Farzana Rahmat Zaki, Ph.D.

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CAREER OBJECTIVE

A highly energetic individual actively looking for full time research scientist/postdoctoral research position in the fields of biomedical imaging and signal processing. I have almost 4 years of research experiences in the field of optical coherence tomography, functional optical coherence tomography (Doppler OCT and optical coherence elastography).

EDUCATION

Ph.D. in Electrical Engineering, **CGPA: 3.93/4.00** — 2015 - 2019
New Jersey Institute of Technology (NJIT), Newark, NJ

M.Sc. in Electrical and Electronic Engineering, **CGPA: 3.75/4.00** — 2013
Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh

B.Sc. in Electrical and Electronic Engineering, **CGPA: 3.44/4.00** — 2006
Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh

COMPUTER SKILLS

Programming languages: MATLAB, C/C++, microcontroller programming, CUDA
Software and tools: Simulink, PSPICE, Microsoft Office Suite (Word, Excel, PowerPoint), Proteus, OptiSystem, OptSim

PROFESSIONAL EXPERIENCES

Teaching Assistant, Department of Electrical and Computer Engineering, New Jersey Institute of Technology (NJIT) — September,2016 – May 2019

Research Assistant, Biophotonics imaging and sensing lab, Department of Electrical and Computer Engineering, New Jersey Institute of Technology (NJIT) — January,2016 – August,2016

Assistant Professor, Department of Electrical and Electronic Engineering, Faculty of Engineering and Technology, Eastern University, Dhaka, Bangladesh — February,2014 – July,2015

Senior Lecturer, Department of Electrical and Electronic Engineering, Faculty of Engineering and Technology, Eastern University, Dhaka, Bangladesh — June,2009 - February,2014

Lecturer, Department of Electrical and Electronic Engineering, Faculty of Engineering and Technology, Eastern University, Dhaka, Bangladesh — March,2007 - June,2009

ADMINISTRATIVE EXPERIENCE

Program Coordinator, Faculty of Engineering and Technology, Eastern University, Dhaka, Bangladesh — October,2012 – August,2014
Key responsibilities: Prepared course offering list, class routines for the department of Electrical and Electronic Engineering (EEE) and worked as examination in-charge for the EEE department.

ACADEMIC AWARDS

- Hashimoto graduate fellowship, New Jersey Institute of Technology, Sept. 2018 to May 2019
- Graduate tuition and stipend awards, New Jersey Institute of Technology, January. 2016 to May 2019
- Graduate stipend award, REAP (Research & Engineering Apprenticeship Program) funded by AEOP (Army Educational Outreach Program), July 2017 and July 2016
- University merit scholarship, Department of EEE, Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh

RESEARCH INTEREST

Optical coherence tomography (OCT) and functional OCT (Doppler OCT, Optical coherence elastography), biomedical optics, optical image processing.

Ph.D. DISSERTATION

Dual modality optical coherence tomography: technology development and biomedical applications

RESEARCH EXPERIENCES

- Quantitative Optical Coherence Elastography for Robust Stiffness Assessment
- Adaptive Doppler analysis for robust handheld optical coherence elastography
- Assessment and removal of additive noise in a complex optical coherence tomography signal based on Doppler variation analysis
- Noise adaptive wavelet thresholding for speckle noise removal in optical coherence tomography
- Nonlinear characterization of elasticity using quantitative optical coherence elastography
- Secure fingerprint identification based on structural and microangiographic optical coherence tomography
- Optical coherence tomography for non-invasive examination and conservation of cultural heritage objects
- Development of Spectral Domain Doppler Phase Microscopy
- OCE quantification of Poisson's ratio through 2D speckle tracking
- Microscope and telescope imaging for the examination of cultural heritage objects (as a mentor, REAP 2016, **AEOP (Army Educational Outreach Program)** summer STEM program)
- Fabrication and characterization of PDMS tissue simulating phantoms with optical properties in NIR (as a mentor, REAP 2017 and Provost summer research,2017, **AEOP (Army Educational Outreach Program)** summer STEM program)

2015 – 2019 (Ph.D.)

Analysis of Third Order Dispersion in Ultra-High Speed Optical Fiber Communication System and its Compensation Technique 2010 - 2012 (M.Sc. Thesis)
(Department of EEE, Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh)

Analysis of Optical Fibers Under External Stress 2005 – 2006 (B.Sc. Thesis)
(Department of EEE, Bangladesh University of Engineering and Technology (BUET), Dhaka, Bangladesh)

PEER-REVIEWED PUBLICATIONS

ARTICLES:

[1] X. Liu, **F. Zaki**, and Y. Wang, "Quantitative optical coherence elastography for robust stiffness assessment," *Applied Science*, vol. 8, no. 8, pp. 1255, 2018.

