

RESUME
of
Mahnaz EtehadTavakol

Position:

Researcher at: Medical Image and Signal Processing Research Center, Isfahan University of Medical Sciences, since 2011

Ph.D Thesis Title:

Asymmetry and Nonlinear Analysis of Breast Thermograms to Establish Possible Differences Between Malignant and Benign Patterns

Education:

- 1) PhD, Electrical Engineering (with emphasis on Medical Imaging), Isfahan University of Technology, 2006-2011
- 2) Ph.D student, Electrical Engineering, University of Texas at Arlington, 2005-2006 (Family move necessitated leaving the program, but continued doctoral study after move at Isfahan University of Technology and completed the degree in 2011)
- 3) MS in applied mathematics, Purdue University, West Lafayette, Indiana, 1989
- 4) BS in Electrical Engineering, Purdue University, West Lafayette, Indiana, 1987

Publications:

A. Journal Papers:

- 1) **EtehadTavakol, M.,** Sadri, S., Ng, E. Y. K., *Application of K- and Fuzzy c-Means for Color Segmentation of Thermal Infrared Breast Images*, Journal of Medical Systems, Vol. 34, No. 1, 2010, Pp: 35 – 42.
- 2) **EtehadTavakol, M.,** Lucas, C., Sadri, S., Ng, E. Y. K., *Analysis of Breast Thermography Using Fractal Dimension to Establish Possible Difference between Malignant and Benign Patterns*, Journal of Healthcare Engineering· Multi-Science Publishing, UK, Vol. 1, No. 1, 2010, Pp. 27 -- 43.
- 3) **EtehadTavakol, M.,** Ng, E. Y. K , Lucas, C., Sadri, S., Gheissari, N., *Estimating the Mutual Information between Bilateral Breast in Thermograms Using Nonparametric Windows*, Journal of Medical Systems, Vol. 35, No. 5, 2011, Pp: 959-967.

- 4) **EtehadTavakol, M.**, Lucas, C., Sadri, S., Ataei, M., Ng, E. Y. K., *Nonlinear Analysis using Lyapunov Exponents in Breast Thermograms to Identify Abnormal Lesions*, *Infrared Physics & Technology*, Elsevier, Vol. 55, 2012, Pp: 345–352.
- 5) **EtehadTavakol, M.**, Ng, E. Y. K., *Breast Thermography as a Potential Non- Contact Method in the Early Detection of Cancer: A Review*, *Journal of Mechanics in Medicine and Biology*, World Scientific Publishing Company, Vol. 13, No. 2, 2013, 20 pages.
- 6) **EtehadTavakol, M.**, Chandran, V., Ng, E. Y. K., Kafieh, R., *Breast Cancer Detection from Thermal Images using Bispectral Invariant Features*, *International Journal of Thermal Sciences*, Elsevier, Vol. 6, 2013, Pp: 21-36
- 7) **EtehadTavakol, M.**, Ng, E. Y. K., Chandran, V., Rabbani, H., *Separable and Non-separable Discrete Wavelet Transform based Texture Features and Image Classification of Breast Thermograms*, *Infrared Physics & Technology*, Elsevier, Vol. 61, 2013, Pp: 274–286
- 8) SamadzadehAghdam, N., MoradiAmin, M., **EtehadTavakol, M.**, Ng, E.Y.K., *Designing and Comparing Different Color Map Algorithms for Pseudo-coloring Breast Thermograms*, *Journal of Medical Imaging and Health Informatics*, Vol. 3, No. 4, 2013, Pp: 487-493.
- 9) **EtehadTavakol, M.**, Ng, E. Y. K., Gheissari, N., *Using Shape Contexts Method for Registration of Contra lateral Breasts in Thermal Images*, *World Journal of Clinical Oncology*, Vol. 5, No. 5, 2014, Pp: 1055–1059.
- 10) Golestani, N., **EtehadTavakol, M.**, Ng, E.Y.K., *Level Set Method for Segmentation of Infrared Breast Thermograms*, *EXCLI Journal*, Vol. 13, 2014, Pp: 241-251.
- 11) **EtehadTavakol, M.**, Fatemi, A., Karbalaie, A., Emrani, Z., Erlandsson, B. E., *Nailfold capillaroscopy in rheumatic diseases: Which parameters should be evaluated?*, *BioMed Research International*, July 2015, <http://www.hindawi.com/journals/bmri/aip/974530/>
- 12) **EtehadTavakol, M.**, Hemmasian Etefagh, M., Ng, E. Y. K., "Evaluation of Risk Factors in Developing Breast Cancer with EM Algorithm in Data Mining Techniques", *JMIHI*, 2015
- 13) Emrani, Z., MSc; Fatemi, A., MD-PhD; **EtehadTavakol, M.**, PhD; Erlandsson, B., Prof, *Capillary density: An important parameter in nailfold capillaroscopy*, *Microvascular*, Elsevier, 109, 7-18, 2016
- 14) Karbalaie, A., Farhad Abtahi, F., Fatemi, A., **EtehadTavakol, M.**, Emrani, Z., Erlandsson, Björn-Erik, *Elliptical Broken Line Method for Calculating Capillary Density in Nailfold Capillaroscopy: Proposal and Evaluation*, *Microvascular Research*, 8 Apr 2017
- 15) **EtehadTavakol, M.**, Ng, E.Y.K., Kaabouchc, N., *Automatic Segmentation of Thermal Images of Diabetic-at-Risk Feet Using the Snakes Algorithm*, *Infrared Physics & Technology*, Elsevier, August 2017

