MELINA BAGHER

Tehran-Iran   Last Update: December 13, 2022

🌐 Personal Website   🔗 LinkedIn page   Ꞧᵉ Research Gate   ✉ Melina2bagher@gmail.com

📞 +98-912-029-8521   🎓 Google Scholar   🐙 github   ✉ melina.bagher@ee.sharif.edu

EDUCATION

🎓 **MASTER OF SCIENCE IN BIOMEDICAL ENGINEERING**   Sep. 2019 – Sep. 2022

Sharif University of Technology   *Tehran, Iran*

- **Thesis:** "Comparative Analysis of Haplotype Assembly Algorithms to Identify Optimal Methods"
- **Advisor:** Prof. Babak Hosseini Khalaj, Prof. Mehran Jahed
- **GPA: 19.19/20 ➜ 4/4 (Ranked)**

🎓 **BACHELOR OF SCIENCE IN BIOMEDICAL ENGINEERING**   Sep. 2014 – Sep. 2018

Islamic Azad University, Science and Research Branch   *Tehran, Iran*

- **Thesis:** "Extraction of Fractal Dimension of Malignant and Benign Skin Lesions in Dermoscopic Images"
- **Advisor:** Prof. S. Rashidi
- **GPA: 19.10/20 ➜ 4/4 (Ranked)**

🎓 **HIGH SCHOOL DIPLOMA IN PHYSICS AND MATHEMATICS**   Sep. 2009 – Jul. 2013

Sarfaraz High school   *Tehran, Iran*

- **GPA: 19.00/20 ➜ 4/4**

PUBLICATIONS

📖 CONFERENCE PAPERS

❍ **Bagher M.**, Karimzadeh R. , khalaj B.H., Jahed M; *QuickHap: a Quick heuristic algorithm for the single individual Haplotype reconstruction problem* ; 29th National and 7th International Iranian conference on Biomedical Engineering 2022 (ICBME) (In press).

❍ Karimzadeh R., **Bagher M.**,Khodabakhsh A., Arabi H., Zaidi H; *Generative Adversarial-based Framework for Classification using Imbalance Data: Application to Pneumonia Detection in Chest Radiographs*; IEEE NSS and Medical Imaging Conference 2022 (In press).

SELECTED ACADEMIC PROJECTS

✩ **A convolutional neural network for Single Individual Haplotype Reconstruction**

Using Pytorch, a single-layer convolutional neural network was designed to solve the haplotype assembly problem. In this project, a new cost function was defined to achieve high accuracy.

✎ *In line with my final project*

✫ **NGS (Next Generation Sequencing) data simulation and variant calling**
Using tools such as PBsim and NanoSim, the sequencing data were simulated in Fastq format and using tools like BWA-MEM, GATK, Samtools, and bvftools the pipeline of variant calling was implemented.
✎ *In line with my final project*

✫ **Registration of the 3D spinal cord CT images on the atlas**
Using Matlab, CPD (Coherent Point Drift) and ICP (Iterative Closest Point) algorithms were exploited to propose different methods for the registration of the spinal cord CT images. Results were evaluated based on HD (Hausdorff Distance), DS (Dice Score), and ASD (Average Surface Distance).
✎ *Medical Image Processing and Analysis Course Project*

✫ **Segmentation of tumors and different tissues of the brain in MRI images**
Using Matlab, several different clustering methods (such as FCM, K-Means, GMM), Chan-Vese, GVF (Gradient vector flow), and basic snake were implemented to register the brain MRI images.
✎ *Medical Image Processing and Analysis Course Project*

✫ **Preprocessing, artifact elimination, and skin lesion segmentation of dermoscopy images**
Using Matlab, noise, hair, and air bubbles of dermoscopy images were removed by exploiting different filters and morphological techniques, then skin lesions were segmented in several different methods.
✎ *In line with my BSc project*

✫ **Simulation and Comparison of SFP and MFP transducers to find the appropriate structure based on application.**
Using MatLab, two transducers SFP (Single-Focal Point) and MFP (Multi-Focal Point) were designed and simulated. Lateral Resolution and DOP (Depth of Field) were compared for different frequencies in these two structures.
✎ *Medical Ultrasound Course Project*