[2] X. Liu, **F. Zaki**, H. Wu, C. Wang, and Y. Wang, "Temporally and spatially adaptive Doppler analysis for robust handheld optical coherence elastography," *Biomedical Optics Express*, vol. 9, no. 7, pp. 3335-3353, 2018.

[3] X. Liu, **F. Zaki**, and D. Renaud, "Assessment and removal of additive noise in a complex optical coherence tomography signal based on Doppler variation analysis," *Applied Optics*, vol. 57, no. 11, pp. 2873-2880, 2018.
[4] **F. Zaki**, Y. Wang, H. Su, X. Yuan, and X. Liu, "Noise adaptive wavelet thresholding for speckle noise removal in optical coherence tomography," *Biomedical Optics Express*, vol. 8, no. 5, pp. 2720-2731, 2017.
[5] X. Liu, **F. Zaki**, Y. Wang, Q. Huang, X. Mei and J. Wang, "Secure fingerprint identification based on structural and microangiographic optical coherence tomography," *Applied Optics*, vol. 56, no. 8, pp. 2255-2259, 2017.
[6] **F. Zaki**, I. Hou, D. Cooper, D. Patel, Y. Yang, and X. Liu, "High-definition optical coherence tomography imaging for noninvasive examination of heritage works," *Applied Optics*, vol. 55, no. 36, pp. 10313-10317, 2016.
[7] Y. Qiu, **F. Zaki**, N. Chandra, S. A. Chester, and X. Liu, "Nonlinear characterization of elasticity using quantitative optical coherence elastography," *Biomedical Optics Express*, vol. 7, no. 11, pp. 4702-4710, 2016.

CONFERENCE PROCEEDINGS:

[1] **F. Zaki**, Y. Wang, C. Wang, and X. Liu, "Adaptive Doppler analysis for robust handheld optical coherence elastography," In Proc. SPIE 10880, Optical Elastography and Tissue Biomechanics VI, 108801I, 21 February 2019.
[2] X. Liu, **F. Zaki**, H. Garg, and J. Rodriguez, "OCE quantification of Poisson's ratio through 2D speckle tracking," In Proc. SPIE 10880, Optical Elastography and Tissue Biomechanics VI, 108801J, 21 February 2019.
[3] **F. Zaki**, D. Renaud, B. Litvin, N. Sadia, J. Gilles, X. Liu, "Doppler variance analysis for high sensitivity morphological OCT imaging," Bulletin of the American Physical Society, **2017**.
[4] **F. Zaki**, Y. Wang, X. Yuan, and X. Liu, "Adaptive wavelet thresholding for optical coherence tomography image denoising," in Imaging and Applied Optics 2017 (3D, AIO, COSI, IS, MATH, pcAOP), OSA Technical Digest (online), Optical Society of America, 2017, paper CTh4B.4.
[5] X. Liu, **F. Zaki**, and Y. Wang, "Robust stiffness quantification using quantitative optical coherence elastography," In Conference on Lasers and Electro-Optics, Optical Society of America, 2017.
[6] **F. Zaki**, I. Hou, D. Copper, D. Patel, Q. Huang, Y. Yang, and X. Liu**,** "Optical coherence tomography for non-invasive examination and conservation of cultural heritage objects," In Proc. SPIE 10110, Photonic Instrumentation Engineering IV, 101100F, 20 February 2017.
[7] Y. Qiu, **F. Zaki**, N. Chandra, S. A. Chester, and X. Liu, **"**Characterization of nonlinear elasticity for biological tissue using quantitative optical coherence elastography**,**" In Proc. SPIE 10053, Optical Coherence Tomography and Coherence Domain Optical Methods in Biomedicine XXI, 1005324, 17 February 2017.
[8] Y. Wang, Y. Qiu, **F. Zaki**, Y. Xu, B. Hubbi, K. D. Belfield, and X. Liu; "Entropy analysis of OCT signal for automatic tissue characterization," In Proc. SPIE 9720, High-Speed Biomedical Imaging and Spectroscopy: Toward Big Data Instrumentation and Management, 972018, 7 March 2016.
[9] J. Y. Qiu, **F. Zaki**, Y. Wang, Y. Xu, N. Chandra, J. Haorah, B. Hubbi, B. Pfister, and X. Liu, "Depth resolved optical coherence elastography based on fiber-optic probe with integrated Fabry-Perot force sensor," In Conference on Lasers and Electro-Optics, OSA Technical Digest (online), Optical Society of America, 2016, paper AW1O.3.
[10] S. Islam**, F. Zaki**, and M. Faisal, "Dispersion optimization of 160-Gb/s 2000-km transmission by appropriate orientation of chirped fiber Bragg grating," In 8th International Conference on Electrical and Computer Engineering (ICECE), 2014, pp. 417-420, December 2014.
[11] **F. Zaki** and M. Faisal, "Impact of third-order dispersion in ultra-high speed long-haul optical fiber communication system," In 2nd International Conference on Informatics, Electronics & Vision (ICIEV), 2013, pp.1-5, 17-18 May 2013.