Poster Presentation:

- 1) **EtehadTavakol, M.**, Emami, MH., *Potential of Infrared Imaging In Assessing Digestive Disorder*, Iranian Congress of Gastroenterology and Hepatology 2015, Azar 94,

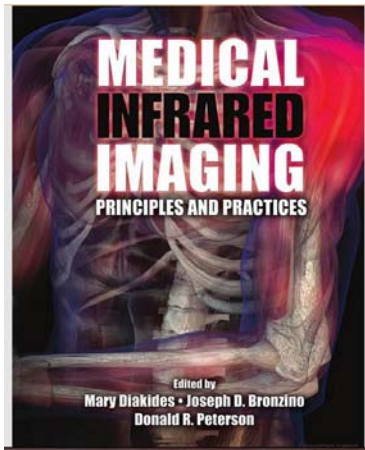
Conference:

- 1) Abdolamir Karbalaie, Alimohammad Fatemi, **Mahnaz EtehadTavakol**, Farhad Abtahi, Zahra Emrani, Björn-Erik Erlandsson, *Counting capillaries in nailfold capillaroscopy: State of the art and a proposed method*, *Biomedical Engineering and Sciences (IECBES)*, 2016 IEEE EMBS Conference, Pp.170-174

B. Book Chapters:

1) Book Title:

Medical infrared imaging: principles and practices



Edited by Mary Diakides, Joseph D. Bronzino, Donald R. Peterson.

Boca Raton, FL CRC Press/Taylor & Francis, 2013

Contribution in chapters

- i. **EtehadTavakol, M.**, E.Y.K., Ng, Lucas, C., Sadri, S. , “*Fuzzy C Means Segmentation and Fractal Analysis of the Benign and Malignant Breast Thermograms*”, Pp. 16-1 – 16-20, Chp. 16.
- ii. **EtehadTavakol, M.**, E.Y.K., Ng, Lucas, C., Sadri, S., Gheissari, N., “*Application of Nonparametric Windows in Estimating the Mutual Information between Bilateral Breasts in Thermograms*”, Pp. 14-1 – 14-14, Chp. 14.

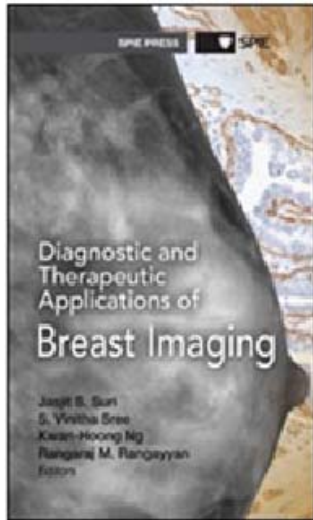
Available in the following sites

1. <http://www.amazon.com/Medical-Infrared-Imaging-Principles-Practices/dp/143987249X>
2. https://books.google.com/books/about/Medical_Infrared_Imaging.html?id=5BrXeG3XkKoC
3. <https://books.google.com/books?id=5BrXeG3XkKoC&pg=SA34-PA29&lpg=SA34-PA29&dq=Medical+infrared+imaging+:++principles+and+practices&source=bl&ots=1K2Isr0fN&sig=gYWu>

