Curriculum Vitae

Research School of Information Sciences & Engineering, College of Engineering & Computer Science, Australian National University, Canberra Australia

Personal information

Name: Seyed Hamid Rezatofighi
Date of birth: 22 September 1984
Marital status: Married
Nationality: Iranian
Email: hamid.rezatofighi@anu.edu.au,
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Education

The Australian National University, Canberra, Australia
PhD in **Engineering & Computer Science**
Thesis: Analysis of Exocytose Events in Cell Membrane Using TIRF Images
Supervisors: Prof. Richard Hartley and Dr. Stephen Gould
Advisors: Dr. Katarina Mele and Dr. William E. Hughes (Biologist)
In Collaboration with: Computational Informatics, CSIRO & Garvan Institute of Medical Research, Sydney, Australia

University of Tehran, Tehran, Iran
M.Sc. in **Electrical Engineering (Biomedical engineering)**
September 2006- February 2009, GPA= 18.44 / 20 (top student)
Thesis: Automatic Recognition of White Blood Cells in Hematological Images
Supervisors: Prof. Hamid Soltanian-Zadeh and Dr. Reza A. Zoroofi
Advisor: Dr. RamezanAli Sharifian (Hematologist)

Islamic Azad University (Science and Research branch), Tehran, Iran
B.Sc. in **Biomedical engineering**
September 2002-2006, GPA=17.40/20 (top student)
Thesis: Design and Build of Treadmill for Stress Test
Supervisor: Dr. Siamak Khorramymehr
Advisor: Dr. Mohammad Ali Pishbin (Physician)

Visits

- **Prof. Dr. Nassir Navab**
  The Chair of Computer Aided Medical Procedures & Augmented Reality
  Technical University of Munich, Munich, Germany, May-August 2013
- **Prof. Ba-Ngu Vo and Dr. Ba Tuong Vo**
  Curtin University, Perth, Australia, Feb. 2013
- **Prof. Ba-Ngu Vo**
  University of Western Australia, Perth, Australia, April 2012

Research interests

- Biological Signal/image/video processing, Computational biology
- Medical image/signal processing,
- Computer vision, Pattern recognition, Machine learning, Signal processing

Honors & awards

***Postgraduate Studentship**, CSIRO, Australia, 2011-2014*
***PhD admission** and **ANU Scholarship (I was granted the scholarship before the application deadline)**, Australian National University, Australia, 2011-2014*
***Research Grant** from instituto Nacional de Engenharia Biomedica, Portugal, 2010-2014*
***Graduate assistantship**, University of Central Florida, USA, 2009-2013*
***Ranked 1st** in **M.Sc.** students in biomedical engineering, University of Tehran, 2006-2009*
***Chosen as the best student in the biomedical engineering Dept. by the university president,** Islamic Azad University, 2005*
***Ranked 1st** in **B.Sc.** students in biomedical engineering, Islamic Azad University, 2002-2006*
***Passed all of undergrad courses in three years instead of four,** Islamic Azad University, 2002-2005*
***Ranked 1st** in **Pre College**, Daneshmand Pre College, 2002*

