## **Ahmed Tahseen Minhaz**

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3795 Washington Park Blvd, Cleveland, OH 44105

**Education**

**Case Western Reserve University** 2024

PhD, Biomedical Engineering

*Thesis: 3D ultrasound imaging of the eye*

**Bangladesh University of Engineering and Technology**

M.Sc., Electrical and Electronic Engineering 2018

*Thesis: Noisy speech enhancement in wavelet domain using generative adversarial network*

B.Sc., Electrical and Electronic Engineering 2016

*Thesis: Sleep apnea detection exploiting features extracted from EEG signals*

**Research and Professional Experience**

**Graduate Research Assistant** August 2018-

Biomedical Imaging Laboratory; Advisor: Dr. David L. Wilson

* Developed a novel 3D ultrasound biomicroscopy imaging system for improved eye disease diagnosis, treatment planning, and assessment.
* Developed 3D ultrasound biomicroscopy image enhancement and image quality assessment approach using generative models for real-time clinical applications.
* Developed deep learning segmentation, visualization, and automated 3D assessment of ciliary body in 3D ultrasound biomicroscopy images.
* Developed a clinical alternative imaging approach for whole eye imaging and analysis of intraocular foreign body using 3D ultrasound.
* Developed an end-to-end deep neural network approach for tuning-free non-contrast ultrasound microvessel.

**Computer Vision Researcher**

Semion Inc. November 2016- Feb 2018

* Developed AI enabled chest X-Ray screening software that identified and localized abnormalities.

**Undergraduate Research Assistant**

Bangladesh University of Engineering and Technology; Advisor: Dr. Celia Shahnaz Summer 2015- July 2018

* Developed apnea detection approach from EEG signal features in patients with sleep apnea syndrome. (B.Sc. project)
* Developed a generative adversarial network-based speech enhancement approach using wavelet features. (M.Sc. dissertation)

**Technical Skills**

* Machine and deep learning in signal and image processing i.e., image segmentation, image enhancement, image quality assessment, speech, and biomedical signal processing.
* Programming: Python (TensorFlow, PyTorch, scikit-learn), MATLAB, C/C++, R
* Visualization and control tools: Amira, 3D Slicer, LabVIEW
* Expertise in various image and signal modalities e.g., ultrasound, X-ray, CT, speech, and EEG

**Honors and Awards**

* Best poster award, *cum laude,* SPIE Medical Imaging 2022, San Diego
* Travel award, SPIE Medical Imaging 2022, San Diego
* Winner, Annual Cleveland Medical Hackathon 2018
* Recipient of Bangladesh-Sweden Trust Fund 2018
* Dean’s list, BUET

**Patents**

* “Processing three-dimensional (3d) ultrasound images”- US Patent No. 20210383548A1– Published December 9, 2021

**Journals**

[1] Minhaz, A.T.,’ Sevgi, D.D., Kwak, S., Kim, A., Wu, H., Helms, R.W., Bayat, M., Wilson, D.L. and Orge, F.H., Deep Learning Segmentation, Visualization, and Automated 3D Assessment of Ciliary Body in 3D Ultrasound Biomicroscopy Images,” Trans. Vis. Sci. Tech., 11(10), 3-3 (2022).

[2] Minhaz, A. T., Orge, F. H., Wilson, D. L., & Bayat, M. (2024). Assessment of intraocular foreign body using high resolution 3D ultrasound imaging. Scientific Reports, 14(1), 12011.

[3] Minhaz, A.T., Murali, A., Wilson, D.L., Orge, F.H., Bayat, M., “3D ultrasound biomicroscopy image enhancement using generative adversarial network.” (under review)

[4] Helms, R. W., Minhaz, A. T., Wilson, D. L. and Örge, F. H., “Clinical 3D Imaging of the Anterior Segment With Ultrasound Biomicroscopy,” Trans. Vis. Sci. Tech. **10**(3), 11–11 (2021).

[5] Minhaz, A.T., Cooley, M., Wilson, D.L., Orge, F.H., Bayat, M., “Deep learning for tuning-free non-contrast ultrasound microvessel imaging.” (under review)

[6] Ehrenstein, S., Minhaz, A.T., Wilson, D.L., Orge, F.H., Bayat, M., “Model-based deep learning for tuning-free non-contrast ultrasound imaging of microvasculature” (under review)

[7] Islam, M. T., Aowal, M. A., Minhaz, A. T. and Ashraf, K., “Abnormality Detection and Localization in Chest X-Rays using Deep Convolutional Neural Networks,” arXiv:1705.09850 [cs] (2017).

**Conference Presentations**

[1] Minhaz, A.T. , Wilson, D.L., Orge, F.H., Bayat, M., “Assessment of ocular injuries using 3D ultrasound images”, presented at the SPIE Medical Imaging, San Diego, CA, USA, Feb. 2024.

