

CURRICULUM VITAE

Raheleh Kafieh

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January 2019

EDUCATION

- 2009 - 2014 Isfahan University of Medical Sciences, Isfahan, Iran, Ph.D.
Major: Biomedical Engineering (Bioelectric)
Advisor: Prof. Hossein Rabbani
Dissertation: Combination of graph theory and time-frequency methods
for analysis of Optical Coherence Tomography
GPA: 18.61 /20, Thesis grade: 20 / 20, Ranked first
- 2006 - 2008 Isfahan University of Medical Sciences, Isfahan, Iran, M.A.
Major: Biomedical Engineering (Bioelectric)
Supervisor: Prof. Alireza Mehri, Prof. Saeed Sadri
Dissertation: Digital Cephalogram Analysis for Automatic Detection of
Important Landmarks
GPA: 18.91 /20, Thesis grade: 19.97 / 20, Ranked first
- 2001 - 2005 Sahand University of Technology, Isfahan, Iran, B.A.
Major: Biomedical Engineering (Bioelectric)
Supervisor: Dr. Amir Saffari-azar
Dissertation: Gender Discrimination of Speakers Using Neural
Networks
GPA: 17.71 /20, Ranked first

ACADEMIC EMPLOYMENT

- November 2018 – Present **Assistant Professor, Vice dean- Research Affairs**, Department of
Advanced Medical Technologies, Isfahan University of Medical
Sciences, Isfahan, Iran
- August 2018 – November 2018 **Visiting Researcher**, Neurocure Clinical Research Center (NCRC),
Charite Medical University, Berlin, Germany
Supervisor: Prof. Alexander Brandt
- September 2015- August 2018 **Assistant Professor, Vice dean- Educational Affairs**, Department of
Advanced Medical Technologies, Isfahan University of Medical

Sciences, Isfahan, Iran

March 2015-
September 2015

Visiting Researcher, Faculty of Engineering and Natural Sciences,
Sabanci University, Istanbul, Turkey
Supervisor: Prof.Gozde Unal

Fall 2009 –
March 2015

Graduate Teaching Assistant/Assistant Instructor, Isfahan
University of Medical Sciences

Fall, 2006 –
Fall 2009

Lecturer, Sepahan University, Isfahan, Iran

AREAS OF INTEREST

Image Processing

- Medical Image Processing
- Computer Vision
- Image enhancement methods
- Noise reduction methods
- Graph based image processing

Machine learning

- Deep Learning

Time-frequency methods

- Sparse representations
- Dictionary learning
- X-lets

Data acquisition and management

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

HONORS AND AWARDS

2018

Research Fellowship Award

Awarded by EINSTEIN Forum, Berlin, Germany

2017

Best Young USERN office Award

Awarded by USERN central office

2014

Research Scholarship Award

Awarded by TUBITAK 2216, Istanbul, Turkey

2014

Ranked first among graduating students

in PhD of Biomedical Engineering, Isfahan University of Medical Science, Isfahan, Iran

2014

Voluntary Contribution Fund

Student Travel Award by IEEE R8 VCF

- 2013 **Best researcher award**
Awarded by Isfahan University of Medical Sciences, Office of Research affairs
- 2009 **Ranked first in national PhD Entrance Exam**
in Biomedical Engineering, Iran
- 2009 **Full-Fund PhD Acceptances**
University Of British Colombia (Biomedical Engineering)
Boston University (Electrical Engineering)
University De Montreal (Electrical Engineering)
Ghent University (Electrical Engineering)
- 2008 **Ranked first among graduating students**
in M.Sc. of Biomedical Engineering, Isfahan University of Medical Science, Isfahan,
Iran
- 2007 **Best Paper Award**
for "LVQ Neural Networks for Detection of Ventricular Arrhythmias", ISCEE07,
Isfahan, Iran
- 2005 **Ranked first among graduating students**
in B.Sc. of Biomedical Engineering, Sahand University of Technology, Tabriz, Iran
- 2001 **Ranked 840th among 400,000 competitors**
in national universities attendance exam, Iran
in B.Sc. of Biomedical Engineering, Sahand University of Technology, Tabriz, Iran

