



Alireza Fallahi

Assistant Professor, Department of Biomedical
Engineering, Hamedan University of Technology

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Education

2022-2023

Postdoctoral research fellow
University of Tehran, Tehran, Iran (Cognitive neuroscience)

2021-2022

Postdoctoral research fellow
Cognitive science and technologies council, Tehran, Iran (Cognitive neuroscience)

2016-2021

PhD degree in Biomedical Engineering (Bioelectric)
Department of Biomedical Engineering, Shahed University, Tehran, Iran. (Rank 1)
Thesis title: Brain Dynamic Functional Connectivity Analysis Using Resting-State Functional MRI Images in Temporal Lobe Epilepsy Patients.

2008-2010

M.Sc. degree in Biomedical Engineering (Bioelectric)
Department of Biomedical Engineering, Shahed University, Tehran, Iran. (Rank 3)
Thesis title: Uterine Fibroid Segmentation, Volume Measurement and Feature Extraction on MRI

2003-2008

B.Sc. degree in Electrical Engineering (Electronic)
Department of Electrical and Computer Engineering, Tabriz University, Tabriz, Iran.

Research Activities

- **Researcher position in projects:**
- **Design and Development of Diagnostic Applications using Artificial intelligence and Machine Learning Approaches Based on Structural and Functional MRI in Psychology and Psychiatry,** Tehran University of Medical Science, 2021-2022.
- **Dynamic Causal Modeling of Resting State fMRI Data in Temporal Lobe Epilepsy Patients,** Tehran University of Medical Science, 2019-2020.
- **Development of models for patients with temporal lobe epilepsy based on diffusion MRI and structural connectivity,** Tehran University of Medical Science, 2019-2020.
- **Evaluation of diagnostic quality of images in two different types of cone-beam computerized tomography machine using contrast-to-noise ratio in two different root canal fillers,** Hamedan University of Medical Science, 2017-2018.
- **Evaluation of Root Canal Preparation Using two types of rotary machine using root canal volume of the tooth,** Hamedan University of Medical Science, 2017-2018.
- **Design and Implementation of ECG Signal Simulator Using Electrical Model of Cardiac,** Hamedan University of Technology, 2012-2013.
- **Design and manufacture of laboratory samples of magnetic field concentrating magnets to measure magnetic particles in space.** Tehran University of Medical Science, 2010-2011.

- **Semi Automated Uterine Fibroid Segmentation and Volume Measurement on MRI Images**, Tehran University of Medical Science, 2009-2010.

Professional Background

- **Assistant Professor, Department of Biomedical Engineering, Hamedan University of Technology**, 2023-present.
- **Academic member, Department of Biomedical Engineering, Hamedan University of Technology**, 2010-2016.
- **Head of Biomedical Engineering Department, Hamedan University of Technology**, 2013- 2015.
- **Technical Evaluator of Knowledge-Based Companies, Hamedan Science and Technology Park**, 2014-present.
- Member of **Molecular and Cellular Imaging Group , Research Center for Science and Technology in Medicine (RCSTM)**, Tehran University of Medical Science, Tehran, Iran, 2009-2010.
- Member of **Advanced Diagnostic and Interventional Radiology Research Center (ADIR)**, Tehran University of Medical Science, Tehran, Iran, 2008-2010.

Teaching Experience

Hamedan University of Technology

Brain Functional Imaging (PhD)	2024-present
Artificial Neural Networks (MSc)	2024-present
Biological Signal Processing (MSc)	2023-present
Introduction to Computational Intelligence	2013-present
Introduction to Biomedical Engineering	2012-present
Electronics I&II	2010-prerent
Electrical Circuits I	2010-2014
Logic Circuits	2011-2013
Signal & Systems	2010-2013

Hamedan University of Medical Science

Application of Computer in Medical Imaging	2014-2020
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Institute for Higher Education ACECR Hamedan

Signal & Systems	2010-2013
Electronic Circuits	2011-1013

Shahed University

Linear Control Lab	2008-2010
Linear Control Systems (Teaching Assistant)	2008-2010
Electrical Circuits I (Teaching Assistant)	2009-2010

