

# Hossein Rabbani

Senior Member,  
IEEE

Associate Professor  
Department of Biomedical Engineering,  
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&  
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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)  
**Faculty 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: Dr. 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)  
**Faculty of Biomedical Engineering** (The Center of Excellence on Biomedical Engineering in Iran), **Amirkabir University of Technology** (Tehran Polytechnic), **Tehran, Iran.**

- Research areas: **motion estimation**, wavelet transform (multiwavelet, **complex wavelet**), image denoising, video restorations (blotches, **scratches**,...).
- Dissertation research topic: **“Video Restoration based on Motion Estimation in Complex Wavelet Domain”**
- Supervisor: Dr. Mansur Vafadust
- Advisor: Dr. 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)  
**Electrical and Computer Engineering Department, Isfahan University of Technology (IUT), Isfahan, Iran.**

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

## Work Experience

2003-2013

### 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 Network
  - Pattern Recognition
  - Stochastic Processes
  - Sparse Transforms and Their Applications in Signal Processing
  - System Identification

### Supervising and Advising

- **Supervisor:**

PhD dissertation researches entitled (in progress):

- Combination of graph based algorithms and time-frequency methods for processing of OCTs
- A new model based on multivariable Gaussianization of optical coherence tomography (OCT) data
- Seeking an appropriate feature extraction method for breast cancer recurrence prediction based on microarray gene expression data
- Automatic detection of acute myeloid leukemia in microscopy images using dictionary learning

M.Sc. dissertation researches entitled:

- 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 asymmetry 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
- Image Restoration Using Gaussian Mixture Models with Neighborhood Nonlocal Clustering

B.Sc. dissertation research entitled:

- Angle detection for biomaterial based on image processing

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

- 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%**
    - ✓ Physics: **86.7%**
    - ✓ Chemistry: **91.2%**.
  - 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, Circuits and Systems Society, Computer Society
- ✓ SPIE member

## Article Reviewer

- ✓ IEEE Transactions on Image Processing
- ✓ IEEE Transactions on Signal Processing
- ✓ IEEE Transactions on Medical Imaging

- ✓ IEEE Transactions on Biomedical Engineering
- ✓ IEEE Signal Processing Letters
- ✓ IEEE Transactions on Geoscience & Remote Sensing
- ✓ IEEE Transactions on Circuits & Systems for Video Technology
- ✓ IEEE Transactions on Multimedia
- ✓ IEEE Transactions on Systems, Man, and Cybernetics--Part B: Cybernetics
- ✓ IEEE Transactions on Biomedical Circuits and Systems
- ✓ 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
- ✓ Measurement
- ✓ Computer Methods and Programs in Biomedicine,
- ✓ Journal of Visual Image Communication & Representation
- ✓ Applied Optics
- ✓ Journal of the Optical Society of America A
- ✓ Biomedical Optics Express
- ✓ PLOS ONE
- ✓ 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 (Springer)
- ✓ Multidimensional Systems and Signal Processing (Springer),
- ✓ Circuits, Systems & Signal Processing (Springer),
- ✓ Measurement Science Review,

- ✓ Journal of Electromagnetic Waves and Applications - Progress in Electromagnetic Research (PIER, PIER B,C,M, PIER Letters)
- ✓ Biomedical Engineering OnLine
- ✓ International Journal of Imaging Systems and Technology
- ✓ 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

- ✓ R. Kafieh, H. Rabbani, I. Selesnick, "Three Dimensional Data-Driven Multi Scale Atomic Representation of Optical Coherence Tomography", **IEEE Transactions on Medical Imaging**, accepted, 2014.
- ✓ 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.
- ✓ 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 (Springer)**, vol. 8, no. 2, pp. 205-222, Feb. 2014.
- ✓ 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.
- ✓ 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.
- ✓ 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.
- ✓ 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.

- ✓ 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.
- ✓ 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.
- ✓ 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.
- ✓ 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.
- ✓ 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.
- ✓ M. Esmaeili, 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.
- ✓ 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.
- ✓ 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.
- ✓ 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.
- ✓ 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.
- ✓ 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.
- ✓ Hossein 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.
- ✓ Farhad Rahimi and Hossein Rabbani, "A dual adaptive watermarking scheme in contourlet domain for DICOM images", **BioMedical Engineering OnLine**, 10:53, 2011.
- ✓ 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.