PROFESSIONAL AFFILIATIONS AND SERVICES _____

Ad-hoc Reviewer

IEEE Transaction of Image Processing (IEEE TIP)
 Medical Image Analysis (MEDIA Elsevier)
 IEEE Transaction on Neural Networks (IEEE TNN)
 Digital Signal Processing (DSP Elsevier)
 Infrared Physics & Technology (INPHY Elsevier)
 Signal, Image and Video Processing (SIVP)
 Computer Methods and Programs in Biomedicine (CMPB)
 Journal of Medical Signals and Sensors (JMSS)
 Journal of Scientific Research and Essay
 Journal of ZUS (Computer and Electronics)

Committee Member

Member of Executive committee at International Affairs, Isfahan University of Medical Sciences
 Head of Biomedical engineering Section in 10th Iranian Student Conference on EE (ISCEE'07) (2007)
 Director of Student Committee in 17th Iranian Biomedical Engineering Conference (ICBME'17) (2010)

PUBLICATIONS

INVITED BOOK CHAPTERS

Hajizadeh, F., & **Kafieh, R.** (2018).

Introduction to Optical Coherence Tomography. In Atlas of Ocular Optical Coherence Tomography (pp. 1-25). Springer, Cham.

Rabbani, H., **Kafieh, R.**, & Amini, Z. (2016).

Optical Coherence Tomography Image Analysis. Wiley Encyclopedia of Electrical and Electronics Engineering, 1-16.

PEER-REVIEWED JOURNAL ARTICLES

Mokhtari, M., Rabbani, H., Mehri-Dehnavi, A., **Kafieh, R.**, Akhlaghi, M. R., Pourazizi, M., & Fang, L. (2019).

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*, 51, 30-41.

Oghli, M. G., Mohammadzadeh, A., **Kafieh, R.**, & Kermani, S. (2018).

A hybrid graph-based approach for right ventricle segmentation in cardiac MRI by long axis information transition. *Physica Medica*, 54, 103-116.

Miri, M., Amini, Z., Rabbani, H., & **Kafieh, R.** (2017).

A comprehensive study of retinal vessel classification methods in fundus images. *Journal of medical signals and sensors*, 7(2), 59.

Kashefpor, M., **Kafieh, R.**, Jorjandi, S., Golmohammadi, H., Khodabande, Z., Abbasi, M., ... & Rabbani, H. (2017).

Isfahan MISP dataset. *Journal of medical signals and sensors*, 7(1), 43.

Kafieh, R., Amini, Z., & Rabbani, H. (2016).

Interdisciplinary researches in Iran IV: The road map of ocular image analysis research group. *Journal of medical signals and sensors*, 6(2), 67.

Rabbani, H., **Kafieh, R.**, Kazemian Jahromi, M., Jorjandi, S., Mehri Dehnavi, A., Hajizadeh, F., & Peyman, A. (2016).

Obtaining thickness maps of corneal layers using the optimal algorithm for intracorneal layer segmentation. *International journal of biomedical imaging*, 2016.

Jamshidi, M., Rabbani, H., Amini, Z., **Kafieh, R.**, Ommani, A., & Lakshminarayanan, V. (2016).

Automatic detection of the optic disc of the retina: A fast method. *Journal of medical signals and sensors*, 6(1), 57.

Kafieh, R., Rabbani, H., Hajizadeh, F., Abramoff, M. D., & Sonka, M. (2015).

Thickness mapping of eleven retinal layers segmented using the diffusion maps method in normal eyes. *Journal of ophthalmology*, 2015.

Kafieh, R., Rabbani, H., & Selesnick, I. (2015).

