

# Hossein Rabbani

Senior Member,  
IEEE

**Professor**  
Department of Biomedical Engineering,  
Isfahan University of Medical Sciences  
&  
Medical Image & Signal Processing  
Research Centre



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## Objective and Fields of Interest

**Objective** Research in multidimensional signal processing including biosignal analysis and modeling (especially medical image/volume), sparse transforms, noise reduction and estimation problem, image/video restoration, probability models of sparse domain's coefficients.

**Fields of interest** Biomedical signal analysis and processing including multidimensional data, time-frequency analysis tools including x-lets, denoising, statistical signal processing, applied mathematics (currently I am focusing on Statistical & Mathematical Modeling of Medical Signals and Systems).

## Academic Qualifications

- 2013 –2014** Postdoctoral Research Fellow, Duke Eye Center, Durham, United States.
- Research topic: **“Automatic Analysis of Various Types of Leakages in Fluorescein Angiograms and Optical Coherence Tomography (OCT)”**
  - Supervisor: Prof. Sina Farsiu
- 2011** Postdoctoral Research Scholar, The University of Iowa, Iowa, United States.
- Research topic: **“Optical Coherence Tomography (OCT) Image Analysis”**
  - Supervisors: Prof. Milan Sonka & Prof. Michael Abramoff
- 2007** Visiting Research Scholar, Electrical & Computer Engineering Department, Queen’s University, Kingston, Ontario, Canada.
- Research topic: **“Statistical modeling of sparse domain’s coefficients and its application to medical image/volume denoising”**
  - Supervisor: Prof. Saeed Gazor.

2002 – 2008

**Doctoral Researches, Bioelectronics** (1<sup>st</sup> rank in entrance exam)

**Department of Biomedical Engineering** (The Center of Excellence on Biomedical Engineering in Iran), **Amirkabir University of Technology** (Tehran Polytechnic), **Tehran, Iran.**

- Dissertation research topic: **“Medical Image/Volume Noise Reduction in Multidimensional Complex Wavelet Transform Domain Using Bivariate Mixture Models”**
- Supervisor: Prof. Mansur Vafadust
- Passed Ph.D. courses: advanced digital signal processing, biomedical signal processing, advanced biomedical signal processing, advanced digital image processing, advanced digital communication, spread spectrum, system identification, advanced neural network.
- Passed the qualifying examination in Sept. 2004.

2000 – 2002

**Master of Science, Bioelectronics** (3<sup>rd</sup> rank)

**Department of Biomedical Engineering** (The Center of Excellence on Biomedical Engineering in Iran), **Amirkabir University of Technology** (Tehran Polytechnic), **Tehran, Iran.**

- Dissertation research topic: **“Video Restoration based on Motion Estimation in Complex Wavelet Domain”**
- Supervisor: Prof. Mansur Vafadust
- Advisor: Prof. Shohreh Kasaei
- Passed M.Sc. courses: digital signal processing, biomedical signal processing, digital image processing, medical imaging systems, stochastic processes, statistical pattern recognition, digital control systems, bioinstrument, and neural network.

1997 – 2000

**Bachelor of Science, Communication** (1<sup>st</sup> rank)

**Department of Electrical and Computer Engineering, Isfahan University of Technology, Isfahan, Iran.**

- Dissertation research topic: **“Designing and Constructing of Laser Communication between Two Computers”**

## Work Experience

2003-2016

**Teaching**

- **Undergraduate level courses**  
(B.Sc. students, Amirkabir University of Technology):

- Statistics and probability
  - Analog and digital communication systems
- **Graduate level courses**  
(M.Sc. & Ph.D. students, Isfahan University of Medical Sciences):
- Advanced Biomedical Signal Processing
  - Biological Signal & System Modeling
  - Biomedical Signal Processing
  - Digital Image Processing
  - Digital Signal Processing
  - Information Technology in Biomedicine
  - Medical Image Processing & Analysis
  - Neural Networks
  - Pattern Recognition
  - Stochastic Processes
  - Sparse Transforms and Their Applications in Signal Processing
  - System Identification
  - Advanced Biological Signal & System Modeling
  - Convex Optimization

### **Supervising and Advising**

- **Supervisor:**

Postdoc projects (in progress):

