Amirhossein Daraie | CV

AmirKabir University – Department of Electrical and Biomedical Engineering
Donders Centre for Cognitive Neuroimaging

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Amirhdre • Amirdre

RESEARCH INTERESTS

- Quantitative Magnetic Resonance Imaging
- Magnetic Resonance Neuroimaging
- Digital Signal Processing and Machine Learning
- Neuroscience

EDUCATION

- **Bachelor of Science** 2018–2022
  Amirkabir University of Technology *Tehran-Iran*
  - Biomedical Engineering
    - GPA: 4/4
    - Score: 18.41 via 116 units
  - Electrical Engineering
    - GPA: 4/4
    - Score: 18.66 via 64 units

HONORS and AWARDS

- Summer Undergraduate Research Scholarship from Donders Institute for Brain, Cognition, and Behaviour, Centre for Cognitive Neuroimaging, July 2021
- Ranked 3rd based on GPA out of all 110 bachelor students of Biomedical Engineering Department at Amir Kabir University of Technology entered at 2018
- Granted admission from Talented Student Office of Amirkabir University of Technology for studying electrical engineering as second degree
- Iran's National Elites Foundation (INEF) Fellowship [2016-2021]: Recognized as scientific elite
- 1st Place in international robotics competition, RoboCup 2019, Sydney, Australia
- 1st Place in international robotics competition, RoboCup 2017, Nagoya, Japan
- 2nd Place in international robotics competition, RoboCup 2016, Leipzig, Germany
- Best Electronics Circuit Design Award in international robotics competition, RoboCup 2015, Hefeie China
- 1st Place in SuperTeam Challenge in international robotics competition, RoboCup 2015, Hefei, China
- 1st Place in the main competition at national robotics competition, RoboCup IranOpen 2017, Tehran, Iran
- 2nd Place in the main competition at national robotics competition, RoboCup IranOpen 2016, Tehran, Iran
- 4th Place SharifCup Line Follower Robots, Sharif University of Technology 2015

PUBLICATION

- Jafarzadeh Esfahani M, Ferrer TC, **Daraie AH**, ..., Fernández G, Dresler M. Sleep awareness and lucid dreams: a combined pre-sleep meditation and sensory cueing protocol. 2022. (In preparation)
- Jafarzadeh Esfahani M, ..., **Daraie AH**, ..., Dresler, M. Citizen Neuroscience: Neuroscience researcher perspectives on do-it-yourself sleep research. *European Journal of Neuroscience*. 2021-2. (In preparation)
- Jafarzadeh Esfahani M, ..., **Daraie AH**, Dresler M. Two-way communication with the dreamers: exploring lucidity applications and consciousness in REM sleep. 2022. (In preparation)

WORK and EXPERIENCE

- *Research Intern* July 2021 - Present
  Under the supervision of Dr. Martin Dresler. Developed a software for home-based sleep recordings and sleep modulation with a focus on lucid dream induction, and sleep staging with single-channel EEG.
  - Technologies used:
    - Machine Learning (SVM, LightGBM)
    - Deep Learning (CNN, LSTM)
    - Single channel EEG measurement
    - Polysomnography
    - User Interface development with Qt framework in Python
- *Neuroscience Exchange Student* June 2018 - Oct. 2020
  Studied a 6 unit Neuroscience course at Tehran medical university and hospital. Topics including but not limited to:
  - Cognitive Functions and the Organization of the Cerebral Cortex
  - Emotion in the brain, Determination of Facial Expressions, The Limbic System, etc.
  - Attention across Sensory Modalities, Problems with the Concept of Attention as Executive Control
  - ...
  - Technologies used:
    - DTI, fMRI, TMS
    - Psychotherapy
    - Virtual and Augmented Reality
- *Team Leader and Programmer* June 2014 - Sep. 2019
  Developing the software and hardware for an autonomous robot. Title of my working experience including but not limited to:
  - Programming and implementing different navigation algorithms in robots
  - Implementing efficient methods to rescue various victims
  - Thought over 15 students, how to:
    - C, C++ programming
    - Designed PCB with ATMega microcontrollers
    - Designed and simulated rescue robots
    - Developed Embedded System
    - Led a team
  - ...
  - Technologies used:
    - Arm Cortex-M3 processor
    - OpenCV
    - Raspberry Pi
    - Altium Designer, LTSpice, SolidWorks, Codevision AVR

VOLUNTEER EXPERIENCE

- Neuroscience course coordinator and class representative
  - Special summer course on neuroscience.
  - I was a joint student from AmirKabir University to the Medical School.
- Active participation in Cornell Universities weekly Frontiers in Neuropsychiatry Seminars (FINS)
  - I am an active member in a weekly seminar series organized by faculties of Cornell University, where scientists present their latest research.

