Amirreza Bahramani

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Education

Master of Science | ***Electrical Engineering / Micro and Nanoelectronics Devices*** Sep. 2022 – Present
Sharif University of Technology, GPA: 15.36/20 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

Work Experience

Researcher Sep. 2022 – Present
Birds' 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 neural activity.
- **Data Analysis**; Using different techniques on spiking data and LFP, obtained from zebra finches.

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

- Setting up the electrophysiology recording system for single-unit and LFP recording in zebra finches.
- Mastering avian surgery needed for neural data acquisition.
- 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.

Research Interests

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

Teaching Experience

Neuroscience Teacher (Link to Materials) *Amir High School*
Teaching fundamentals of systems 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

Surgery Protocol for Electrophysiological Recording in Zebra Finches | ***Protocol*** Fall 2023
Birds' Lab, IPM Protocols Link

- Detailed protocol needed for the surgery of anesthetized zebra finches in order to record neural activity from them.

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.

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: Plexon Offline Sorter, 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

Best Poster Award at Sharif University, School of Electrical Engineering Dec. 2023
Selected as one of the four best posters based on my master's thesis. Download Here

Best Paper Award at Iranian Conference on Biomedical Engineering (ICBME 2023) Dec. 2023
For the "*Fabrication of a Low-Cost Multi-Electrode Neural Probe for Brain Signal Recording*" paper. Link to Paper

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

Best Internship Award at K. N. Toosi University of Technology Dec. 2021
My internship was at ICAS lab, on neuromorphic computing which led to my bachelor's thesis.

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

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

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