- ✓ 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.
- ✓ H. Rabbani, M. Vafadoost, 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.
- ✓ H. Rabbani, “Image Denoising in Steerable Pyramid Domain Based on a Local Laplace Prior”, **Pattern Recognition**, vol. 42, pp. 2181-2193, Sept. 2009.
- ✓ 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.
- ✓ H. Rabbani, M. Vafadoost, "Image/Video Denoising Based on a Mixture of Laplace Distributions with Local Parameters in Multidimensional Complex Wavelet Domain", **Signal Processing**, vol. 88, pp. 158-173, Jan. 2008.
- ✓ H. Rabbani, M. Vafadoost, "Wavelet Based Image Denoising Based on a Mixture of Laplace Distributions”, **Iranian Journal of Science & Technology**, Transaction B., Engineering, vol. 30, no. B6., pp. 711-733, 2006.

#### Book Chapters

- ✓ Alireza Mehri Dehnavi, Nilufar Salehpour, Hossein Rabbani, Eiman Farahabadi, Amin Farahabadi, "Automatic Analysis of Vectorcardiogram Signal for Detection of Cardiovascular Diseases", **Cardiovascular Disease**, ISBN 978-1-922227-28-7, Publisher: iConcept Press, 2013.
- ✓ Hossein Rabbani, Alireza Mehri Dehnavi and Mehrab Ghanatbari, "Estimation the Depth of Anesthesia by the Use of Artificial Neural Network", **Artificial Neural Networks - Methodological Advances and Biomedical Applications**, ISBN 978-953-307-243-2, Edited by: Kenji Suzuki, Publisher: InTech, April 2011.

#### Selected International Conference Papers

- ✓ R. Shams, H. Rabbani, “A comparison between x-lets in denoising cDNA microarray images”, in Proc. IEEE 2014 International Conference on Acoustics, Speech, and Signal Processing (**ICASSP**), Florence, Italy, May 4-9, 2014, pp. 2483-2487.
- ✓ R. Kafieh, H. Rabbani, “Combination of graph theoretic grouping and time-frequency analysis for image segmentation with an example for EDI-OCT”, in Proc. IEEE 2014 International Conference on Acoustics, Speech, and Signal Processing (**ICASSP**), Florence, Italy, May 4-9, 2014, pp. 5115-5119.
- ✓ R. Kafieh, H. Rabbani, “Combination of graph theoretic grouping and time-frequency analysis for image segmentation with an example for EDI-OCT”, accepted in **IEEE** 2014 International Conference on Acoustics, Speech, and Signal Processing (**ICASSP**), Florence,

Italy, May 4-9, 2014.