- Intra-retinal layer and fluid segmentation of 3D OCT images by deep learning
- Classification of ocular images using optimum basis functions (DL & MCA)
- OCT modeling: statistical modeling vs. geometrical modeling vs. energy-based modeling
- Synchronized analysis of EEG, MRI images, and SPECT images of patients suffering from seizure

PhD dissertation researches:

- Combination of graph based algorithms and time-frequency methods for processing of OCTs
- Seeking an appropriate feature extraction method for breast cancer recurrence prediction based on microarray gene expression data
- A new model based on Gaussianization of OCT data
- Automatic analysis of features of AMD in OCT images using 3D curvelet transform
- Automatic detection of acute myeloid leukemia in microscopic images using dictionary learning

- Automatic diagnosis of Mild Cognitive Impairment (MCI) by dictionary learning -based analysis of EEG signals
- 3D OCT Classification by Deep Learning
- Fully automated segmentation of fluid/cyst regions in OCT images using neutrosophic sets and graph algorithms

PhD dissertation researches (in progress):

- 3D Sparse Reconstruction of Cone-beam CT
- Multivariate Statistical Modeling of OCT Images
- Sparse Representation of PH Monitoring Signals
- Energy-based Modeling of OCT Images
- Sparse Representation of OCT Images

M.Sc. dissertation researches:

- Polyp detection/segmentation in video colonoscopy by convolutional neural network
- Image restoration using Gaussian mixture models with neighborhood nonlocal clustering
- Evaluation of the symmetricity of cup to disk ratio in left and right eyes of normal subjects
- Mosaicing macula OCT images and OCT optical disk
- Designing a dictionary for OCT images based on K-SVD algorithm using texture characteristics of retinal layers for image segmentation
- Automatic segmentation of corneal layer boundaries in OCT images and obtaining 3D maps of the entire thickness of cornea and inner layers
- Automatic detection of leishman bodies in bone marrow samples from patients with visceral leishmaniasis using level set method
- Evaluation of asymmetricity of right and left eyes of normal subjects using extracted features from optical coherence tomography (OCT) and color fundus images
- Automatic diagnosis of malaria based on complete circle-ellipse fitting search algorithm
- Automatic segmentation and recognition of lung nodules in thoracic CT images using active contour modeling and convex hull
- Segmentation of enhanced depth imaging optical coherence tomography (EDI-OCT) images using graph cut algorithm based on Gaussian mixture model of wavelet features
- Forming projection images from retinal layers on the 3D optical coherence tomography (OCT) data and fusion of them using curvelet transform to form an optimal projection image

- Evaluation of image pre-compensation methods for enhancing visual efficiency in the presence of higher order ocular optical aberrations
- Extraction of 15-lead ECG signal from vectorcardiogram (VCG) signal using partial linear transformation for providing information from posterior side of the heart
- Detection of foveal avascular zone (FAZ) based on curvelet transform for grading of diabetic retinopathy
- Extraction of nucleolus candidate zone in white blood cells of peripheral blood smear images using curvelet transform
- A comparison between hp version of finite element method with EIDORS for electrical impedance tomography
- A comparison between ECG and VCG signals for detection of ischemia location
- Estimation of somatosensory evoked potentials with multi-adaptive filters
- A contourlet-based watermarking method for medical images
- Automatic detection of diabetic retinopathy by extraction of retinal image features in curvelet domain
- Estimating depth of anesthesia based on wavelet transform and neuro-fuzzy systems
- Microcalcification detection in mammographic images using fractal model in wavelet domain
- Persian script character recognition using PCA
- A comparison between ECG and VCG for detection of ischemia
- Automatic detection and recognition of lung nodule in CT image based on active contour
- Complexity analysis of EEG signals for Mild Cognitive Impairment (MCI) diagnosis
- 3D segmentation of proximal enamel lesions in micro-ct images
- Automatic analysis of tracheal acoustic signals for apnea detection and introducing new clinical indices of depth of sedation
- Statistical modeling of 3D OCT data by mixture model

B.Sc. dissertation research entitled:

- Angle detection for biomaterial based on image processing

- **Advisor:** M.Sc. dissertation researches entitled:

- Transform based ellipse detection in microscopic images using elliptical basis functions
- Automatic extraction and recognition of myeloma cell in microscopic bone marrow aspiration images
- Extraction of candida fungus from pap smear images based on ridgelet transform for vulvovaginal candidiasis diagnosis