[UJKC932ArHFsoFBNHMeAAAn0&hl=en&sa=X&ei=xDptVYHjO4icNu UguAG&ved=0CEsO6AEwBw#v=onepage&q=Medical%20infrared%20imaging%20%3A%20principles%20and%20practices&f=false](http://www.spie.org/Publications/Book/899757)

2) Book Title:

Edited by :J.S. Suri, V. Sree, Kwan Hoong Ng, R. M. Rangayyan,
SPIE Group



SPIE PRESS BOOK

Diagnostic and Therapeutic Applications of Breast Imaging

Editor(s): Jasjit S. Suri; S. Vinitha Sree; Kwan-Hoong Ng; Rangaraj M. Rangayyan

Published: 22 February 2012; 542 pages; Hardcover

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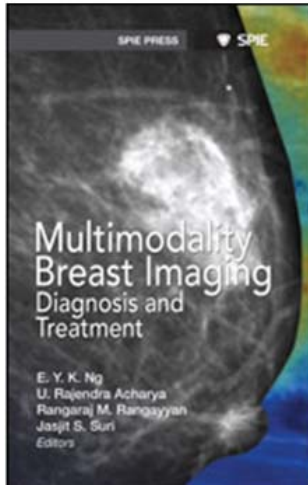
Contribution in one chapter;

- i. EtehadTavakol, M., E.Y.K., Ng, Lucas, C., Sadri, S., “Color Segmentation and Fractal analysis of Breast Thermograms”, Chp. 11.

Available in the following sites

1. <http://spie.org/Publications/Book/899757>
2. <http://www.amazon.com/Diagnostic-Therapeutic-Applications-Imaging-Monograph/dp/0819487899>
3. <http://www.amazon.com/Diagnostic-Therapeutic-Applications-Imaging-Monograph/dp/0819487899>

3) Book Title:



SPIE PRESS BOOK

Multimodality Breast Imaging: Diagnosis and Treatment

Editor(s): E. Y. K. Ng; U. Rajendra Acharya; Rangaraj M. Rangayyan; Jasjit S. Suri

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Contribution in one chapter;

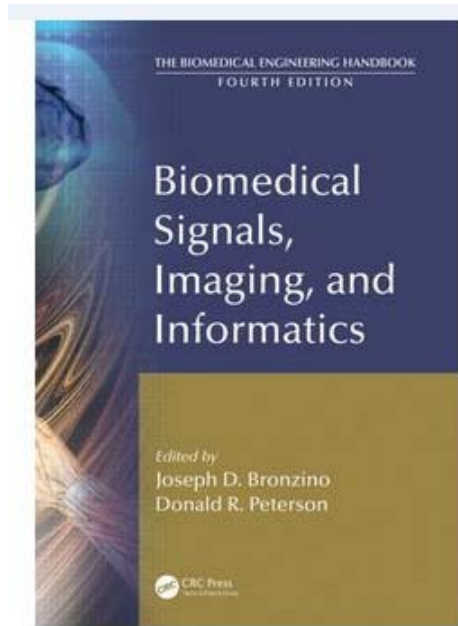
i. **EtehadTavakol,M.**, Ng, E.Y.K. , Lucas, C. , Ataei, M., “*Abnormal Lesions Detection from Breast Thermal Images using Lyapunov Exponents*”,

ii.

Available in site:

1. [http://www.amazon.com/Multimodality-Breast-Imaging-Diagnosis Treatment/dp/0819492949](http://www.amazon.com/Multimodality-Breast-Imaging-Diagnosis-Treatment/dp/0819492949)

4) **Book Title:**



Biomedical Signals, Imaging, and Informatics

Joseph D. Bronzino, Donald R. Peterson

December 16, 2014 by CRC Press

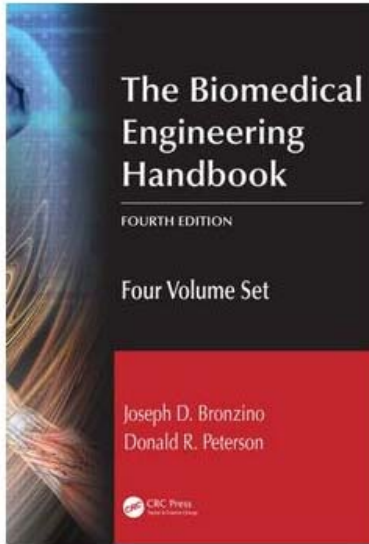
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Series: The Biomedical Engineering Handbook, Forth Edition