- ✓ T. Mahmudi, R. Kafieh, H. Rabbani, “Comparison of macular OCTs in right and left eyes of normal people”, in Proc. **SPIE** 9038, Medical Imaging 2014: Biomedical Applications in Molecular, Structural, and Functional Imaging, 90381K, San Diego, California, United States Feb. 15-20, 2014.
- ✓ O. Sarrafzadeh, H. Rabbani, A. Talebi, “The best features selection for Leukocytes classification in blood smear microscopic images”, in Proc. **SPIE** 9041, Medical Imaging 2014: Digital Pathology, 90410P, San Diego, California, United States Feb. 15-20, 2014.
- ✓ F. Ghasemi, H. Rabbani, “A statistical model for 3D segmentation of retinal choroid in optical coherence tomography images”, in Proc. **SPIE** 9038, Medical Imaging 2014: Biomedical Applications in Molecular, Structural, and Functional Imaging, 90381W, San Diego, California, United States Feb. 15-20, 2014.
- ✓ A. Soltani, S. Sadri, H. Rabbani, A. Doost-Hosseini, "Vessel Centerlines Extraction from Fundus Fluorescein Angiogram Based on Hessian Analysis of Directional Curvelet Subbands", in Proc. **IEEE** 2013 International Conference on Acoustics, Speech, and Signal Processing (**ICASSP**), Vancouver, Canada, May 26-31, 2013, pp. 1070-1074.
- ✓ R. Kafieh, H. Danesh, H. Rabbani, M. Sonka, M. D. Abramoff, "Vessel Segmentation in Images of Optical Coherence Tomography Using Shadow Information and Thickening of Retinal Nerve Fiber Layer", in Proc. **IEEE** 2013 International Conference on Acoustics, Speech, and Signal Processing (**ICASSP**), Vancouver, Canada, May 26-31, 2013, pp. 1075-1079.
- ✓ R. Kafieh, H. Rabbani, M. Sonka, M. D. Abramoff, “Intra-Retinal Layer Segmentation of Optical Coherence Tomography Using Diffusion Map”, in Proc. **IEEE** 2013 International Conference on Acoustics, Speech, and Signal Processing (**ICASSP**), Vancouver, Canada, May 26-31, 2013, pp. 1080-1084.
- ✓ R. Kafieh, H. Rabbani, M. D. Abramoff, M. Sonka, “OCT image alignment using diffusion maps”, accepted in **IEEE** 2013 International Conference on Acoustics, Speech, and Signal Processing (**ICASSP**), Vancouver, Canada, May 26-31, 2013.
- ✓ R. Kafieh, H. Rabbani, “Optical coherence tomography noise reduction over learned dictionaries with introduction of complex wavelet for start dictionary”, in Wavelets and Sparsity XV, Dimitri Van De Ville; Vivek K. Goyal; Manos Papadakis, Editors, Proceedings of **SPIE** Vol. 8858 (SPIE, Bellingham, WA 2013), 885826.
- ✓ SH. Hajeb, H. Rabbani, “Automatic detection of micro-aneurysms in retinal images based on curvelet transform and morphological operations”, in Applications of Digital Image Processing XXXVI, Andrew G. Tescher, Editors, Proceedings of **SPIE** Vol. 8856 (SPIE, Bellingham, WA 2013), 88561W.
- ✓ Hossein Yousofi, Hossein Rabbani, Peyman Adibi, “Automatic fuzzy based level set method for segmentation of Barrett's esophagus in endoscopy images”, accepted in Applications of Digital Image Processing XXXVI, Part of **SPIE** Optical Engineering + Applications, San Diego Convention Center, San Diego, California, United States Aug. 25-29, 2013.
- ✓ Monireh Sheikhhosseini, Hossein Rabbani, Maryam Zekri, Ardeshir Talebi, “Automatic diagnosis of malaria by use of least square circle-ellipse fitting search”, accepted in

Applications of Digital Image Processing XXXVI, Part of **SPiE** Optical Engineering + Applications, San Diego Convention Center, San Diego, California, United States Aug. 25-29, 2013.

- ✓ SH. Gashmard, A. Mehri, H. Rabbani, "A New Combined Method for Character Recognizing in Farsi Printed Scripts Using PCA", in Proc. **ACM** International Workshop on Natural Language Processing, Aug. 3-5, 2012, Chennai, India, pp. 812-815.
- ✓ N. Salehpour, A. Mehri, H. Rabbani, M. Behjati, "Partial Linear Transformation of Vectorcardiogram to 12 Lead Electrocardiogram Signals", in Proc. **IEEE** 12th International Conference on Bioinformatics & Bioengineering, Larnaca, Cyprus, November 11-13, 2012, pp. 91-94.
- ✓ M. Golabakhsh, H. Rabbani, M. Esmaeili, "Detection and Registration of Vessels of Fundus and Oct Images Using Curvelet Analysis", in Proc. **IEEE** 12th International Conference on Bioinformatics & Bioengineering, Larnaca, Cyprus, November 11-13, 2012, pp. 594-597.
- ✓ N. Salehpour, A. Mehri, H. Rabbani, M. Behjati, "Posterior ECG: Producing a new electrocardiogram signal from vectorcardiogram using partial linear transformation", in Proc. **IEEE** 12th International Conference on Bioinformatics & Bioengineering, Larnaca, Cyprus, November 11-13, 2012, pp. 95-98.
- ✓ J. Jalili, H. Rabbani, R. Kafieh, A. Mehri, "Forming Projection Images From Each Layer of Retina Using Diffusion Map Based OCT Segmentation", in Proc. 11<sup>th</sup> **IEEE** International Conference on Information Science, Signal Processing and their Applications, Quebec, Canada, 2012, pp. 930-934.
- ✓ S. Mohammadpour, A. Mehri, H. Rabbani, V. Lakshminarayanan, "A Pre-Compensation Algorithm for Different Optical Aberrations Using an Enhanced Wiener Filter and Edge Tapering", in Proc. 11<sup>th</sup> **IEEE** International Conference on Information Science, Signal Processing and their Applications, Quebec, Canada, 2012, pp. 935-939.
- ✓ E. Farahabadi, A. Farahabadi, H. Rabbani, M. Parsa Mahjoub, "Detection of QRS Complex in Electrocardiogram Signal Based on a Combination of Hilbert Transform, Wavelet Transform and Adaptive Thresholding," in Proc. **IEEE-EMBS** International Conference on Biomedical and Health Informatics, China, 2012, pp. 170-173.
- ✓ E. Farahabadi, A. Farahabadi, A. Mehri Dehnavi, H. Rabbani, M. Parsa Mahjoub, "Ischemia Detection via Dynamic Time Warping and Fuzzy Rules", in Proc. **IEEE-EMBS** International Conference on Biomedical and Health Informatics, 2012, pp. 166-169.
- ✓ H. Rabbani, S. Gazor, "Local probability distribution of natural signals in sparse domains", in Proc. 2011 **IEEE** International Conference on Acoustics, Speech, and Signal Processing (**ICASSP**), Prague Congress Centre (PCC), May 22-27, 2011, pp. 1289-1292, *The Winner of ICASSP 2011 Travel Grant*.
- ✓ R. Kafieh, H. Rabbani, "Wavelet-Based Medical Infrared Image Noise Reduction Using Local Model for Signal and Noise", in Proc. 2011 **IEEE** Workshop on Statistical Signal Processing (SSP2011), Nice, France, 2011, pp. 549-552.
- ✓ A. Shirazi, H. Ahmadi Noubari, A. Mehri Dehnavi and H. Rabbani, "Application of wavelets and fractal-based methods for detection of microcalcification in mammograms: a comparative analysis using neural network", Proc. **SPiE** 8285, 82857E, 2011.

