof. Morteza A. Sharif** – Assistant Professor, Urmia University of Technology, Iran
* **Prof. Mahyar Janahmadi** – Professor, Neuroscience Research Center, Shahid Beheshti University of Medical Sciences, Iran
* **Prof Fariba Bahrami** – Professor, Computational Neuroscience Laboratory, School of Electrical and Computer Engineering, College of Engineering, University of Tehran, Tehran, Iran
* **Prof Mehdi Eskandarzade** – Professor, Mechanical Engineering Department, Mohaghegh Ardabili University, Ardabil, Iran
* **Dr. Hadi Borjkhani** – Research Assistant, Hochschule für Technik und Wirtschaft Berlin, Germany  
  *(Full contact details available on request.)*