CURRICULUM VITAE

Mahnoosh Tajmirriahi
Isfahan University of Medical sciences
Hezar Jarib Street, Isfahan, Iran
mtriahi2000@amt.mui.ac.ir

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EDUCATION

2018 -2022	Isfahan University of Medical Sciences, Isfahan, Iran, **Ph.D.** **Major:** Biomedical Engineering (Bioelectric) **Supervisors:** Zahra Amini, Ph.D., Hossein Rabbani, Ph.D. **Dissertation:** Modeling of optical coherence tomography (OCT) images based on stochastic differential equations **GPA:** 19.88 /20, **Thesis grade:** 19.86 / 20, Ranked first

ACADEMIC EMPLOYMENT

September 2022-Present	**Assistant Professor, Head of Education Development Office (EDO)**, Department of Advanced Medical Technologies, Isfahan University of Medical Sciences, Isfahan, Iran
Fall 2018 – March 2021	**Graduate Teaching Assistant/Assistant Instructor**, Isfahan University of Medical Sciences
Fall, 2006 – Fall 2018	**Lecturer**, Isfahan University of Technology, Isfahan, Iran

AREAS OF INTERESTS

Signal & Image processing
- Medical signal & image processing
- Image enhancement methods
- Noise reduction methods
- Stochastic models for signal & image processing

Artificial Intelligence
- Machine learning
- Deep learning
- Generative models

Sparse representation
- Dictionary learning

X-lets

Data acquisition and management

Medical data Acquisition (Ocular data like Optical Coherence Tomography, Fundus, OCTA)

HONORS AND AWARDS

2022 **Ranked first among graduating students**
in PhD of Biomedical Engineering, Isfahan University of Medical Science, Isfahan, Iran

2018 **Ranked first in national PhD Entrance Exam**
in Biomedical Engineering, Iran

2017 **Ranked first among graduating students**
in M.Sc. of Electrical Engineering, Payame Noor University, Tehran, Iran,

2000 **Ranked 364th among 400,000 competitors**
in national universities attendance exam, Iran in B.Sc. of Electrical Engineering, Amirkabir University of Technology, Tehran, Iran.

PROFESSIONAL AFFILIATIONS AND SERVICES

Ad-hoc Reviewer

IEEE Transactions on Medical Imaging (IEEE TMI)
IEEE Transactions on Instrumentation and Measurement (IEEE TIM)
Scientific Reports
BMC Medical Informatics and Decision Making
BMC Ophthalmology
PLOS ONE
Journal of Medical Signals and Sensors (JMSS)

Committee Member

Secretary of the Boards of Directors at Avicenna Center of Excellence (ACE), Isfahan Province Elites Foundation
Member of Executive committee at 6th Event of the Isfahan Interdisciplinary Research Network of Healthcare on Neuroscience
Member of Executive committee at 18th Iranian Conference on Electrical Engineering (ICEE' 18) (2010)

PUBLICATIONS

INVITED BOOK CHAPTERS

Hajizadeh F., Kafieh R., **Tajmirriahi M.** (2023)
Introduction to Optical Coherence Tomography. In Atlas of Ocular Optical Coherence Tomography (pp. 1-34). Springer, Cham.

Amini Z., Kafieh R., **Tajmirriahi M.**, Parsons Z., Rabbani H. (2022)
Application of enface image registration/alignment to introduce new ocular imaging biomarkers. In Photo Acoustic and Optical Coherence Tomography Imaging, Volume 2: Fundus imaging for the retina (pp. 1-3). Bristol UK: IOP Publishing.

PEER-REVIEWED JOURNAL ARTICLES

Tajmirriahi M., Amini Z., Rabbani H. (2022)
Logarithmic Moments for Mixture of Symmetric Alpha Stable Modelling. *IEEE Signal Processing Letters.* **(ISI, Q1)**

Saeedizadeh N., **Tajmirriahi M.**, Haghani A., Amini Z., Pour EK., Riazi-Esfahani H., Fadakar K., Kafieh R., Rabbani H. (2022)
A Device-independent, Shape Preserving Retinal Optical Coherence Tomography Image Alignment Method Applying TV-Unet for RPE Layer Detection. *IEEE Transactions on Instrumentation and Measurement*. **(ISI, Q1 10%)**

Tajmirriahi M, Kafieh R., Amini Z., Lakshminarayanan V. (2022)
A Dual-Discriminator Fourier Acquisitive GAN for Generating Retinal Optical Coherence Tomography Images. *IEEE Transactions on Instrumentation and Measurement*. **(ISI, Q1 10%)**

Tajmirriahi M., Amini Z., Rabbani H., Kafieh R. (2022)
An Interpretable Convolutional Neural Network for P300 Detection: Analysis of Time Frequency Features for Limited Data", *IEEE Sensors, Meas.,* **(ISI, Q1 10%)**

Tajmirriahi M., Amini Z., Kafieh R., Rabbani H., Mirzazadeh A., Haghjooy Javanmard S. (2022)
Statistical Inference of COVID-19 Outbreak: Delay Distribution Effect in EQIR Modeling of Epidemic", *Journal of Medical Signals & Sensors*. **(ISI, Q2)**

Tajmirriahi M., Amini Z., Hamidi H., Zam A., Rabbani H. (2021)
Modeling of Retinal Optical Coherence Tomography Based on Stochastic Differential Equations: Application to Denoising. *IEEE Transactions on Medical Imaging* **(ISI, Q1 5%)**

Tajmirriahi M., Kafieh R., Amini Z., Rabbani H. (2021)

A Lightweight Mimic Convolutional Auto-encoder for Denoising Retinal Optical Coherence Tomography Images," *IEEE Transactions on Instrumentation and Measurements.* **(ISI, Q1 10%)**