- ✓ M. Esmaili, H. Rabbani, A. Mehri, A. Dehghani, “A new curvelet transform based method for extraction of red lesions in digital color retinal images”, in Proc. 2010 **IEEE** International Conference on Image Processing (**ICIP**), Hong Kong, 26-29 Sept. 2010, pp. 4093-4096, *The Winner of IEEE Signal Processing Society (SPS) Grant*.
- ✓ H. Rabbani, “Video deblurring in complex wavelet domain using local Laplace prior for enhancement and anisotropic spatially adaptive denoising for PSF detection”, in Proc. 2010 **IEEE** International Conference on Image Processing (**ICIP**), Hong Kong, 26-29 Sept. 2010, pp. 3329-3332.
- ✓ M. Ghanatbari, A. Mehri Dehnavi, H. Rabbani, A. Mahuri, “A comparative study of the output correlations between wavelet transform, neural and neuro fuzzy networks and BIS index for depth of anesthesia”, accepted in **IEEE** Symposium on Industrial Electronics and Applications (ISIEA 2010), Malaysia, 3-6 Oct. 2010, pp.655-659.
- ✓ F. Rahimi, H. Rabbani, “A Visually imperceptible and robust image watermarking scheme in contourlet domain”, in Proc. **IEEE** International Conference on Signal Processing, China, 24-28 Oct. 2010, pp. 1817-1820.
- ✓ R. Soltanzadeh, H. Rabbani, “Classification of three types of red blood cells in peripheral blood smear based on morphology”, in Proc. **IEEE** International Conference on Signal Processing, China, 24-28 Oct. 2010, pp. 707-710.
- ✓ P. Akbary, H. Rabbani, “Removing power line interference and ECG signal from EMG signal using matching pursuit”, in Proc. **IEEE** International Conference on Signal Processing, China, 24-28 Oct. 2010, pp. 1714-1717.
- ✓ A. Farahabadi, E. Farahabadi, H. Rabbani, A. Mehri, M. P. Mahjoob, “An entropy-based method for ischemia diagnosis using ECG signal in wavelet domain”, in Proc. **IEEE** International Conference on Signal Processing, China, 24-28 Oct. 2010, pp. 195-198.
- ✓ A. Shirazinowdeh, H. Ahmadinoubari, A. Mehridehnavi and H. Rabbani, “Application of wavelets and fractal-based methods for detection of Microcalcification in Mammograms: A Comparative Analysis using Neural Network”, accepted in 2010 International Conference on Signal and Information Processing, 14-15 Dec. 2010, China.
- ✓ Z. Mirzadeh, R. Mehri, H. Rabbani, “A fast method for video deblurring based on a combination of gradient methods and denoising algorithms in Matlab and C environments”, accepted in IS&T/**SPIE** Electronic Imaging 2010, San Jose Convention Center San Jose, Proc. SPIE Vol. 7529, CA United States, 17 - 21 January 2010.
- ✓ M. Esmaili, H. Rabbani, A. Mehri, A. Dehghani, “Extraction of retinal blood vessels by curvelet transform”, in Proc. 2009 **IEEE** International Conference on Image Processing (**ICIP**), Cairo, Egypt, Nov. 7-11, 2009, pp. 3353-3356, *The Winner of IEEE ICIP Student Author Participation Award*.
- ✓ M. Esmaili, H. Rabbani, A. Mehri, A. Dehghani, “Automatic optic disk detection by the use of curvelet transform”, accepted in 9th **IEEE** International Conference on Information Technology and Applications in Biomedicine (ITAB), Cyprus, 5-7 November, 2009.
- ✓ M. Ghanatbari, A. Mehri, H. Rabbani, A. Mahuri, “Estimating the depth of anesthesia by applying sub-parameters to an artificial neural network during general anesthesia”, accepted in 9th **IEEE** International Conference on Information Technology and Applications in

