Amirreza Bahramani

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Education

Master of Science | ***Electrical Engineering / Micro and Nanoelectronics Devices*** Sep. 2022 – Present
Sharif University of Technology Tehran, Iran

- Thesis: Vocal Perception in Zebra Finches: Analysis of Measured Neural Responses to Variety of Auditory Stimuli Using Neural Probe
- Supervisors: Dr. Ali Ghazizadeh and Dr. Mehdi Fardmanesh

Bachelor of Science | ***Electrical Engineering*** Sep. 2017 – Feb. 2022
K. N. Toosi University of Technology, GPA: 15.54/20 Tehran, Iran

- Thesis: Design and Implementation of a Fully-Digital Neuromorphic Processor
- Supervisor: Dr. Amir M. Sodagar

Research Experience

Researcher Sep. 2022 – Present
Bird's Lab, Institute for Research in Fundamental Sciences (IPM) Tehran, Iran

- Neuroscience; Trying to investigate the neural mechanism of vocal perception in zebra finches through electrophysiology and behavioral experiments.
- Electrophysiology; Performing surgery on zebra finches in order to record single-unit activity.
- Data Analysis; Using different neural data (especially spiking data and LFP) analysis techniques on LFP and spiking data obtained from zebra finches.

Research Assistant Feb. 2022 – Sep. 2022
Bird's Lab, Institute for Research in Fundamental Sciences (IPM) Tehran, Iran

- Setting up the electrophysiology recording system for single-unit recording in zebra finches.
- Implementing costume software for online spike detection and processing using MATLAB.

Internship Jul. 2021 – Feb. 2022
Research Laboratory for Integrated Circuits and Systems (ICAS), K. N. Toosi University of Technology Tehran, Iran

- Utilizing Spiking Neural Networks in Python for English handwritten digit recognition.

Areas of Interest

- Systems Neuroscience
- Computational Neuroscience
- Neurobiology of Vocal Perception
- Neurobiology of Decision-Making
- Spiking Neural Networks
- Neuroethology of Birdsong

Teaching Experience

Neuroscience Teacher *Amir High School*
Teaching basic neuroscience to students. Oct. 2023 – Present

Teaching Assistant *K. N. Toosi University of Technology*
Electronics 2 by Dr. Hesam Zandi Sep. 2021 – Jan. 2022

Teaching Assistant *K. N. Toosi University of Technology*
Digital Systems 1 by Dr. Hesam Zandi Feb. 2021 – Jul. 2021

Teaching Assistant *K. N. Toosi University of Technology*
Electronics 1 by Dr. Hesam Zandi Sep. 2020 – Feb. 2021

Teaching Assistant *K. N. Toosi University of Technology*
Electric Circuits 1 by Dr. Ali A. Razi-Kazemi Feb. 2020 – Jul. 2020

Selected Projects

Neural Data Analysis from Auditory Areas | ***MATLAB*** Summer 2023
Birds' Lab, IPM GitHub Link

- Here are some codes for analysis of recorded LFP and spiking data from zebra finches' auditory areas.

Stimulus Presentation Effect on Neural Variability | ***MATLAB*** Spring 2023
Advanced Topics in Neuroscience Course, Sharif University GitHub Link

- As the final project of this course, I investigated the effect of stimulus presentation on neural variability in different datasets.

Visual Modeling and Sparse Representation | ***MATLAB*** Jul. 2023
Advanced Topics in Neuroscience Course, Sharif University

- Building basis functions like V1 from different datasets.

Learning to Predict Where Human Look | ***MATLAB*** Jun. 2023
Advanced Topics in Neuroscience Course, Sharif University

- Comparison of different saliency maps, produced by previously established algorithms.

Modeling Evidence Accumulation | ***MATLAB*** Jun. 2023
Advanced Topics in Neuroscience Course, Sharif University

- Basic models of evidence accumulation and decision-making have been implemented.

LFP Analysis and Traveling Wave | ***MATLAB*** May 2022
Advanced Topics in Neuroscience Course, Sharif University GitHub Link

- Investigation of the properties of LFP signals and the traveling waves within them.

Analysis of Area 7a Population Response | ***MATLAB*** Apr. 2022
Advanced Topics in Neuroscience Course, Sharif University GitHub Link

- Analyzing single-unit and population response of area 7a neurons in a motor task.

Modeling the Irregularity of Neuronal Activity | ***MATLAB*** Feb. 2022
Advanced Topics in Neuroscience Course, Sharif University GitHub Link

- Analyzing simulated spike trains and their statistics.

Skills

Languages: English, Farsi (Native)
Wet Lab Skills: Electrophysiology, Avian Neurosurgery
Programming: MATLAB, Python, R, C++
Software Packages: Scikit-learn, TensorFlow, PyTorch, EEGLAB, Brainstorm, Brian2
Simulators: PSpise, HSpice, Proteus
Hardware Discription Languages (HDL): VHDL, Verilog
Document Creation: Microsoft Office Suite, LaTeX

Honors and Awards

Iranian Undergraduate National Entrance Exam in Math and Physics (Konkour) Summer 2017
Among 1% top students in total of 150k participants.

Iranian Graduate National Entrance Exam in Electrical Engineering Summer 2022
Ranked 115 among 10k participants.

Selected Courses

Computational Neuroscience Summer School — *Neuromatch Academy*
Certification Link

Deep Learning Summer School — *Neuromatch Academy*
Certification Link

Computational and Systems Neuroscience School — *Sharif University and IPM*
by Many Instructors

Advanced Topics in Neuroscience — *Sharif University*
by Dr. Ali Ghazizadeh

Advanced Solid-State Devices — *Sharif University*
by Dr. Bizhan Rashidian

Neurobiology of Decision-Making — *IPM*
by Dr. Mehdi Sanayei

Neurophysiology and Neuroanatomy — *IPM*
by Dr. Mehdi Sanayei

Implantable Biomedical Systems — *K. N. Toosi University of Technology*
by Dr. Amir M. Sodagar — Course Description

Statistical Pattern Recognition — *K. N. Toosi University of Technology*
by Dr. Hamid Abrishami Moghaddam

Functional Brain Imaging Systems — *K. N. Toosi University of Technology*
by Dr. Ali Khadem

EEG Signal Recording and Signal Processing Workshop — *National Brain Mapping Laboratory*
by Dr. Ali Motie Nasrabadi

Principle of Experiment Design and Analysis — *Sharif University*
Dr. Jamal Amani Rad