Three dimensional data-driven multi scale atomic representation of optical coherence tomography. *IEEE transactions on medical imaging*, 34(5), 1042-1062

Danesh, H., **Kafieh, R.**, Rabbani, H., & Hajizadeh, F. (2014).

Segmentation of choroidal boundary in enhanced depth imaging OCTs using a multiresolution texture based modeling in graph cuts. *Computational and mathematical methods in medicine*, 2014.

Jahromi, M. K., **Kafieh, R.**, Rabbani, H., Dehnavi, A. M., Peyman, A., Hajizadeh, F., & Ommani, M. (2014).

An automatic algorithm for segmentation of the boundaries of corneal layers in optical coherence tomography images using gaussian mixture model. *Journal of medical signals and sensors*, 4(3), 171.

Kafieh, R., Rabbani, H., Abramoff, M. D., & Sonka, M. (2013).

Intra-retinal layer segmentation of 3D optical coherence tomography using coarse grained diffusion map. *Medical image analysis*, 17(8), 907-928.

Kafieh, R., Rabbani, H., Hajizadeh, F., Ommani, M., & Kermani, S. (2013).

An accurate multimodal 3-D vessel segmentation method based on brightness variations on OCT layers and curvelet domain fundus image analysis. *IEEE Trans. Biomed. Engineering*, 60(10), 2815-2823.

Kafieh, R., Rabbani, H., Abramoff, M. D., & Sonka, M. (2013).

Curvature correction of retinal OCTs using graph-based geometry detection. *Physics in Medicine & Biology*, 58(9), 2925.

EtehadTavakol, M., Chandran, V., Ng, E. Y. K., & **Kafieh, R.** (2013).

Breast cancer detection from thermal images using bispectral invariant features. *International journal of thermal sciences*, 69, 21-36.

Kafieh, R., Rabbani, H., & Kermani, S. (2013).

A review of algorithms for segmentation of optical coherence tomography from retina. *Journal of medical signals and sensors*, 3(1), 45.

Jafarian, F., & **Kafieh, R.** (2013).

New Algorithm to Detect Moving Target in an Image with Variable and Complex Background Using Wavelet Transform. *International Journal of Computer Theory and Engineering*, 5(1), 71.

Kafieh, R., & Mehrdehnavi, A. (2013).

A comprehensive comparison of different clustering methods for reliability analysis of microarray data. *Journal of medical signals and sensors*, 3(1), 22.

Mahmudi, T., **Kafieh, R.**, Rabbani, H., Dehnavi, A. M., Akhlaghi, M. R., Arbabian, K., & Ahmadi, M. (2013).

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*, 31(247).

Danesh, H., **Kafieh, R.**, & Rabbani, H. (2013).

Automated Choroidal Segmentation in Enhanced Depth Imaging Optical Coherence Tomography Images. *Journal of Isfahan Medical School*, 31(230).

Kafieh, R., Shahmoradi, M., Hekmatian, E., Foroohandeh, M., & Emamidoost, M. (2012).

Removing distortion of periapical radiographs in dental digital radiography using embedded markers in an external frame. *Journal of medical signals and sensors*, 2(4), 219.

Kafieh, R., Rabbani, H., & Foroohandeh, M. (2012).

Circular symmetric Laplacian mixture model in wavelet diffusion for dental image denoising. *Journal of medical signals and sensors*, 2(2), 103.

Kafieh, R., Lotfi, T., & Amirfattahi, R. (2011).

Automatic detection of defects on polyethylene pipe welding using thermal infrared imaging. *Infrared Physics & Technology*, 54(4), 317-325.

Kafieh R., Mehri A., Sadri S., Raji H. (2009).

Automatic Detection of Cephalometric Landmarks on Cephalograms of Patients Referring to Isfahan University of Medical Sciences. *Iranian Journal of Biomedical Engineering*.