Contribution in chapters

- i. **M. Etehadtavakol**, E.Y.K. Ng, C. Lucas, S. Sadri, and N. Gheissari., “*Application of Nonparametric Windows in Estimating the Mutual Information between Bilateral Breasts in Thermograms*” in Biomedical Engineering Handbook, Biomedical Signals, Imaging, and Informatics, J.D. Bronzino, Donald R. Peterson (Ed), CRC Press, USA, pp. 35-1 to 35-14. Chp. 35.
- ii. **M. Etehadtavakol**, E.Y.K. Ng, C. Lucas, and S. Sadri., “*Fuzzy C Means Segmentation and Fractal Analysis of the Benign and Malignant Breast Thermograms*” in Biomedical Engineering Handbook, Biomedical Signals, Imaging, and Informatics, J.D. Bronzino, Donald R. Peterson (Ed), CRC Press, USA, pp. 37-1 to 37-20. Chp. 37.



The Biomedical Engineering Handbook, Fourth Edition: Four Volume Set

Joseph D. Bronzino, Donald R. Peterson

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- iii. Assessment of Foot Complications in Diabetic Patients Using Thermography: A Review
Mahnaz Etehadtavakol and Eddie Y.K. Ng
- iv. An Overview of Medical Infrared Imaging in Breast Abnormalities Detection
Mahnaz Etehadtavakol and Eddie Y.K. Ng
- v. Registration of Contralateral Breasts Thermograms by Shape Context Technique
Mahnaz Etehadtavakol and Eddie Y.K. Ng
- vi. Color Segmentation of Breast Thermograms: A Comparative Study
Mahnaz Etehadtavakol and Eddie Y.K. Ng

Teaching Experiences:

- 1) lecturer, Electrical Engineering, Azad university, 1376-1384
- 2) lecturer, Math department, Isfahan University of Technology, 1370-1378
- 3) graduate assistant and graduate instructor, Purdue university, Aug 1988 – Dec 1989
- 4) lecturer, Department of Advanced Medical Technology, Isfahan University of Medical Sciences, following graduate courses
 1. Advanced Medical Imaging,
 2. Advanced Biosignal Processing.
 3. System Biology,

Research Projects & Work Experience:

- 1) Research project : “Feature extraction by higher order spectral of two bilateral breast thermograms”, in Medical Image and Signal Processing Research Center, Isfahan University of Medical Sciences, 2012
- 2) Research project : “Comparison of Separable and Nonseparable Discrete Wavelet Transform to Extract first and Second Order Statistical Features from Contra lateral Pectoral Regions In Breast Thermograms to Detect Abnormalities”, in Medical Image and Signal Processing Research Center, Isfahan University of Medical Sciences, 2013
- 3) Research project: “Breast thermograms segmentation by level set method”, in Medical Image and Signal Processing Research Center, Isfahan University of Medical Sciences, 2014
- 4) Research project:” Collecting Nailfold Capillaroscopic Database of Iranian Autoimmune Patients”, 2015
- 5) Research project: ”Proposing an effective algorithm to detect non visible patterns in mammograms”, 2015
- 6) Research project : “Feasibility of thermography as an adjunctive method to assess foot complications in diabetic patients:”, 2015
- 7) Research project: “Segmentation of 2D infrared images of female breasts, diabetic plantar feet and sports injuries by applying graph cut algorithm and comparison with Fuzzy c means algorithm”, 2016
- 8) Research project: “Feasibility of thermography as an adjunctive method for breast cancer early detection and monitoring of breast cancer survivors”, 2017
- 9) Breast Infrared Imaging in SeyedoShohada hospital, Isfahan, Iran, in two projects, 2009
- 10) Breast Thermography Workshop, 17th Iranian Conference on Biomedical Engineering Isfahan University of Medical Sciences, Nov. 2010

Associate Editor of :

Journal of Medical Imaging and Health Informatics (ISI)