Research experience

1. Tracking and segmentation of vascular structures using random finite set filtering framework, Technical University of Munich, Germany, 2013
2. Tracking of hair follicle stem cells and assessment of their dynamic behaviors in vivo live imaging, in close collaboration with Yale school of medicine, USA & Technical University of Munich, Germany & Helmholtz Association of German Research Centers, Germany, 2013
3. Multi-target tracking using Bayesian framework, Australian National University, 2011-2014
    - Traditional Bayesian filtering
        - Kalman, Interacting Multiple Model (IMM) and SMC (Particle) Filtering
        - Data Association algorithms such as PDA, JPDA and MHT
    - Random finite set based Bayesian filtering
        - PHD, Cardinalized PHD (CPHD) and Multi-Bernoulli Filtering for both linear and non-linear systems
        - Jump Markov system models for maneuvering targets and multi-target tracking using superpositional sensors
        - track-before-detect approaches, tracking with unknown clutter rate and detection profile
4. Analysis of exocytose events in cell membrane using TIRF images, Australian National University, 2011-2014
    - Noise reduction and Image enhancement
    - Spot detection
    - Realistic TIRFM sequences' simulation
    - Multi-objects tracking
5. Detection and segmentation of hepatic hemangioma in ultrasound images, 2010-2011
6. Retinal vessel enhancement and segmentation in fundus images, University of Tehran, 2007-2011
7. Hematological and pathological image analysis, University of Tehran, 2007-2010
8. Analysis of IVUS images, University of Tehran, 2006-2009
    - Border (Lumen & Media-Adventitia borders) segmentation
    - Characterization of plaque compositions
9. Liver MR image analysis, University of Tehran, 2009
    - Segmentation of liver's vessels
    - Segmentation of liver's Lobes
10. Analyzing the mammograms (micro-calcification detection), University of Tehran, 2009
11. Classification of post-operative patient data, University of Tehran, 2008
12. Brain signal processing, University of Tehran, 2006-2007
    - Brain computer interface(BCI)
    - Biometric using VEP
13. Design and build of treadmill for stress test, Islamic Azad University, 2005

Teaching & supervising experience

1. Supervising a Master Student (Patrick Bürckstümmer) from Technical University of Munich, 2013
2. Teaching assistant of "Computer Vision", Australian National University, 2012
3. Teaching assistant of "Digital Signal Processing" and "Biological Signal Processing", University of Tehran, 2007
4. Teaching assistant of "Electronic I", Islamic Azad university, 2005
5. Tutoring courses of "Static and Strength of Materials", "Dynamics", "Signals & Systems" and "Systems of Linear Control" and MATLAB for freshmen and sophomores, Islamic Azad University,2004-2006

Skills

- **Programming:**
    - Assembly (8086,8051,AVR)
    - MATLAB: mfile, Different Toolboxes, Simulink, GUI
    - C/C++
- **Image Analysis software:** ImageJ/Fiji, IMARIS
- **Simulation software:** P-spice, orCAD, Labview

Graduate courses

Convex optimization, Stochastic Processes, Digital Signal Processing (DSP), Biological Signal Processing (BSP), Image Signal Processing, Pattern Recognition, Medical Imaging Systems, Fuzzy Logic, Wavelets Analysis & Application, Seminar, Presentation of Technical Documents in English

Reviewer of Journals & conferences

- Computerized Medical Imaging and Graphics, *Elsevier*
- Computer Methods and Programs in Biomedicine, *Elsevier*
- International Symposium on Biomedical Imaging (ISBI)
- Engineering in Medicine and Biology Conference (EMBC)

Publications

Journal Articles

- **S. H. Rezatofighi,** S. Gould, B. T. Vo, B. -N. Vo, K. Mele, R. Hartley, "Multi-Target Tracking With Unkown Clutter Rate and Detection Profile: Application to Time-lapse Cell Microscopy Sequences," *Submitted to IEEE Transaction on Medical Imaging.*
- E. Moghimirad, **S. H. Rezatofighi**, H. Soltanian-Zadeh, "Retinal Vessel Segmentation Using Multi-Scale Medialness Function," *Computers in Biology and Medicine,* vol. 42, no. 1, pp. 50-60, 2012.
- **S. H. Rezatofighi**, H. Soltanian-Zadeh, "Automatic Recognition of Five Types of White Blood Cells in Peripheral Blood," *Computerized Medical Imaging and Graphics,* vol. 35, pp. 333-343, 2011.
- A. Taki, A. Roodaki, S. Avansari**, S. H. Rezatofighi**, S. K. Setarehdan, N. Navab, "Automatic Analysis of IVUS Images: From Border Detection to Plaque Characterization," *International Journal of Computer Assisted Radiology and Surgery*, vol. 4, no. 1, pp. S17-21, 2009.