- Extraction of vessels, optic disc and fovea avascular zone from fundus fluorescein angiogram based on Hessian analysis of directional curvelet subbands
- Medical image compression with multi-wavelet
- A new adaptive technique for fast and accurate estimation of SSAEP

## Honors

- I was really interested in studying mathematics before entering university and all of my grades in this field were excellent. I participated in the entrance exam of universities.
  - My grades in this exam were:
    - ✓ Mathematics: **98/100**
    - ✓ Physics: **86.7/100**
    - ✓ Chemistry: **91.2/100**
  - I had this opportunity to choose **all of the best universities** in Iran.
- B.Sc. Degree with the honor of the **1<sup>st</sup> rank** from Isfahan University of Technology.
- M.Sc. Degree with the honor of the **3<sup>rd</sup> rank** from Amirkabir University of Technology.
- **1<sup>st</sup> rank** in the Ph.D. entrance exam of Amirkabir University of Technology in bioelectrics.
- **1<sup>st</sup> rank** in the Ph.D. entrance exam of Isfahan University of Technology in communication engineering.
- **Outstanding selected Ph.D. thesis** by Iranian Society for Biomedical Engineering.
- **The winner of national prize of “Young Assistant Professors”**.
- **IEEE, Elected Senior Member, 2013**

## Membership

- ✓ IEEE Senior Member  
Signal Processing Society, Engineering in Medicine and Biology Society

## Article Reviewer

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|--|--|
| ✓ IEEE Trans. on Image Processing            | ✓ IEEE Trans. on Circuits & Systems for Video Technology           |
| ✓ IEEE Trans. on Signal Processing           | ✓ IEEE Trans. on Multimedia  |
| ✓ IEEE Trans. on Medical Imaging             | ✓ IEEE Trans. on Systems, Man, and Cybernetics-Part B: Cybernetics |
| ✓ IEEE Trans. on Biomedical Engineering      | ✓ IEEE Trans. on Biomedical Circuits and Systems                   |
| ✓ IEEE Signal Processing Letters             | ✓ IEEE Journal of Biomedical and Health Informatics                |
| ✓ IEEE Reviews in Biomedical Engineering     | ✓ IEEE Access  |
| ✓ IEEE Trans. on Geoscience & Remote Sensing |  |

- ✓ IEEE Trans. on Instrumentation & Measurement
- ✓ IET Image Processing Journal
- ✓ IET Signal Processing Journal
- ✓ IET Computer Vision
- ✓ Pattern Recognition
- ✓ Signal Processing
- ✓ Computers in Biology & Medicine
- ✓ Digital Signal Processing
- ✓ Biomedical Signal Processing & Control
- ✓ Pattern Recognition Letters
- ✓ Ultrasonics
- ✓ Journal of Biophotonics
- ✓ Journal of Biomedical Optics
- ✓ Measurement
- ✓ Computer Methods and Programs in Biomedicine,
- ✓ Journal of Visual Image Communication & Representation
- ✓ Applied Optics
- ✓ Optics Letters
- ✓ Journal of Optical Society of America A
- ✓ Applied Soft Computing
- ✓ Biomedical Optics Express
- ✓ PLOS ONE
- ✓ Journal of Medical Systems
- ✓ The Computer Journal
- ✓ Medical & Biological Engineering & Computing
- ✓ Neural Computing & Applications
- ✓ Journal of Applied Mathematics
- ✓ EURASIP Journal on Image and Video Processing
- ✓ Signal, Image and Video Processing
- ✓ Multidimensional Systems & Signal Processing
- ✓ Circuits, Systems & Signal Processing
- ✓ Current Medical Imaging Reviews
- ✓ International Journal of Pattern Recognition and Artificial Intelligence
- ✓ Journal of Innovative Optical Health Sciences
- ✓ Medical Principles & Practice
- ✓ Measurement Science Review
- ✓ Electronics Letters
- ✓ SPIE Journal of Medical Imaging
- ✓ Complexity
- ✓ Progress in Electromagnetic Research (PIER)
- ✓ BMC Open
- ✓ BMC Medical Imaging
- ✓ Biomedical Engineering OnLine
- ✓ International Journal of Imaging Systems and Technology
- ✓ Mathematical Problems in Engineering
- ✓ Cognitive Neurodynamics
- ✓ Journal on Modern Optics
- ✓ Optik
- ✓ Computer Methods in Biomechanics and Biomedical Engineering: Imaging & Visualization
- ✓ Journal of Research in Medical Sciences
- ✓ Iranian Journal of Biomedical Engineering
- ✓ Iranian Journal on Electrical & Computer Engineering
- ✓ Iranian Journal of Physics Research
- ✓ Several International IEEE Conferences and National Conferences