LICENSES and CERTIFICATIONS

- ÖSD Zertifikat Deutsch Österreich B1 (ZDÖ B1) Österreichisches Sprachdiplom Deutsch, Sep 2020
- CIW Web Development Professional certification.2016
- Cambridge English: Preliminary (PET). Cambridge University, April 2015
- Javascript, jQuery, and AJAX Certification.Tehran Institute of Technology (MFT), Dec 2014

LANGUAGE SKILLS

- Persian Native
- English Professional
- German Intermediate, B2.2

PROJECTS

- ZmaxCoDo EEG Analyzer
  - Developed a stand-alone software for an EEG wearable device with Python.
  - Real-time sensory stimulation.
  - Real-time spectrogram and periodogram analysis.
  - Online automatic sleep scoring with SVM, Random forest, Gradient boosting, CNN and LSTM.
  - Supervisor: Dr. Martin Dresler
- Powerful Again: A rehabilitation platform for patients with spinal cord injury
  - Body segmentation with RGB cameras, and infrared projectors and detectors.
  - Real-time gesture recognition and body skeletal detection.
  - Adaptive training for patients with different levels of spinal injuries.
  - Supervisor: Dr. Soroush Sadeghnejad, Dr. Mohammad Ali Ahmadi-pajouh
- Simulating a pulse-coupled neural network (PCNN) model of mammalian cortex with Izhikevich model
  - Simulated a networks of spiking neurons.
  - Stimulated network with different inputs.
  - Fourier analysis of spiking time series.
  - Simulated collective dynamics and rhythms similar to those of the mammalian cortex in the awake state.
  - Supervisor: Dr. Mehrdad Saviz
- Visualization of preparatory activity in the ALM and the CN
  - Visualized neural activity recorded in the paper: A cortico-cerebellar loop for motor planning. Nature 56.
  - Analyzed neural dynamics in lower dimensional feature space from correlational structure across 64 channels of data.
  - Visualized state-space trajectories via PCA.
  - Supervisor: Dr. Mehrdad Saviz

WORKSHOPS

- Brain Imaging Workshop (Structural and Functional) NBML - National Brain Mapping Laboratory
- FMRI BOOTCAMP, A two day workshop presented by Prof. Rebecca Saxe. MIT - Massachusetts Institute of Technology (Online)
- Artificial Intelligence Winter School. IPM - Institute For Research In Fundamental Sciences
- Preparing, Delivering and Evaluating Perfect Scientific Presentation. TUMS
- Resolving Conflict and Disputes in Academic Environment. TUMS
- Use of Animals and Humans in Biomedical Experimentation. TUMS
- Lab and Workplace Ethics and Scientific Record Keeping. TUMS
- Management of Conflict of Interest in University. TUMS
- Active Participation in a Debate Competition: What it means to be a truly educated person? TUMS
- Ownership of Data and Intellectual Property Rights. TUMS
- Collaboration and Team Work in Scientific Research.TUMS
- Scientific Mentorship - Basic, Norms and Policies. TUMS
- Poster Preparation, Presentation and Evaluation. TUMS
- Plagiarism and Scientific Misconduct, Basics, Techniques and Policies. TUMS
- Scientific Authorship. TUMS
- Systematic Book Reading for Smart Learning. TUMS
- Basic Styles of Academic Leadership. TUMS
- Best and Worst Styles of Academic Leadership. TUMS

COURSES

- Neural Networks: Theory and Applications [Spring 2021]
  - Multiple Instructor
- MIT 9.11: The Human Brain [Fall 2020]
  - Instructor: Prof. Nancy Kanwisher (Massachusetts Institute of Technology)
- Neuroscience [Fall 2019, Summer 2020]
  - Instructor: Prof. Mohsin Reza Heidari (Amir Kabir University)
- Virtual Reality [Summer 2019]
  - Instructor: Prof. Steven M. LaValle (University of Illinois at Urbana-Champaign)
- SYDE 522 Machine Intelligence [Winter 2018-9]
  - Instructor: Dr. Hamid R. Tizhoosh (University of Waterloo)

Online Courses

- Python Programming
- C++ Programming
- Linear Algebra with Python
- Digital Signal Processing with Python
- Statistics and Machine Learning
- Machine Learning: Python In Data Science
- Unreal Engine with C++
- Git and Github

COMPUTER SKILLS

Programming/Scripting

- Python
  - Tensorflow
  - Pytorch
  - Sklearn
  - Pandas
  - Numpy, Matplotlib
  - PyQt
- MySQL
- C/C++
- JavaScript
- HTML5/CSS3
- LaTeX

IDEs/Tools

- VSCode
- PyCharm
- CLion
- Sublime Text
- MATLAB
- Unity3D
- Unreal Engine 4
- Altium Designer 20

TEACHING EXPERIENCES

- Teaching Assistant
  - Machine Learning Summer 2020
    - Instructor: Farrokh Karimi (IPM Institute For Research In Fundamental Sciences)
  - Computer Vision Winter 2019-0
    - Instructor: Farrokh Karimi (Sharif University Of Technology)
  - Python Programming Language Summer 2019
    - Instructor: Mohsin Reza Heidari (Amir Kabir University)

References, and further information are available upon request