Publications

Peer-reviewed Journal Articles

- Ramin Aghili Karampour, Alireza Fallahi, **A Hybrid Approach for Early Diagnosis of Cardiac Ischemia from Electrocardiogram Signal: Combining Classical and Deep Learning-Based Features**, Biomedical Signal Processing and Control, 2026
- Ehsan Hemmati, Mohammad-Reza Nazem-Zadeh, Alireza Fallahi, Zahra Vahabi, Mohammad Taghi Joghataei, Laila Alibiglou, **Altered Effective Connectivity in Cortico-Striatal Pathways During Sentence Processing and Oral Motors in Parkinson's Disease**, Cortex, 2025
- Seyyed Mostafa Sadjadi, Elias Ebrahimzadeh, Alireza Fallahi, Jafar Mehvari Habibabadi, Mohammad-Reza Nazem-Zadeh, Hamid Soltanian-Zadeh, **Spatio-temporal independent component classification for localization of seizure onset zone**, Frontiers in Neurology, 2025
- Alireza Fallahi, Mohammad-Reza Nazem-Zadeh, Narges Hosseini-Tabatabaei, Jafar Mehvari Habibabadi, Seyed-Sohrab Hashemi-Fesharaki, Hamid Soltanian-Zadeh, **Language and Memory Network Alterations in Temporal Lobe Epilepsy: A Functional and Structural Connectivity Study**, American Journal of Neuroradiology, 2025
- Donya Abolghasemkhah Salmasi, Alireza Fallahi, Narges Hoseini-Tabatabaei, Seyed-Sohrab Hashemi-Fesharaki, Reza Rostami, Mohammad-Reza Nazem-Zadeh, **Assessing the Effectiveness of Neurofeedback for Drug-Resistant Focal Epilepsy: A Preliminary MRI Study**, Frontiers in Biomedical Technologies, 2025
- Pourya Abbasi, Alireza Fallahi, Maryam Nourshahi, Yasamin Asadi, Hamid Soltanian-Zadeh, Mohammad-Reza Nazem-Zadeh, **The impact of brain functional connectivity on skill and physical performance in soccer players: A resting state fMRI study**, Psychology of Sport and Exercise, 2025
- Alireza Fallahi, Narges Hoseini-Tabatabaei, Fatemeh Eivazi, Neda Mohammadi Mobarakeh, Hamed Dehghani-Siahaki, Laila Alibiglou, Reza Rostami, Jafar Mehvari Habibabadi, Seyed-Sohrab Hashemi-Fesharaki, Mohammad Taghi Joghataei, Mohammad-Reza Nazem-Zadeh, **Dynamic causal modeling of reorganization of memory and language networks in temporal lobe epilepsy**, Annals of Clinical and Translational Neurology, 2023
- Harati Kabir, Vida; MahdaviFar, Rasoul; Fallahi, Alireza, **Non-invasive grading of brain tumors using online support vector machine with dynamic fuzzy rule-based parameters optimization**, Proceedings of the Institution of Mechanical Engineers, Part H: Journal of Engineering in Medicine, 2023
- Iman Sarbisheh, Leili Tapak, Alireza Fallahi Javad Fardmal, Majid Sadeghifar, Mohammad-Reza Nazem-Zadeh, Jafar Mehvari Habibabadi, **Cortical Thickness Analysis in Temporal Lobe Epilepsy Using Fully Bayesian Spectral Method in Magnetic Resonance Imaging**, BMC Medical Imaging, 2022.
- Rosita Shishegar, Ziba Gandomkar, Alireza Fallahi, Mohammad-Reza Nazem-Zadeh, Hamid Soltanian-Zadeh, **Global and local shape features of the hippocampus based on Laplace–Beltrami eigenvalues and eigenfunctions: a potential application in the lateralization of temporal lobe epilepsy**, Neurol Sci, 2022.