## Editorial Board Member:

- ✓ Journal of Isfahan Medical School
- ✓ Journal of Medical Signals and Sensors (Editor-in-Chief)

## Publications

### International Journal Papers

1. M. Mokhtari, **H. Rabbani\***, A. Mehridehnavi, R. Kafieh, M. Akhlaghi, M. Pourazizi, L. Fang, "Local comparison of cup to disc ratio in right and left eyes based on fusion of color fundus images and OCT B-scans", *Information Fusion*, vol. 51, pp. 30-41, 2019.
2. M. Kashefpoor, **H. Rabbani\***, M. Barekatin, "Supervised dictionary learning of EEG signals for mild cognitive impairment diagnosis", *Biomedical Signal Processing & Control*, vol. 53, pp. 101559, 2019.
3. M. Momenzadeh, M. Sehhati\*, **H. Rabbani**, "A novel feature selection method for microarray data classification based on hidden Markov model", *Journal of Biomedical Informatics*, vol. 95, pp. 103213, 2019.
4. L. Huang, X. He, L. Fang\*, **H. Rabbani** and X. Chen, "Automatic Classification of Retinal Optical Coherence Tomography Images With Layer Guided Convolutional Neural Network," *IEEE Signal Processing Letters*, vol. 26, no. 7, pp. 1026-1030, July 2019.
4. A Abbasi, A Monadjemi\*, L Fang\*, **H Rabbani**, Yi Zhang, "Three-dimensional optical coherence tomography image denoising through multi-input fully-convolutional networks", *Computers in Biology and Medicine*, vol. 108, pp. 1-8, May 2019.
5. R. Kafieh, **H. Rabbani** and G. Unal\*, "Bandlets on Oriented Graphs: Application to Medical Image Enhancement," *IEEE Access*, vol. 7, pp. 32589-32601, 2019.
6. R. Sharbati, H. R. Ramazi, F. Khoshnoudian, H. R. Amindavar & **H. Rabbani**, "Stochastic Model for Simulation of Ground-Motion Sequences Using Kernel-Based Smoothed Wavelet Transform and Gaussian Mixture Distribution", *Journal of Earthquake Engineering*, 2019. DOI: 10.1080/13632469.2019.1605948.
7. L. Fang, C. Wang, S. Li, **H. Rabbani**, X. Chen and Z. Liu, "Attention to Lesion: Lesion-Aware Convolutional Neural Network for Retinal Optical Coherence Tomography Image Classification," *IEEE Transactions on Medical Imaging*, 2019. DOI: 10.1109/TMI.2019.2898414.
8. M. Lashgari, M. Shahmoradi, **H. Rabbani\***, M. Swain, "Missing Surface Estimation Based on Modified Tikhonov Regularization: Application for Destructed Dental Tissue," *IEEE Transactions on Image Processing*, vol. 27, no.5, pp. 2433-2446, 2018.
9. R. Rasti, **H. Rabbani\***, A. Mehridehnavi and F. Hajizadeh, "Macular OCT Classification using a Multi-Scale Convolutional Neural Network Ensemble," *IEEE Transactions on Medical Imaging*, vol. 37, no. 4, pp. 1024-1034, 2018.