✫ **Simulation of acoustic wave propagation in different materials and reconstruction of simulated ultrasound images.**
Using the K-wave toolbox in Matlab, the environment, resource and sensor layout were simulated and the transmission and reflection coefficients were calculated at different angles to reconstruct ultrasound images.
✎ *Medical Ultrasound Course Project*

✫ **Simulation of main neural dynamics models**
Using Matlab, different 4D,2D, and 1D neural dynamic models were simulated, and the results in phase plot and time domain were evaluated.
✎ *System Biology Course Project*

✫ **Design and simulation of the analog circuit for recording EEG signals**
Design and simulation of a Using PSpice, a circuit for the EEG recorder device was designed and simulated.
✎ *Bioinstrument Course Project*

✫ **EEG signal analysis and preprocessing, noise and artifact elimination to prepare the signal for higher-level processing**
Using Matlab, Notch and bandpass filters, ICA and PCA were implemented and EOG artifacts were eliminated.
✎ *Bioinstrument Course Project*

WORKING EXPERIENCE

Medical Equipments unit of Parsian Hospital   Summer 2018

ENGINEERING INTERNSHIP
- Becoming familiar with Repair and maintenance of health monitoring equipments ...

Educational counsellor   2019 - 2021

Mahan Institude of Higher Education
- Consulting to Master and Ph.D Konkoor Candidates.

TEACHING EXPERIENCE

○ **TEACHING ASSISTANT** | Medical Images Analysis and Processing | Supervisor: Prof. Emad Fatemizadeh

  Department of Electrical Engineering, Sharif University of Technology   *Fall 2021*

○ **TEACHING ASSISTANT** | System Biology | Supervisor: Prof. Babak Hossein Khalaj

  Department of Electrical Engineering, Sharif University of Technology   *spring 2020*

○ **TEACHING ASSISTANT** | Electronics 2 | Supervisor: Prof. Keyvan Maghouli

  Department of Biomedical Engineering, Islamic Azad University, Science and Research Branch   *Fall 2019*

○ **TUTOR** | Engineering Mathematics, Differential Equations, Signals and Systems,

  Mahan Institude of Higher Education   *Summer 2019*

LANGUAGES

English *(Professional Working Proficiency)*
Persian/Farsi *(Native)*

TECHNICAL SKILLS

Programming Languages:	Python, R, C/C++, Bash
Python Selected Libraries:	Matplotlib, Numpy, Scipy
Software Simulators:	Matlab, Simulink
Hardware Simulator:	Pspice, Proteus
Typesetting:	TeX, Prezi, Microsoft Office(Word, Powerpoint, Excel)
Operating Systems:	Windows,Ubuntu
NGS Tools and Simulators:	GATK Toolkit, BWA, Samtools, BCFtools, PBSIM, NanoSim, ART

HONORS & AWARDS

- Ranked 39 among about 40,000 participants in M.Sc Electrical Engineering nationwide university entrance exam

- Member of National Elite Foundation

- Distinguished student in master's degree

- Distinguished student in B.Sc degree

RESEARCH INTERESTS

- Medical Image Processing
- Computational Genomics, NGS data analysis
- Medical Signal Processing
- Deep Learning

HOBBIES

SPORTS: Volleyball, Badminton, Ping-pong, Foosball, Karting

ART: Piano Player (Advanced), Guitar Player (Intermidiate)

REFERENCES

Asst. Prof. Saeed. Rashidi, *Department of Biomedical Engineering, Islamic Azad University, Science and Research Branch*
Email: rashidi@srbiau.ac.ir

Prof. Babak Hosseini Khalaj, *Department of Electrical Engineering, Sharif University of Technology*
Email: khalaj@sharif.edu

Asst. Prof. Mehran Jahed, *Department of Electrical Engineering, Sharif University of Technology*
Email: Jahed@sharif.edu

Asst. Prof. Emad Fatemizadeh, *Department of Electrical Engineering, Sharif University of Technology*
Email: fatemizadeh@sharif.edu