Proceeding Articles

- W. T. E. Pitkeathly, **S. H. Rezatofighi,** J. Z. Rappoport, E. Claridge "A Framework for Generating Realistic Synthetic Sequences of Dynamic Confocal Microscopy Images," *Accepted in Medical Image Understanding and Analysis Conference (MIUA* 2013*), Birmingham, UK.*
- **S. H. Rezatofighi,** S. Gould, B. -N. Vo, K. Mele, W. E. Hughes, R. Hartley, "A Multiple Model Probability Hypothesis Density Tracker for Time-lapse Cell Microscopy Sequences," *Accepted in the International Conference on Information Processing in Medical Imaging (IPMI 2013), Asilomar, USA* (~25% total acceptance rate)(Selected for oral presentation).
- **S. H. Rezatofighi,** W. T. E. Pitkeathly, S. Gould, R. Hartley, K. Mele, W. E. Hughes, James G. Burchfield, "A Framework for Generating Realistic Synthetic Sequences of Total Internal Reflection Fluorescence Microscopy Images," *Accepted in the IEEE International Symposium on Biomedical Imaging (ISBI 2013), April 7-11, San Francisco, USA* .
- **S. H. Rezatofighi,** S. Gould, R. Hartley, K. Mele, W. E. Hughes, "Application of the IMM-JPDA Filter to Multiple Target Tracking in Total Internal Reflection Fluorescence Microscopy Images," *The International Conference on Medical Image Computing and Computer Assisted Intervention (MICCAI 2012), October 1-5, Nice, France*, pp. 357–364, 2012. (~30% acceptance rate)
- **S. H. Rezatofighi,** R. Hartley, W. E. Hughes, "A New Approach for Spot Detection in Total Internal Reflection Fluorescence Microscopy," *The IEEE International Symposium on Biomedical Imaging (ISBI 2012), May 2-5, Barcelona, Spain,* pp. 860-863, 2012 (Selected for oral presentation, oral acceptance rate= 19%).
- N. Bahrami, **S. H. Rezatofighi**, A. Mahdavi Adeli, S. K. Setarehdan, "Boundary Delineation for Hepatic Hemangioma in Ultrasound Images," *The International Conference of the IEEE, Medicine and Biology Conference (EMBC11), Boston, USA*, pp. 7989-7992, 2011.
- P. R. Tabrizi, **S. H. Rezatofighi,** M. J. Yazdanpanah, "Using PCA and LVQ Neural Network for Automatic Recognition of Five Types of White Blood Cells," *The International Conference of the IEEE, Engineering in Medicine and Biology Conference 2010 (EMBC10), Buenos Aires, Argentina*, vol. 1, pp. 5593-5596, 2010.
- **S. H. Rezatofighi,** K. Khaksari, H. Soltanian-Zadeh, "Automatic Recognition of Five Types of White Blood Cells in Peripheral Blood," *The International Conference on Image Analysis and Recognition (ICIAR 2010)), June 21-23, Povoa de Varzim, Portugal,* (*Published by Springer's* Lecture Notes in Computer Science *(LNCS) series*, vol. 6112, pp. 161-172, 2010).
- E. Moghimirad, **S. H. Rezatofighi**, H. Soltanian-Zadeh, "Multi-resolution Approach for Retinal Vessel Segmentation Using Medialness Function," *The IEEE International Symposium on Biomedical Imaging (ISBI 2010), April 14-17, Rotterdam, The Netherlands,* pp. 29-32, 2010.
- **S. H. Rezatofighi,** A. Pourmorteza, A. Roodaki, H. Soltanian-Zadeh, "Polar Run-Length Features in Segmentation of Retinal Blood Vessels," *The IEEE conference, International Conference on Digital Image Processing (ICDIP 2009), Bangkok, Thailand,* pp. 72-79, 2009.
- **S. H. Rezatofighi**, H. Soltanian-Zadeh, R. Sharifian, R. A. Zoroofi, "A New Approach to White Blood Cell Nucleus Segmentation Based on Gram-Schmidt Orthogonalization," *The IEEE conference, International Conference on Digital Image Processing (ICDIP 2009), Bangkok,*

Thailand, pp. 107-111, 2009.