10. A. Rashno, D. D. Koozekanani, P. M. Drayna, B. Nazari, S. Sadri, **H. Rabbani**, K. K. Parhi\*, "Fully-Automated Segmentation of Fluid/Cyst Regions in Optical Coherence Tomography Images with Diabetic Macular Edema using Neutrosophic Sets and Graph Algorithms," *IEEE Transactions on Biomedical Engineering*, vol. 65, no. 5, pp. 989-1001, May 2018.
5. A. Abbasi, A.H. Monadjemi\*, L. Fang, **H. Rabbani**, "Optical Coherence Tomography Retinal Image Reconstruction via Nonlocal Weighted Sparse Representation", *Journal of Biomedical Optics*, vol. 23, no. 3, 036011, 2018.
6. R. Rasti, A. Mehri Dehnavi\*, **H. Rabbani**, F. Hajizadeh, "Automatic Diagnosis of Abnormal Macula in Retinal OCT Images Using Wavelet-Based Convolutional Neural Network Features and Random Forests Classifier", *Journal of Biomedical Optics*, vol. 23, no. 3, 036011,035005, 2018.
7. S. Momeni, O. Sarrafzadeh, **H. Rabbani**\*, "Automatic Brain Aneurysm Extraction in Angiography Videos Using Circlet Transform and a Modified Level Set Model", *Current Medical Imaging Reviews*, vol. 14, no. 6, pp. 923-932, 2018.
8. M. Momenzadeh, A. Vard\*, A. Talebi, A. M. Dehnavi, **H. Rabbani**, "Computer-Aided Diagnosis Software for Vulvovaginal Candidiasis Detection From Pap Smear Images", *Microscopy Research & Technique*, vol. 81, no. 1, pp. 13-21, 2018.
9. A. Ahdi, **H. Rabbani**\*, A. Vard, "A Hybrid Method for 3D Mosaicing of OCT Images of Macula and Optic Nerve Head," *Computers in Biology and Medicine*, vol. 91, pp. 277-290, 2017.
10. L. Fang \*, Ch. Wang , Sh. Li, J. Yan, X. Chen, **H. Rabbani**, "Automatic Classification of Retinal 3D OCT Images Using Principle Component Analysis Network with Composite Kernels", *Journal of Biomedical Optics*, vol. 22, no. 11, 116011, 2017.
11. A. Rashno, B. Nazari, D. D. Koozekanani, P.M. Drayna, S. Sadri, **H. Rabbani** and K.K. Parhi\*, "Fully-Automated 2D and 3D Segmentation of Fluid Regions in Exudative Age-Related Macular Degeneration Subjects: Kernel Graph Cut in Neutrosophic Domain," *PLOS ONE*, vol. 12, no. 10, e0186949, 2017.
12. Z. Amini, **H. Rabbani**\*, "Optical Coherence Tomography Image Denoising Using Gaussianization Transform", *Journal of Biomedical Optics*, vol. 22, no. 8, pp. 1-12, 2017.
13. M. Momenzadeh, M.R. Sehhati\*, A. Mehri Dehnavi, A. Talebi, **H. Rabbani**, "Automatic Diagnosis of Vulvovaginal Candidiasis from Pap smear Images", *Journal of Microscopy*, vol. 267, no. 3, pp. 299-308, 2017.
14. L. Fang\* , L. Yang , Shutao Li , **H. Rabbani** , Zh. Liu , X. Chen , Q. Peng, "Automatic Detection and Recognition of Multiple Macular Lesions in Retinal OCT Images with Multi-instance Multi-label Learning", *Journal of Biomedical Optics*, vol. 22, no. 6, 066014, 2017.
15. M.J. Allingham\*, D. Mukherjee, E.B. Lally, **H. Rabbani**, P.S. Mettu, S.W. Cousins, S. Farsiu, "A Quantitative Approach to Predict Differential Effects of Anti-VEGF Treatment on Diffuse and Focal Leakage in Patients with Diabetic Macular Edema - A Pilot Study", *Translational Vision Science & Technology*, vol. 7, no. 6, 2017.