- Sarbisheh, Iman, Tapak, Leili and Fallahi, Alireza, Fardmal, Javad, Sadeghifar, Majid, Nazemzadeh, Mohammad Reza, Mehvari Habibabadi, Jafar, **Cerebral Cortex Thickness in Patients with Temporal Lobe Epilepsy Using Magnetic Resonance Imaging**, Alborz university medical journal, 2022
- Fallahi A, Pooyan M, Habibabadi J.M, Hashemi-Fesharaki S.S, Hoseini Tabatabaei N, Ay M, Nazem-Zadeh M, **A novel approach for extracting functional brain networks involved in mesial temporal lobe epilepsy based on self-organizing maps**. Informatics in Medicine Unlocked, 2022
- Fallahi, A., Pooyan M · Habibabadi, JM, Nazem-Zade, M, **Comparison of multimodal findings on epileptogenic side in temporal lobe epilepsy using self-organizing maps**. Magnetic Resonance Materials in Physics, Biology and Medicine, 2021
- **Fallahi, A., Pooyan, M., Lotfi, N., Mohammad-Reza Nazem-Zade, et al., Dynamic functional connectivity in temporal lobe epilepsy: a graph theoretical and machine learning approach**. Neurol Sci ,2020.
- Saati S, Eskandarloo A, **Falahi A**, Tapak L, Bahareh Hekmat, **Evaluation of the efficacy of the metal artifact reduction algorithm in the detection of a vertical root fracture in endodontically treated teeth in cone-beam computed tomography images: An in vitro study**, Dental and Medical Problems, 2019, 56(4):357-363.
- A. Fallahi, F. Baniasad, N. Lotfi, M. Mirbagheri, N. Mohammadi-Mobarakeh, L. Tapak, S. S.Hashemi-Fesharaki, M. Pooyan, J. Mehvari-Habibabadi, M. Nazem-Zadeh, **Evolution Of Functional Connectivity And Dynamic Interaction In Temporal Lobe Epilepsy**, Epilepsia, 2019, 60 (S2).
- **A. Fallahi**, H. Ghanbari Khorram, A. Kokabi, **Electrocardiogram signal generation using electrical model of cardiac cell: application in cardiac ischemia**, Journal of Medical Engineering & Technology, 2019 , 43(4).
- Z. Donyavi, A. Shokri, Z. Pakseresht, L. Tapak, **A. Falahi**, H. Abbaspourrokni, **Comparative evaluation of retreatability of endodontically treated teeth using AH 26, fluoride varnish and mineral trioxide aggregate-based endodontic sealers**, The Open Dentistry Journal, 2019, vol. 13.
- **A. Fallahi**, H. Khotanlou, M. Pooyan, H. Hashemi, and M. A. Oghabian, **Segmentation of Uterine Using Neighbourhood Information Affected Possibilistic FCM and Gaussian Mixture Model in Uterine Fibroid Patients MRI**, journal of Biomedical Engineering: Applications, Basis and Communications, 2014, Vol. 26, No. 1
- M. Ghelich Oghli, V. Dehlaghi, A. Mohammad Zadeh, **A. Fallahi**, Mohammad Pooyan, **Right Ventricle Functional Parameters Estimation in Arrhythmogenic Right Ventricular**

Dysplasia Using a Robust Shape Based Deformable Model, Journal of Medical Signals & Sensors, 2014, Vol. 14, No. 3

- H. Khotanlou, **A. Fallahi**, M. Pooyan, M. A. Oghabian, **Segmentation of Uterine Fibroid on MRI Based On Chan-Vese Level Set Method and Shape Prior Model**, journal of Biomedical Engineering, Applications, Basis and Communications, 2014, Vol. 26, No. 2
- M. Ghelich Oghli, **A. Fallahi**, V. Dehlaghi and M. Pooyan, **Left Ventricle Volume Measurement on Short Axis MRI Images Using a Combined Region Growing and Super ellipse Fitting Method**, ACEEE International Journal on Signal & Image Processing, 2013, Vol. 4, No. 2.
- **A. Fallahi** , M. Pooyan , H. Ghanaati , M. A. Oghabian, H. Khotanlou , M. Shakiba , A. H. Jalali , K. Firouznia, **Uterine Segmentation and Volume Measurement in Uterine Fibroid Patients' MRI Using Fuzzy C-Mean Algorithm and Morphological Operations**, Iranian Journal of Radiology, 2011, Vol. 8, No. 3.
- **A. Fallahi**, M. Pooyan and H. Khotanlou, **A New Approach For Classification of Human Brain CT Images Based on Morphological Operations**, Journal of Biomedical Science and Engineering, 2010, 3, 78-82.