MANUSCRIPTS IN PREPARATION/SUBMITTED FOR REVIEW _____

Kafieh R., Rabbani H., Unal G. (under review).

Bandlets on Oriented Graphs: Application to Medical Image Enhancement. *IEEE Access*.

Mahmudi T., **Kafieh R.**, Rabbani H., Mehri A., Akhlaghi M.(under review).

Evaluation of asymmetry in right and left eyes of normal subjects using extracted features from optical coherence tomography and fundus images. *International Journal of Retina and Vitreous*

Montazeri M., Sajjadifar Z., **Kafieh R.** (in preparation).

A semiautomatic software for segmentation and feature extraction from Optical Coherence Tomography images.

Kafieh R., Motamedi S., Zimmermann H., Brandt A. (in preparation).

Berlin-Deep Algorithm for retinal segmentation in neurodegenerative diseases

Salafian B., Rashno A., Sadri S., **Kafieh R.** (in preparation).

Neutrosophic space for segmentation of choroidal boundary in OCT images from Macula and optic Nerve Head

Ataie A., Raii M., Ashtari F., Mansurian M., **Kafieh R.** (in preparation).

Comparison of radiometric symmetry in OCT data from eyes of normal, MS, and Devic patients

Kafieh R., Kadas E., Yadav S., Zimmermann H., Brandt A. (in preparation).

Deep learning methods for combination of OCT images with clinical and morphometry data for discrimination of healthy, MS and Devic people

CONFERENCE PRESENTATIONS

- Mokhtari, M., Rabbani, H., Mehri-Dehnavi, A., & **Kafieh, R.** (2017, July).
Exact localization of breakpoints of Retinal pigment epithelium in Optical Coherence Tomography of Optic Nerve Head. In *Engineering in Medicine and Biology Society (EMBC), 2017 39th Annual International Conference of the IEEE* (pp. 1505-1508).
- Jorjandi, S., Rabbani, H., **Kafieh, R.**, & Amini, Z. (2017, July).
Statistical modeling of Optical Coherence Tomography images by asymmetric Normal Laplace mixture model. In *Engineering in Medicine and Biology Society (EMBC), 2017 39th Annual International Conference of the IEEE* (pp. 4399-4402).
- Mahmudi, T., **Kafieh, R.**, Rabbani, H., Mehri, A., & Akhlagi, M. (2015, September).
Asymmetry evaluation of fundus images in right and left eyes using radon transform and fractal analysis. In *Image Processing (ICIP), 2015 IEEE International Conference on* (pp. 163-167).
- Mahmudi, T., **Kafieh, R.**, Rabbani, H., & Akhlagi, M. (2014, March).
Comparison of macular OCTs in right and left eyes of normal people. In *Medical Imaging 2014: Biomedical Applications in Molecular, Structural, and Functional Imaging* (Vol. 9038, p. 90381W). International Society for Optics and Photonics.
- Kafieh, R.**, Rabbani, H., & Gazor, S. (2014, May).
Combination of graph theoretic grouping and time-frequency analysis for image segmentation. In *ICASSP* (pp. 5115-5119).
- Mahmudi, T., **Kafieh, R.**, Rabbani, H., & Akhlagi, M. (2014, March).
Comparison of macular OCTs in right and left eyes of normal people. In *Medical Imaging 2014: Biomedical Applications in Molecular, Structural, and Functional Imaging* (Vol. 9038, p. 90381W). International Society for Optics and Photonics.
- Kafieh, R.**, Danesh, H., Rabbani, H., Abramoff, M., & Sonka, M. (2013, May).
Vessel segmentation in images of optical coherence tomography using shadow information and thickening of Retinal Nerve Fiber Layer. In *Acoustics, Speech and Signal Processing (ICASSP), 2013 IEEE International Conference on* (pp. 1075-1079).
- Kafieh, R.**, Rabbani, H., Abramoff, M., & Sonka, M. (2013, May).
Intra-retinal layer segmentation of optical coherence tomography using diffusion map. In *Acoustics, Speech and Signal Processing (ICASSP), 2013 IEEE International Conference on* (pp. 1080-1084).
- Kafieh, R.**, & Rabbani, H. (2013, September).
Optical Coherence Tomography noise reduction over learned dictionaries with introduction of complex wavelet for start dictionary. In *Wavelets and Sparsity XV* (Vol. 8858, p. 885826). International Society for Optics and Photonics.