16. Z. Amini, **H. Rabbani\***, "Letter to the Editor: Correction to “The Normal-Laplace Distribution and its Relatives”, Communications in Statistics - Theory and Methods, vol. 46, no. 4, pp. 2076-2078, 2017.
17. M. Esmaeili, A. Mehri-Dehnavi, and **H. Rabbani\***, "3D Curvelet-Based Segmentation and Quantification of Drusen in Optical Coherence Tomography Images", Journal of Electrical and Computer Engineering, vol. 2017 (2017), Article ID 4362603, 12 pages.
18. Z. Amini, **H. Rabbani\***, "Statistical Modeling of Retinal Optical Coherence Tomography", IEEE Transactions on Medical Imaging, vol. 35, no. 6, pp. 1544-1554, 2016.
19. O. Sarrafzadeh, **H. Rabbani**, A. Mehri Dehnavi\*, A. Talebi, "Analyzing Features by SWLDA for the Classification of HEp-2 Cell Images Using GMM", Pattern Recognition Letters, vol. 82, part 1, pp. 44-85, Oct. 2016.
20. M. Shahmoradi, M. Lashgari, **H. Rabbani\***, J. Qin, M. Swain, "A comparative study of new and current methods for dental micro-CT image denoising", Dentomaxillofacial Radiology, vol. 45, no. 3, 2016.
21. Z. Amini, **H. Rabbani\***, “Classification of Medical Image Modeling Methods: A Review”, Current Medical Imaging Reviews, vol. 12, no. 2, pp. 130-148, 2016.
22. **H. Rabbani**, R. Kafieh\*, M. Kazemian Jahromi, et al., “Obtaining Thickness Maps of Corneal Layers Using the Optimal Algorithm for Intracorneal Layer Segmentation,” International Journal of Biomedical Imaging, vol. 2016, Article ID 1420230, 11 pages, 2016.
23. M. Niknejad, **H. Rabbani\***, M. Babaei-Zadeh, "Image Restoration Using Gaussian Mixture Models with Spatially Constrained Patch Clustering," IEEE Transactions on Image Processing, vol. 24, no. 11, pp. 3624-3636, Nov. 2015.
24. R. Kafieh, **H. Rabbani\***, I. Selesnick, “Three Dimensional Data-Driven Multi Scale Atomic Representation of Optical Coherence Tomography”, IEEE Transactions on Medical Imaging, vol. 34, no. 5, pp. 1042-1062, 2015.
25. **H. Rabbani\***, M.J. Allingham, P.S. Mettu, S.W. Cousins, S. Farsiu, “Fully Automatic Segmentation of Fluorescein Leakage in Subjects with Diabetic Macular Edema”, Investigative Ophthalmology and Visual Science, vol. 56, no. 3, pp. 1482-1492, 2015.
26. MR. Sehhati\*, A. Mehri, **H. Rabbani**, M. Pourhossein, “Stable Gene Signature Selection for Prediction of Breast Cancer Recurrence Using Joint Mutual Information”, IEEE/ACM Transactions on Computational Biology and Bioinformatics, vol. 12, no. 6, pp. 1440-1448, 2015.
27. Z. Saeeidzadeh, A. Mehri\*, A. Talebi, **H. Rabbani**, O. Sarrafzadeh, A. Vard, “Automatic Recognition of Myeloma Cells in Microscopic Images using Bottleneck algorithm, Modified Watershed and SVM Classifier”, Journal of Microscopy, vol. 261, no. 1, pp. 46-56, 2015.
28. R. Kafieh, **H. Rabbani\***, F. Hajizadeh, M. D. Abramoff and M. Sonka, “Thickness Mapping of Eleven Retinal Layers in Normal Eyes Using Spectral Domain Optical Coherence Tomography”, Journal of Ophthalmology, Article ID 259123, 14 pages, 2015.
29. A. Soltanipour, S. Sadri, **H. Rabbani\***, MR Akhlaghi, "Analysis of Fundus Fluorescein Angiogram Based on the Hessian Matrix of Directional Curvelet Sub-bands and Distance