REVIEWER ACTIVITIES Biomedical Optics express, Optics letters

CONFERENCE PRESENTATIONS

[1] **F. Zaki**, Y. Wang, C. Wang, and X. Liu, "Adaptive doppler analysis for robust handheld optical coherence elastography," presented at BiOS Poster Presentation, SPIE Photonic West 2019, San Francisco, CA, 2019.
[2] **F. Zaki**, X. Liu, H. Garg, and J. Rodriguez, "OCE quantification of Poisson's ratio through 2D speckle tracking," presented at BiOS Poster Presentation, SPIE Photonic West 2019, San Francisco, CA, 2019.
[3] **F. Zaki**, D. Renaud, and X. Liu, "Doppler variance analysis for high sensitivity morphological OCT imaging" in Annual meeting of APS mid-atlantic section 2017, Newark, New Jersey,2017.

[4] Y. Qiu, **F. Zaki**, N. Chandra, S. A. Chester, and X. Liu "Characterization of nonlinear elasticity for biological tissue using quantitative optical coherence elastography**"** presented at SPIE Photonics West 2017 conference, San Francisco, 2017.
[5] **F. Zaki** and M. Faisal, "Impact of third-order dispersion in ultra-high speed long-haul optical fiber communication system," presented at 2nd International Conference on Informatics, Electronics and Vision (ICIEV), Dhaka, 2013.

PROFESSIONAL AFFLIATION Member, The Institution of Engineers, Bangladesh (IEB)

SCIENTIFIC MEMBERSHIP
Student member, The Optical Society of America (OSA)
Student member, SPIE, the international society for optics and photonics

UNDERGRADUATE PROJECT SUPERVISION
- A microcontroller- based LED moving message display
- Implementation of a microcontroller- based burglar alarm
- Design and implementation of a low-cost microcontroller-based UPS
- Study of cell-phone jamming technique and design of cellular frequency detector
- Design and implementation of a prepaid electricity billing system using a digital energy meter

TEACHING EXPERIENCES
UNDERGRADUATE COURSE INSTRUCTORS, Eastern University, Dhaka, Bangladesh (2007 - 2015)
Basic electrical circuits, Analog electronics, Digital electronics, Power electronics, Control system I, Engineering materials, Optical fiber communication, Optoelectronics.

TEACHING ASSISTANT, New Jersey Institute of Technology, Newark, NJ (2016- 2019)
Electronic devices I, Electromagnetic fields II, Fundamentals of engineering design, Electronic circuits I, Circuits and systems I, Electrical engineering principles.

OTHER EXPERIENCES
- Organizing Member, 3rd Bangladesh Physics Olympiad (Dhaka Division), Bangladesh (2013)
- Organizing Member, 1st Eastern University Mathematics Olympiad, Dhaka, Bangladesh (2010)

REFERENCES:
1. **Dr. Xuan Liu (Ph.D. dissertation advisor)**
   Assistant Professor, Department of Electrical and Computer Engineering
   New Jersey Institute of Technology, Newark, NJ 07102.
   email: xuan.liu@njit.edu

2. **Dr. Haim Grebel**
   Professor, Department of Electrical and Computer Engineering
   New Jersey Institute of Technology, Newark, NJ 07102.
   email: haim.grebel@njit.edu

3. **Dr. Durgamadhab Misra**
   Professor and Graduate advisor, Department of Electrical and Computer Engineering
   New Jersey Institute of Technology, Newark, NJ 07102.
   email: dmisra@njit.edu