- Jalili, J., Rabbani, H., Akhlaghi, M., **Kafieh, R.**, & Dehnavi, A. M. (2012, July).
Forming projection images from each layer of retina using diffusion may based OCT segmentation. In *ISSPA* (pp. 930-934).
- Naeemabadi, M., Rabbani, P., MehriDehnavi, A., & **Kafieh, R.** (2011, November).
An Automatic Solution for Unwanted Black Area Elimination in Photocopy Machines. In *Machine Vision and Image Processing (MVIP), 2011 7th Iranian* (pp. 1-5).
- Kafieh, R.**, & Rabbani, H. (2011, June).
Wavelet-based medical infrared image noise reduction using local model for signal and noise. In *Statistical Signal Processing Workshop (SSP), 2011 IEEE* (pp. 549-552).
- Kafieh, R.**, Sadri, S., Mehri, A., & Raji, H. (2008).
Discrimination of bony structures in cephalograms for automatic landmark detection. In *Advances in Computer Science and Engineering* (pp. 609-620). Springer, Berlin, Heidelberg.
- Kafieh, R.**, Mehri, A., & Sadri, S. (2007, December).
Automatic landmark detection in cephalometry using a modified active shape model with sub image matching. In *Machine Vision, 2007. ICMV 2007. International Conference on* (pp. 73-78).
- Kafieh, R.**, & Amirfattahi, R. (2007, December).
Detection of ventricular Arrhythmias using roots location in AR-modelling. In *Information, Communications & Signal Processing, 2007 6th International Conference on* (pp. 1-4).

RESEARCH EXPERIENCE

RESEARCH SCHOLARSHIPS/GRANTS SUCCESSFULLY APPLIED

- | | |
|------|---|
| 2018 | Iran- Switzerland research Seed Money Grant
(Role: Co-PI) A feasibility study to develop an OCT-based ocular health kiosk to diagnose Diabetic Retinopathy |
| 2018 | Research Scholarship Supported by EINSTEIN FORUM
(28,600 Euros) Berlin, Germany |
| 2018 | Research Grant Supported by National Institute for Medical Research Development (NIMAD)
(Role: PI, 17000 \$) Automatic analysis of MRI and OCT Data for discrimination of Multiple Sclerosis (MS) and neuromyelitis optica (NMO) in presence of Isolated Optic Neuritis |
| 2014 | Research Scholarship Supported by TUBITAK
(9000 \$) Design and application of Bandlet on Graph for image denoising |

- 2014 **Research Grant by National Iranian Gas Company (NIGC)**
 (Role: Co-PI, 9000 \$) Non-destructive quality testing of polyethylene pipe welding using thermal infrared imaging technique
- 2008-2016 **Research Grants Supported by Medical Image and Signal Processing (MISP):**
- (Role: PI, 1500 \$) Graph based method for registration of Fundus and OCT data from retina, started in 2016.
- (Role: PI, 1500 \$) Segmentation of Haller's Layer and choroid/sclera boundary in EDI-OCT images, started in 2016.
- (Role: PI, 900 \$) Classification of normal, AMD, and DME cased based on OCT images and Dictionary learning methods, 2016-17.
- (Role: PI, 1500 \$) Scoring Molar Preparations with Image Processing Techniques, 2015-17.
- (Role: PI, 650 \$) Mean shift algorithms for Segmentation of Boundaries of Corneal Layers in Optical Coherence Tomography Images in presence of artificial rings, 2014-15.
- (Role: PI, 650 \$) Mosaicing of OCTs taken from ONH and Macula, 2013-2015.
- (Role: Co-PI, 650 \$) Sparse representation for classification of blood vessels on Fundus images, 2013-2016.
- (Role: PI, 650 \$) Removing Distortion of Periapical Images in Dental Digital Radiography using Embedded Markers, 2010-2012.
- (Role: Co-PI, 650 \$) Estimation of features from Higher Order Spectra (HOS) in right and left breast of thermograms, 2011-2013.
- (Role: Co-PI, 650 \$) Automatic Off line Diagnostic of Cervical Cancer through processing of Pap smear slides, 2008-9.