- **S. H. Rezatofighi,** R. A. Zoroofi, R. Sharifian, C. Lucas, H. Soltanian-Zadeh, "Automatic Recognition of Basophils in Hematological Images," *The Iranian Conference on Machine Vision and Image Processing*, November 4-6, 2008.
- **S. H. Rezatofighi**, A. Roodaki, H. Ahmadi Noubari, "An Enhanced Segmentation of Blood Vessels in Retinal Images Using Contourlet," *The International Conference of the IEEE Engineering in Medicine and Biology Society (EMBC08), Vancouver, BC*, pp. 3530-3533, 2008.
- **S. H. Rezatofighi**, A. Roodaki, R. A. Zoroofi, R. Sharifian, H. Soltanian-Zadeh, "Automatic Detection of Red Blood Cells in Hematological Images Using Polar Transformation and Run-length Matrix," *The International conference on signal processing (ICSP 2008), Beijing, China*, pp. 806-809, 2008.
- **S. H. Rezatofighi**, R. A. Zoroofi, R. Sharifian, H. Soltanian-Zadeh, "Segmentation of Nucleus and Cytoplasm of White Blood Cells Using Gram-Schmidt Orthogonalization and Deformable Models," *The 9th International conference on signal processing (ICSP 2008), Beijing, China*, pp. 801-805, 2008.
- A. Yazdani, A. Roodaki, **S. H. Rezatofighi,** K. Misaghian, and S. K. Setarehdan, "Fisher Linear Discriminant Based Person Identification Using Visual Evoked Potentials," *The 9th International conference on signal processing (ICSP 2008), Beijing, China*, pp. 1677-1680, 2008 .
- A. Pourmorteza, **S. H. R. Tofighi,** A. Roodaki, A. Yazdani, H. Soltanian-Zadeh, "Context-Dependent Segmentation of Retinal Blood Vessels Using Hidden Markov Models," *The Int'l CSI Computer Conference (CSICC'08) 2008 Kish Island, Persian Gulf, Iran*, (*Published by Springer's Communications in Computer and Information Science (CCIS) series*, vol. 6, pp. 348-355, 2008).

References

1. **Richard Hartley**
   - **Title**: Prof.
   - **Affiliation**: Research School of Information Sciences and Engineering, College of Engineering and Computer Science, The Australian National University, Canberra, Australia & National ICT, Canberra, Australia.
   - **Email**: richard.hartley@anu.edu.au
2. **Stephen Gould**
   - **Title**: Dr.
   - **Affiliation**: Research School of Information Sciences & Engineering, College of Engineering & Computer Science, The Australian National University, Canberra, Australia.
   - **Email**: Stephen.gould@anu.edu.au
3. **Ba-Ngu Vo**
   - **Title**: Prof.
   - **Affiliation**: School of Electrical Electronic & Computer Engineering, the University of Western Australia & Curtin University, Perth, Australia.
   - **Email**: ba-ngu.vo@curtin.edu.au & ba-ngu.vo@uwa.edu.au
4. **William E. Hughes**
   - **Title**: Dr.
   - **Affiliation**: The Garvan Institute of Medical Research, Sydney, Australia & Department of Medicine, St. Vincent's Hospital, Sydney, Australia.
   - **Email**: w.hughes@garvan.org.au
5. **Katarina Mele**
   - **Title**: Dr.
   - **Affiliation**: CSIRO Computational Informatics, Sydney, Australia.
   - **Email**: katarina.mele@csiro.au
6. **Hamid Soltanian-Zadeh:**
   - **Title**: Prof.
   - **Affiliation**: Electrical & Computer Engineering Dept., University of Tehran, Tehran, Iran & Henry Ford Hospital, Detroit, MI, USA
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