[2] Minhaz, A.T. , Wilson, D.L., Orge, F.H., Bayat, M., “Imaging intraocular foreign bodies with three-dimensional ultrasound”, yet to be presented at the ARVO Annual Meeting, Seattle, WA, USA, May 2024.

[3] Minhaz, A. T., Cooley, M., Subramaniam, A., Exner, A., Orge, F., Wilson, D., & Bayat, M. (2022, October). End-to-end deep learning for tuning-free non-contrast ultrasound microvessel imaging. In 2022 IEEE International Ultrasonics Symposium (IUS) (pp. 1-3). IEEE.

[2] A. T. Minhaz, M. Bayat, F. Orge, and D. L. Wilson, “Deconvolution and improved visualization of ocular structures in UBM using deep learning,” in 2020 IEEE International Ultrasonics Symposium (IUS), Sep. 2020, pp. 1–3, doi: 10.1109/IUS46767.2020.9251648.

[3] A. T. Minhaz et al., “Deconvolution of ultrasound biomicroscopy images using generative adversarial networks to visualize and evaluate localization of ocular structures,” presented at the SPIE Medical Imaging, San Diego, CA, USA, Feb. 2021.

[4] A. T. Minhaz et al., “Comparison of manual and automated 3D measurements of ciliary body in three dimensional ultrasound biomicroscopy (3D-UBM) images.,” Invest.

Ophthalmol. Vis. Sci., vol. 61, no. 9, pp. PB0051–PB0051, Jul. 2020.

[5] A. T. Minhaz et al., “3D ultrasound biomicroscopy (3D-UBM) imaging of the eye for unique 3D assessment of ciliary body,” in Medical Imaging 2020: Ultrasonic Imaging and Tomography, Houston, United States, Mar. 2020, p. 27, doi: 10.1117/12.2549846.

[6] Murali, A., Minhaz, A.T., Wilson, D.L., Orge, F.H., Bayat, M., “Deep learning image deconvolution for enhanced biometric measurements in 3D ultrasound biomicroscopy”, yet to be presented at the ARVO Annual Meeting, Seattle, WA, USA, May 2024.

[7] H. Wu et al., “3D ultrasound biomicroscopy (3D-UBM) imaging and automated 3D assessment of the iridocorneal angle for glaucoma patients,” in Medical Imaging 2019:

Ultrasonic Imaging and Tomography, Mar. 2019, vol. 10955, p. 109550U, doi:

10.1117/12.2513072.

[8] C. Shahnaz and A. T. Minhaz, “Sleep Apnea frame detection based on Empirical Mode Decomposition of delta wave extracted from wavelet of EEG signals,” in 2016 IEEE International WIE Conference on Electrical and Computer Engineering (WIECON-ECE), Dec. 2016, pp. 233–236, doi: 10.1109/WIECON-ECE.2016.8009125.

[9] C. Shahnaz, A. T. Minhaz, and S. T. Ahamed, “Sub-frame based apnea detection exploiting delta band power ratio extracted from EEG signals,” in 2016 IEEE Region 10 Conference (TENCON), Nov. 2016, pp. 190–193, doi: 10.1109/TENCON.2016.7847987.

[10] M. T. Islam, M. N. Shaan, E. J. Easha, A. T. Minhaz, C. Shahnaz, and S. A. Fattah, “Enhancement of noisy speech based on decision-directed Wiener approach in perceptual wavelet packet domain,” in TENCON 2017 - 2017 IEEE Region 10 Conference, Nov. 2017, pp. 2666–2671, doi: 10.1109/TENCON.2017.8228313.

[11] S. Noor, E. A. Dhrubo, A. T. Minhaz, C. Shahnaz, and S. A. Fattah, “Audio Visual

Emotion Recognition Using Cross Correlation and Wavelet Packet Domain Features,” in 2017 IEEE International WIE Conference on Electrical and Computer Engineering (WIECON-ECE), Dec. 2017, pp. 233–236, doi: 10.1109/WIECON-ECE.2017.8468871.

**Leadership and Mentoring Experience**

* Led a team of clinicians, residents, and undergraduate students during my PhD for the eye imaging project.
* Teaching assistant for multiple graduate and undergraduate level courses on signal processing and instrumentation.
* Founder, President, Bangladeshi Students Association at Case Western (2019-2021)
* Treasurer, Community for Representation in Engineering (formerly known as Underrepresented Minorities in Biomedical Engineering) (2020-2021)

**References**

David L. Wilson, PhD

Robert J. Herbold Professor of Biomedical Engineering and Radiology

Case Western Reserve University

Faruk H. Örge, MD

William R. and Margaret E. Althans Chair and Professor

Director, Center for Pediatric Ophthalmology and Adult Strabismus

Rainbow Babies and Children's Hospital and University Hospitals Eye Institute

Mahdi Bayat, PhD

Research Assistant Professor

Electrical, Computer and Systems Engineering

Case Western Reserve University