- Regularized Level Set Evolution", *Journal of Medical Signals and Sensors*, vol. 5, no.3, pp. 141-155, 2015.
30. **H. Rabbani\*** and S. Gazor, "Local Probability Distribution of Natural Signals in Sparse Domains," *International Journal of Adaptive Control and Signal Processing*, vol. 28, no. 1, pp. 52-62, Jan. 2014.
  31. SH. Hajeb, **H. Rabbani\***, MR. Akhlaghi, "A New Combined Method Based on Curvelet Transform and Morphological Operators for Automatic Detection of Foveal Avascular Zone", *Signal, Image & Video Processing*, vol. 8, no. 2, pp. 205-222, Feb. 2014.
  32. H. Danesh, R. Kafieh, **H. Rabbani\***, F. Hajizadeh, "Segmentation of Choroidal Boundary in Enhanced Depth Imaging OCTs Using a Multiresolution Texture Based Modeling in Graph Cuts", *Computational and Mathematical Methods in Medicine*, vol. 2014, Article ID 479268, 9 pages.
  33. R. Kafieh, **H. Rabbani\***, M. Sonka, M. D. Abramoff, "Intra-Retinal Layer Segmentation of 3D Optical Coherence Tomography Using Coarse Grained Diffusion Map", *Medical Image Analysis*, vol. 17, no. 8, pp. 907-928, Dec. 2013.
  34. R. Kafieh, **H. Rabbani\***, S. Kermani, "A Review of Algorithms for Segmentation of Optical Coherence Tomography from Retina", *Journal of Medical Signals and Sensors*, vol. 3, no. 1, pp. 45-60, 2013.
  35. R. Kafieh, **H. Rabbani\***, F. Hajizadeh, M. Ommani, S. Kermani, "An Accurate Multimodal 3D Vessel Segmentation Method Based on Brightness Variations on OCT Layers and Curvelet Domain Fundus Image Analysis", *IEEE Transactions on Biomedical Engineering*, vol. 60, no. 10, pp. 2815-2823, Oct. 2013.
  36. M. Sheikhhosseini, **H. Rabbani\***, M. Zekri, A. Talebi, "Automatic Diagnosis of Malaria Based on Complete Circle-Ellipse Fitting Search Algorithm", *Journal of Microscopy*, vol. 252, no. 3, pp. 189-203, Dec. 2013.
  37. **H. Rabbani\***, M. Sonka, M. D. Abramoff, "Optical Coherence Tomography Noise Reduction Using Anisotropic Local Bivariate Gaussian Mixture Prior in 3-D Complex Wavelet Domain", *International Journal of Biomedical Imaging*, vol. 2013, Article ID 417491, 23 pages.
  38. M. Golabakhsh, **H. Rabbani\***, "Vessel Based Registration of Fundus and OCT Projection Images of Retina Using a Quadratic Registration Model", *IET Image Processing*, vol. 7, no. 8, pp. 768-776, Nov. 2013.
  39. M. Etehadtavakol\*, E.Y.K. Ng, V. Chandranc, **H. Rabbani**, "Separable and Non-separable Discrete Wavelet Transform based Texture Features and Image Classification of Breast Thermograms", *Infrared Physics & Technology*, vol. 61, pp. 274-286, Nov. 2013.
  40. R. Kafieh, **H. Rabbani\***, M. Sonka, M. D. Abramoff, "Curvature Correction of Retinal OCTs Using Graph-Based Geometry Detection", *Physics in Medicine & Biology*, vol. 58, pp. 2925-2938, 2013.
  41. **H. Rabbani\***, S. Gazor, "Video Denoising in 3-D Complex Wavelet Domain Using Local Bessel K-Form Prior", *IET Image Processing*, vol. 6, no. 9, pp. 1262-1274, Dec. 2012.
  42. M. Esmaili, **H. Rabbani\***, A. M. Dehnavi, A. Dehghani, "Automatic Detection of Exudates and Optic Disk in Retinal Images Using Curvelet Transform", *IET Image*

Processing, vol. 6, no. 7, pp. 1005-1013, Oct. 2012.