Tajmirriahi M., Amini Z. (2021)
Modeling of seizure and seizure-free EEG signals based on stochastic differential equations". *Chaos, Solitons & Fractals*. **(ISI, Q1 10%)**

MANUSCRIPTS IN PREPARATION/SUBMITTED FOR REVIEW

Tajmirriahi M., Rabbani H.
Linear Multifractional Stable Motion for Modeling of Fluid-filled Regions in Retinal Optical Coherence Tomography Images. *IEEE Transactions on Medical Imaging.* (under review)

Tajmirriahi M., Rabbani H.
A Review of EEG-based Localization of Epileptic Seizure Foci: Keys for Multimodal Fusion of Brain Data. *Life*. (under review)

Tajmirriahi M., Amini Z., Rabbani H.
Local self-similar solution of ADMM for denoising of retinal OCT images, *IEEE Transactions on Instrumentation and Measurements.* (under review)

Tajmirriahi M., Rabbani H.
Markov random fields in Generative adversarial networks for synthesis of annotated OCT images. (in preparation)

CONFERENCE PRESENTATIONS

Tajmirriahi M., Rostamian R., Amini Z., Hamidi A., Zam A., Rabbani H. (July 2022)
Stochastic Differential Equations for Automatic Quality Control of Retinal Optical Coherence Tomography images. In 44th Annual International Conference of the IEEE Engineering in Medicine & Biology Society (EMBC) (pp. 3870-3873).

Tajmirriahi M., Rostamian R., Amini Z., Hamidi A., Zam A., Rabbani H (July 2022)
Mixture of Symmetric Stable Distributions for Macular Pathology Detection in Optical Coherence Tomography Scans. In 44th Annual International Conference

of the IEEE Engineering in Medicine & Biology Society (EMBC) (pp. 3866-3869).

Tajmirriahi M., Shayegh F. (2016)
Modified formant tracking system based on vowel encoding in midbrain. In 1th International on New Research Achievements in Electrical & Computer Engineering, Amirkabir University of Technology, IEEE.

RESEARCH EXPERIENCE

2017 - 2023 **Research Grants Supported by Medical Image and Signal Processing (MISP), Isfahan University of Medical Sciences:**

(Role: PI, 500$) Synthesis of annotated OCT images with diabetic macular edema (DME) using GANs, 2022-2023.

(Role: PI, 1000$) Enhancement of OCT images using stochastic models, 2022-2023.

(Role: Co-PI, 500$) EEG signal classification of epileptic patients using symmetric alpha stable mixture model, 2022-2023.

(Role: Co-PI, 500$) Synthesis of high-quality OCT images (normal and DME) using a GAN with the ability to learn frequency domain information. 2021-2022.

(Role: Co-PI, 500$) P300 detection in EEG signals in patients with amyotrophic lateral sclerosis (ALS) by using interpretable deep convolutional networks. 2021-2022.

(Role: Co-PI, 500$) P300 component detection using time-frequency analysis and deep convolutional networks. 2021-2022.

(Role: Co-PI, 650$) Classification of Seizure and Seizure-free EEG Signals, 2019-2020.
(Role: Co-PI, 650$) Statistical Inference of COVID-19, 2019-2021.

(Role: Co-PI, 650$) speech enhancement for people with hearing loss, 2017- 2021.

2018 **Research Grants Supported by Student Research Committee, Isfahan University of Medical Sciences**
(Role: PI, 500$) Noise reduction of the Optical coherence Tomography Images using Deep Dictionary Learning. 2018-2020.

ADVISORY AND SUPERVISORY OF PROJECTS

Supervisory of PhD Projects:

Analysis of MRI images using stochastic differential equations (SDEs)
Designing of anesthesia apnea screening system based on breathing sounds

Advisory of PhD Projects:

Using multivariate statistical modeling in deep variational auto-encoders (VAE) to analyze OCT images.
Stochastic differential equation (SDE) and morphological component analysis (MCA) for detection of damaged tissues in endoscopic images

Supervisory of M.Sc. Projects:

Detection of Parkinson's disease from EEG signals using time-frequency features and deep learning methods

Supervisory of B.Sc. Projects:

Design and implementation of a smart anti-theft system using AVR microcontroller
Design and implementation of a digital oscilloscope

TEACHING EXPERIENCES

INSTRUCTOR OF RECORD- GRADUATE LEVEL

Isfahan University of Medical Sciences

2022-2023	Advanced Topics in Biomedical Signal Modeling
2022	Advanced Topics in Biomedical Signal Processing
2022-2023	Biomedical Systems Modeling
2022	Advanced Topics in Signal Processing
2022-2023	Digital Image Processing

TEACHING ASSISTANTSHIPS- GRADUATE LEVEL

Isfahan University of Medical Sciences

2018-2020	Biomedical Signal Processing

2019-2020	Digital Signal Processing
2019-2020	Brain Computer Interfaces
2019-2020	Pattern Recognition
2019-2021	Advanced Methods in Biomedical Signal Processing

INSTRUCTOR OF RECORD- UNDERGRADUATE LEVEL

Isfahan University of Technology

2006-2008	Electrical Circuits Laboratory
2008-2017	Electronics Laboratory

SKILLS

PROGRAMMING SKILLS:

MATLAB, Python, Deep learning essentials like Tensorflow, Keras
ORCAD, VHDL, CODEVISION

HARDWARE DESIGN SKILLS:

AVR microcontroller hardware design, SIM900 GSM module

LANGUAGE SKILLS:

Persian: Native language

English: Excellent in reading, writing, speaking, listening