ADVISORY AND SUPERVISORY OF PROJECTS:

Supervisory of PhD Projects:

- Deep learning methods for automatic analysis and feature extraction from OCT images in neurodegenerative diseases
- Comparison of OCT and fMRI data in presence of Optic Neuritis

Application of F-shapes in analysis of OCT images in MS and Devic

Advisory of PhD Projects:

Reconstruction of CT fan beam projections using sparse methods.

Supervisory of M.Sc. Projects:

Texture feature extraction from OCT data for comparison of MS and Devic diseases

Diffusion distance measurement in graph based analysis of fMRI data

Neutrosophic space for segmentation of choroidal boundary in OCT images from Macula and optic Nerve Head

Ratiometric analysis of OCT data in multiple sclerosis

Improved graph based method for Automatic PDE detection

Advisory of M.Sc. Projects:

Evaluation of asymmetry in right and left eyes of normal objects using features extracted from optical coherence tomography and fundus images.

Segmentation of the Boundaries of Corneal Layers in Optical Coherence Tomography Images.

Segmentation of choroidal boundary on EDI OCTs using a combination of wavelet descriptors and graph cuts.

Analysis of Digital Dental Anterior-Posterior images for Automatic Detection of Important Landmarks.

Three-dimensional segmentation of dental lesions in Cone-Beam CT images.

Application of Dictionary learning in separation of texture and cartoon for Optical Coherence Tomographic Images.

Supervisory of B.Sc. Projects:

Human Posture Detection in images with non uniform backgrounds.

Bioelectric Signal Modulation and transmission to computer.

Design and development of a Line Detector Robot Using infrared sensors.

Design and development of an Angle Simulator Robot.

Design and development of a Drug Delivery Timer and Alarm.

Design and development of a Remote Control for Model Aircrafts.

Design of a humidity and temperature control system for chicken transportation trailers.

TEACHING EXPERIENCE

INSTRUCTOR OF RECORD- GRADUATE LEVEL

Isfahan University of Medical Sciences

2018	Deep learning with python
2018	Wavelets Theory
2018	Digital Image Processing
2017	Advanced Methods in Xlets and Dictionary learning
2017- 2018	Medical Bio-instrumentation
2017- 2018	Mathematics for Engineering
2015- 2018	Biomedical Signal Processing
2015- 2017	Graph based theories for image segmentation
2014- 2018	Digital Image Processing

TEACHING ASSISTANTSHIPS- GRADUATE LEVEL

Isfahan University of Medical Sciences

2009- 2012	Digital Signal Processing
2012- 2013	Digital Image Processing

INSTRUCTOR OF RECORD- UNDERGRADUATE LEVEL

Sepahan University, Isfahan, Iran

2006-2009	English for Engineering
2006-2009	Mathematics for Engineering
2006-2008	Electrical Circuits
2007-2008	Application of MATLAB in Electrical Engineering
2006-2007	Digital circuits

SKILLS _____

PROGRAMMING SKILLS

Matlab, Python, C

Deep learning essentials like tensorflow, keras

LANGUAGE SKILLS

English: TOEFL score (IBT) in 2009: 107 /120

listening: 27, reading: 29, speaking: 22, writing: 29

Turkish: native language

Persian: native language