Conference Proceedings

- Ramin Aghili Karampour, Amir Arshia Bakhtiar, Kiarash Hajizamani, Alireza Fallahi, Hamid Soltanian Zadeh, **Cardiac Ischemia Detection Using Self-Organizing Map Feature Selection Method**, 2024 31st National and 9th International Iranian Conference on Biomedical Engineering
- Alireza Fallahi , Hosna Tavakoli, Narges Hoseini-Tabatabaei , Reza Rostami, Hamid Soltanian Zadeh, Mohammad-Reza Nazem-Zadeh, **Application of Functional Connectivity Analysis in TMS Treatment Evaluation for Patients with Mental Disorder**, 7th Iranian Congress on Brain Mapping, ICBM 2023
- Alireza Fallahi, Narges Hosseini Tabatabaei, Neda Tavakoli, Mohammad-Reza Nazem-Zadeh, **Application of Functional Network Analysis in TMS Treatment for Patients with Mental Disorders**, OHBM Annual Meeting, 2023 (accepted)
- Alireza Fallahi, Nastaran Lotfi, Fatemeh Eyvazi, Neda Mohammadi-Mobarakeh, Narges Hosseini Tabatabaei, Jafar Mehvari-Habibabadi, Mohammad-Reza Ay, Mohammad Pooyan, Mohammad-Reza Nazem-Zadeh, **A Graph Theoretical Approach for Brain Nodal Based Lateralization of Temporal Lobe Epilepsy Using Functional Connectivity Analysis**, ISMRM & SMRT Annual Meeting & Exhibition, 2022
- Alireza Fallahi , Mohammad Pooyan , Jafar Mehvari-Habibabadi , Narges Hoseini Tabatabaei , Mohammadreza Ay, Mohammad-Reza Nazem-Zadeh, **Application of Machine Learning and**

Multimodal Neuroimaging Markers in Lateralization of Temporal Lobe Epilepsy, ISMRM & SMRT Annual Meeting & Exhibition,2022

- Fatemeh Salimi, Saeed Masoudnia, Alireza Fallahi, Narges Hoseini Tabatabaei, Mohammadreza Ay, Mohammad Reza Nazem-Zadeh, **Structural Connectivity in Default Mode Network May Lateralize Temporal Lobe Epilepsy: A Graph-Theory Approach**, ISMRM & SMRT Annual Meeting & Exhibition,2022
- Alireza Fallahi , Fatemeh Salimi , Fatemeh Eyvazi , Narges Hosseini Tabatabaei , Mohammad-Reza Ay , and Mohammad-Reza Nazem-Zade, **Altered Large-Scale Brain Networks in Mesial Temporal Lobe Epilepsy Based on Dynamic Causal Modeling**, ISMRM & SMRT Annual Meeting & Exhibition,2021
- Alireza Fallahi , Neda Mohammadi-Mobarakeh , Narges Hosseini Tabatabaei , Mohammad Pooyan , Jafar Mehvari-Habibabadi , Mohammad-Reza Ay , and Mohammad-Reza Nazem-Zadeh., **Lateralization of Temporal Lobe Epilepsy Using Multimodal MRI, Decision Tree, and Random Forest Methods**, ISMRM & SMRT Annual Meeting & Exhibition,2021.
- **Fallahi, A.**, Pooyan, M., Lotfi, N., Mohammad-Reza Nazem-Zade, et al., **Evolution of Graph Theory in Dynamic Functional Connectivity for Lateralization of Temporal Lobe Epilepsy**, 41st Annual International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC), 2019.
- **A.Fallahi**, N. Lotfi, F. Baniasad, N. Mohammadi-Mobarakeh, L. Tapak, S. S. Hashemi Fesharaki, M. Pooyan, M. Nazem-Zadeh, J. Mehvari Habibabadi, **Dynamic Functional Connectivity in Lateralization of Temporal Lobe Epilepsy**, 15th International Epilepsy Congress,Tehran,2019.
- A. Fallahi, N. Lotfi, F. Baniasad, N. Mohammadi-Mobarakeh, L. Tapak, S. S. Hashemi Fesharaki, J. Mehvari Habibabadi, M. Pooyan, M.R. Nazem-Zadeh, **Dynamic Functional Connectivity in Lateralization of Temporal Lobe Epilepsy**, 15Th Iranian International Epilepsy Congress, 2019.
- Farhad Parivash, Leila Amuzadeh, **A. Fallahi**, **Design expanded BCI with improved efficiency for VR-embedded neurorehabilitation systems**, 19th CSI International Symposium on Artificial Intelligence and Signal Processing, 2017.
- N.Jamebozorg, P.Memar, **A. Fallahi**, **Heart Failures Recognition and Classification Using Artificial Neural Network**, International conference in new research of Electrical Engineering & Computer Science, 2015
- **A.Fallahi**, M. Rezaii, **Myocardial Ischemia Modeling Using Electrical Model of Cardiac Signal**, The First Conference on Novel Approaches of Biomedical Engineering in Cardiovascular Disease, 2015
- **A. Fallahi**, R. Jafari, M. Vejdannik, **ECG Analysis Using Wavelet Transform, Neural Networks and Support Vector Machines, Application to Myocardial Ischemia Detection**, 8th Symposium on Advance in Science and Technology, 2014.
- M. Vejdannik, **A. Fallahi**, A. Shahab, **Segmentation and Volume Measurement of Cleft Palate in CBCT Images Using PNN Neural Network and Curve Fitting**, 8th Symposium on Advance in Science and Technology, 2014.
- **A. Fallahi**, M. Rezaii, M. Vejdannik, **Design and Implimention of ECG Simulator Circuit Using Electrical Model of Cardiac Cell**, 8th Symposium on Advance in Science and Technology, 2014. and Image Analysis, 2013.