43. SH. Hajeb, **H. Rabbani\***, MR. Akhlaghi “Diabetic Retinopathy Grading by Digital Curvelet Transform”, Computational and Mathematical Methods in Medicine, vol. 2012, Article ID 761901, 11 pages, 2012.
44. SH. Hajeb, **H. Rabbani\***, A. M. Dehnavi, MR. Akhlaghi, SH. H. Javanmard, “Analysis of Foveal Avascular Zone for Grading of Diabetic Retinopathy Severity Based on Curvelet Transform”, Graefe's Archive for Clinical and Experimental Ophthalmology (Springer), vol. 250, no. 11, pp. 1607-1614, Nov. 2012.
45. R. Soltanzadeh, **H. Rabbani\***, A. Talebi, “Extraction of Nucleolus Candidate Zone in White Blood Cells of Peripheral Blood Smear Images Using Curvelet Transform”, Computational and Mathematical Methods in Medicine, vol. 2012, Article ID 574184, 12 pages, 2012.
46. M. Esmaeili, **H. Rabbani\***, A. Mehri, “Automatic Optic Disk Boundary Extraction by the Use of Curvelet Transform and Deformable Variational Level Set Model”, Pattern Recognition, vol. 47, no. 7, pp. 2832-2842, July 2012.
47. **H. Rabbani\***, M. P. Mahjub, E. Farahabadi, A. Farahabadi, A. Mehri, “An Entropy-Based Method for Ischemia Diagnosis Using ECG Signal in Wavelet Domain”, Journal of Research in Medical Sciences, vol. 16, no. 11, pp. 1473-1482, 2011.
48. **H. Rabbani\***, “Statistical modeling of low SNR magnetic resonance images in wavelet domain using Laplacian prior and two-sided Rayleigh noise for visual quality improvement”, Measurement Science Review, vol. 11, no. 4., pp. 125-130, 2011.
49. F. Rahimi and **H. Rabbani\***, “A dual adaptive watermarking scheme in contourlet domain for DICOM images”, BioMedical Engineering OnLine, 10:53, 2011.
50. **H. Rabbani\*** H, M. P. Mahjub, E. Farahabadi, A. Farahabadi, "R Peak Detection in Electrocardiogram Signal Based on an Optimal Combination of Wavelet Transform, Hilbert Transform, and Adaptive Thresholding", Journal of Medical Signals and Sensors, vol. 1, no. 2, pp. 91-98, 2011.
51. A. Mehri, E. Farahabadi, **H. Rabbani\***, A. Farahabadi, M. P. Mahjub, N. Rajabi, “Detection and Classification of Cardiac Ischemia by Using Vectorcardiogram Signal via Neural Network”, Journal of Research in Medical Sciences, vol. 16, no. 2, pp. 136-142, 2011.
52. **H. Rabbani\***, S. Gazor, “Image Denoising Employing Local Mixture Models in Sparse Domains”, IET Image Processing, vol. 4, no. 5, pp. 413-428, Oct. 2010.
53. **H. Rabbani**, S. Gazor\*, R. Nezafat, “Wavelet-Based 3D Medical Image Denoising Using Bivariate Laplacian Mixture Model”, IEEE Transactions on Biomedical Engineering, vol. 56, no. 12, pp.2826-2837, Dec. 2009.
54. **H. Rabbani\***, “Image Denoising in Steerable Pyramid Domain Based on a Local Laplace Prior”, Pattern Recognition, vol. 42, pp. 2181-2193, Sept. 2009.
55. **H. Rabbani**, M. Vafadoost, S. Gazor\*, P. Abolmaesumi, “Speckle Noise Reduction of Medical Ultrasound Images in Complex Wavelet Domain Using Mixture Priors”, IEEE Transactions on Biomedical Engineering, vol. 55, no.9, pp. 2152-2160, Sept. 2008.

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### **Submitted Papers (Under Review)**

- ✓ "Image Analysis in In-Vivo Stem Cell Tracking"
- ✓ "The hp-version of Finite Element Method for Electrical Impedance Tomography with EIDORS"
- ✓ "Interdisciplinary Researches in Iran I-VI"
- ✓ "Circular Symmetric Laplacian Mixture Model in Wavelet Diffusion for Dental Image Denoising"
- ✓ "Detection and Classification of Breast Cancer in Wavelet Sub-bands of Fractal Segmented Cancerous Zones"
- ✓ "Hybrid Method for Prediction of Metastasis in Breast Cancer Patients Using Gene Expression Signals"
- ✓ "Bio-Signal and System Modeling: From Image Processing to System Biology"
- ✓ "Using protein interaction database and support vector machine to improve gene signatures for prediction of breast cancer recurrence"
- ✓ "Designing and implementing bio-impedance spectroscopy device by measuring impedance in a mouse tissue"
- ✓ "Assessment of TGF- $\beta$ 3 on production of aggrecan by human articular chondrocytes in pellet culture system"
- ✓ "An Automatic Algorithm for Segmentation of the Boundaries of Corneal Layers in Optical Coherence Tomography Images using Gaussian Mixture Model"

### **Under Preparation Papers**

- ✓ "Statistical Modeling of Speckle in Optical Coherence Tomography Images"
- ✓ "Automatic Symptomatic Exudate-Associated Derangement (SEAD) Detection in Optical Coherence Tomography"
- ✓ "Image Modeling Using Spherically Invariance Random Processes"
- ✓ "Gauss-Taylor Expansion: A New Model for Statistical Modeling of Images in Sparse Domains"
- ✓ "On the Local EM Algorithm"
- ✓ "A New Speckle Noise Reduction Method in a Bayesian Framework"
- ✓ "A Two-Step Video Denoising Method Based on an Accurate Estimation of Local Variance in a Bayesian Framework "

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