Biomedicine (ITAB), Cyprus, 5-7 November, 2009.

- ✓ A. Farahabadi, E. Farahabadi, H. Rabbani, A. Mehri, M. P. Mahjoob, “Noise removal from Electrocardiogram Signal Employing an Artificial Neural Network in Wavelet Domain”, accepted in 9th **IEEE** International Conference on Information Technology and Applications in Biomedicine (ITAB), Cyprus, 5-7 November, 2009.
- ✓ H. Rabbani, “Shape adaptive estimation of variance in steerable pyramid domain and its application for spatially adaptive image enhancement”, in Proc. 2009 **IEEE** International Conference on Acoustics, Speech, and Signal Processing (**ICASSP**), Taipei, Taiwan, April 19 - 24, 2009.
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#### **National Journal Papers**

- ✓ T. Mahmudi, R. Kafieh, H. Rabbani, A. Mehri, M. R. Akhlaghi, Kh. Arbabian, M. Ahmadi, "Evaluation of Asymmetry of Retinal Nerve Fiber Layer and Total Retina in Right and Left Eyes of Normal Subjects Using Extracted Features from Optical Coherence Tomography", **Journal of Isfahan Medical School**, vol. 31, no. 247, first week, Oct. 2013.
- ✓ Z. Amini, H. Rabbani, "EEG- based Seizure detection by Gaussian Process model", **Journal of Isfahan Medical School**, vol. 31, no. 243, first week, Aug. 2013.
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- ✓ A. Farahabadi, E. Farahabadi, H. Rabbani, M. Rezvani, "An Automatic Method for Measuring The Angle of Lumbar Lordosis", **Journal of Isfahan Medical School**, vol. 30, no. 200, 2nd week, pp. 1145-1152.

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

- ✓ "Image Analysis in In-Vivo Stem Cell Tracking", **accepted**.
- ✓ "R Peak Detection in Electrocardiogram Signal Based on an Optimal Combination of Wavelet Transform, Hilbert Transform and Adaptive Thresholding", **accepted**.
- ✓ "The hp-version of Finite element method for Electrical Impedance Tomography with EIDORS", **accepted**.
- ✓ "Interdisciplinary Researches in Iran", **accepted**.
- ✓ "A Review of Algorithms for Segmentation of Optical Coherence Tomography from Retina", **accepted**.
- ✓ "Interdisciplinary Researches in Iran II", **accepted**.
- ✓ "Bio-Signal and System Modeling: From Image Processing to System Biology", **accepted**.
- ✓ "Circular symmetric Laplacian mixture model in wavelet diffusion for dental image denoising", **accepted**.
- ✓ "Classification of Benign and Malignant Lesions in Mammograms Based on Detection of Cancerous Zones Using Fractal Modeling and Wavelet Transform"
- ✓ "Hybrid method for prediction of metastasis in breast cancer patients using gene expression signals", **accepted**.
- ✓ "Using protein interaction database and support vector machine to improve gene signatures for prediction of breast cancer recurrence", **accepted**.
- ✓ "Designing and implementing bio-impedance spectroscopy device by measuring impedance in a mouse tissue", **accepted**.
- ✓ "Assessment of TGF- $\beta$ 3 on production of aggrecan by human articular chondrocytes in pellet culture system", **accepted**.

#### **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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