- M. Vejdannik, **A. Fallahi, A New Method for Segmentation of Red Blood Cells and White Blood Using PNN Neural Network and Distance Transform**, 1th Conference on Pattern Recognition and Image Analysis, 2013.
- M. Ghelich Oghli, **A. Fallahi, M. Pooyan, 3-D Heart Segmentation on CT Images using Superellipsoid Model Fitting**, 20nd Iranian conference of Electrical Engineering (ICEE 2012), 2012.
- M. Ghelich Oghli, **A. Fallahi, V. Dehlaqi, M. Pooyan, A Novel Method for Left Ventricle Volume Measurement on Short Axis MRI Images Based on Deformable Superellipses**, Second International Joint Conference on Advances in Signal Processing and Information Technology, 2012.
- M. Rezaii, **A. Fallahi, ECG Simulator Circuit Design Using Electrical Model of Cardiac Cell**, 17th National Iranian Student Conference on Electrical Engineering, 2011.
- **A. Fallahi, M. Pooyan, H. Hashemi, H. Khotanlou, M. A. Oghabian, K. Firuznia, Uterine Fibroid Segmentation on MRI Based on Chan-Vese Level Set Method and Shape Prior Model**, International Conference on Imaging Theory and Applications(IMAGAPP 2010), Angers, France, 2010.
- **A. Fallahi, M. Pooyan, H. Khotanlou, H. Hashemi, M. A. Oghabian, K. Firuznia, Uterine Fibroid Segmentation on Multiplan MRI Using FCM, MPFCM and Morphological Operations**, 2nd IEEE International Conference on Computer Engineering and Technology (ICCET 2010), Chengdu, Sichuan, China, 2010.
- M. Glichoghli, **A. Fallahi, M. Pooyan, Automatic Region Growing Method Using GSmap and Spatial Information on Ultrasound Images**, 18nd Iranian conference of Electrical Engineering (ICEE 2010), Isfahan, Iran, 2010.
- **A. Fallahi, M. Pooyan, H. Hashemi, M. A. Oghabian, H. Khotanlou and S. Ahmari, Uterine Segmentation and Volume Measurement in Uterine Fibroid Patients MRI Using PFCM and Morphological Operations**, Presented at and published in the Proceedings of 16th Iranian Conference on Biomedical Engineering (ICBME), Tehran, 2009.
- **A. Fallahi, M. Pooyan, H. Mohammadnejad, Application of Morphological Operations In Human Brain CT Image With SVM**, Presented at and published in the Proceedings of 3th IEEE International Conference on Bioinformatics and Biomedical Engineering (iCBBE 2009), Beijing, China, 2009.
- A. Bakhshipour, **A. Fallahi, M. Pooyan, H. Mohammadnejad, Myocardial Ischemia Detection with ECG Analysis, Using Wavelet Transform and Support Vector Machines**, 17th Iranian Conference on Biomedical Engineering, 2010.

Honors & Awards

- **Best Researcher Member**, Department of Biomedical Engineering, Hamedan University of Technology, 2015.
- **Best Educational Member**, Department of Biomedical Engineering, Hamedan University of Technology, 2014.
- **Best Researcher Member**, Department of Biomedical Engineering, Hamedan University of Technology, 2013.

Research Interests

- Neuroimaging analysis
- Artificial Intelligence
- Functional MRI (fMRI) Connectivity Analysis
- Medical Image Processing
- Medical Signal Processing
- Pattern Recognition
- Advanced Neural Networks

Computer Skills

Programming Software:

MATLAB, C++, OpenCV, MFC

Engineering Software:

Simulink, OrCAD, Code Vision, PSpice, Proteus, FSL, MIPAV, MRICro,

Mathematical Software and Toolbox:

Image Processing Toolbox ,Statistical Pattern Recognition (*PRTools*), Neural Network Toolbox, Signal Processing Toolbox, Wavelet Toolbox, SPM, DPABI