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Abrar Faiyaz

PhD Candidate & Research Assistant, Department of ECE

Education

PhD Candidate in Electrical and Computer Engineering, *(Expected)* 2023-24
Specialization: **Diffusion MRI, AI**
***University of Rochester**, United States*

MSc in Electrical Engineering, 01/2018 - 01/2020
Specialization: **AI, Medical Imaging**
***University of Rochester**, United States*

BSc in Computer Science and Engineering, 08/2012 - 11/2016
First class with Honors (Ranked 1st), Specialization: **ML, Ultrasound**
Islamic University of Technology, Bangladesh. **CGPA: 4.0/4.0**

Professional Experience

Research Assistant & Teaching Assistant, 01/2018 - *Present*
Department of *Electrical and Computer Engineering*,
University of Rochester, Rochester, NY

Journal Article Reviewer, 03/2022 - *Present*
NMR in Biomedicine, **Frontiers in Neurology**

Lecturer, Department of *Computer Science and Engineering*, 01/2017 - 01/2018
Courses:

- CSE4503- Microprocessor and Assembly Language,
- CSE4673- Operating System and System Programming,
- CSE4607- Computer Graphics & Multimedia Systems,
- CSE4885- Human Computer Interaction

Islamic University of Technology, Dhaka, Bangladesh

Paid Co-op Internship, Software Solutions Department 10/2015 - 01/2016
Samsung R&D Institute, Bangladesh, Dhaka, Bangladesh

Awards & Achievements

***Champion** in the **MICCAI Challenge 2022**,* *09/2022*
*International Competition on **Artificial Intelligence in diffusion MRI** organized by CDMRI & MICCAI Society.* [Challenge Results] [Details]

*Received **OIC Gold Medal 2016** award for academic excellence in BSc.,* *11/2016*
*International Award recognised by **Organisation of Islamic Cooperation**, Jeddah, Kingdom of Saudi Arabia*

*Awarded **Educational Stipend** in the **ISMRM Conference**,* *2020, 2021, 2022*
International Society for Magnetic Resonance in Medicine.

*First Runners Up at **16th IUT Programming Contest 2015**.,* *11/2015*
*Programming contest organized by **Islamic University of Technology**, Dhaka, Bangladesh*

Research Publications

Journal Articles (Peer Reviewed)

J1. **Faiyaz, A.**, Doyley, M., Schifitto, G., Zhong, J., Uddin, M. N., "Single-shell noddi using dictionary-learner-estimated isotropic volume fraction," *NMR in Biomedicine*, vol. 35, no. 2, e4628, 2022.

J2. Finkelstein, A., **Faiyaz, A.**, Weber, M. T., Qiu, X., Uddin, M. N., Zhong, J., Schifitto, G., "Fixel-based analysis and free water corrected dti evaluation of hiv associated neurocognitive disorders," *Frontiers in Neurology; https://doi.org/10.3389/fneur.2021.725059*, 2021.

J3. Uddin, M. N., **Faiyaz, A.**, Wang, L., Zhuang, Y., Murray, K. D., Descoteaux, M., Tivarus, M. E., Weber, M. T., Zhong, J., Qiu, X., "A longitudinal analysis of brain extracellular free water in hiv infected individuals," *Scientific reports*, vol. 11, no. 1, pp. 1–12, 2021.

J4. Diba, T., **Faiyaz, A.**, Akhlagi, N., Doyley, M., Alam, S. K., Zara, J., Garra, B., "Elastic modulus quantification from strain elastograms: Progress towards a low cost alternative to shear wave elastography," *Journal of Ultrasound in Medicine*, vol. 39, no. S1, S26–S31, 2020.

J5. Korshunov, V. A., Smolock, E. M., Wines-Samuelson, M. E., **Faiyaz, A.**, Mickelsen, D. M., Quinn, B., Pan, C., Dugbartey, G. J., Yan, C., Doyley, M. M., "Natriuretic peptide receptor 2 locus contributes to carotid remodeling," *Journal of the American Heart Association*, vol. 9, no. 10, e014257, 2020.

J6. Korshunov, V. A., Quinn, B., **Faiyaz, A.**, Ahmed, R., Sowden, M. P., Doyley, M. M., Berk, B. C., "Strain-selective efficacy of sacubitril/valsartan on carotid fibrosis in response to injury in two inbred mouse strains," *British Journal of Pharmacology*, vol. 176, no. 15, pp. 2795–2807, 2019.

Journal Articles (Under Preparation)

J7. **Faiyaz, A.**, Kabir, I., L, W., Doyley, M., Sack, I., Qiu, X., Uddin, M., Schifitto, G., *Magnetic resonance elastography investigation on hiv+ cohort with cerebral small vessel disease*.

J8. **Faiyaz, A.**, Uddin, M. N., Schifitto, G., *Angular upsampling in diffusion mri using contextual hemihex sub-sampling in q-space*.

J9. Uddin, M. N., **Faiyaz, A.**, Finkelstein, A., Tivarus, M., Zhong, J., Weber, M., Wang, L., Wang, H., Qiu, X., Schifitto, G., *Linking myelin heterogeneity index with cognitive performance among hiv infected individuals at risk of cerebral small vessel disease*.

Conference Proceedings (Peer Reviewed)

C1. **Faiyaz, A.**, Hoang, N., Finkelstein, A., Zhong, J., Doyley, M., Wang, H., Uddin, M. N., Schifitto, G., "Bayestract: Automated machine learning based brain artery segmentation, anatomical prior annotation and feature-extraction in mr angiography," in *Proc. Intl. Soc. Mag. Reson. Med. 31*, 2022.

C2. Uddin, M. N., **Faiyaz, A.**, Finkelstein, A., Schifitto, G., "Myelin water imaging in an hiv population at risk of cerebral small vessel disease," in *Proc. Intl. Soc. Mag. Reson. Med. 31*, 2022.

C3. **Faiyaz, A.**, Doyley, M. M., Schifitto, G., Zhong, J., Uddin, M. N., "Deep learner estimated isotropic volume fraction enables reliable single-shell noddi reconstruction," in *Proc. Intl. Soc. Mag. Reson. Med. 30*, 2021.

C4. **Faiyaz, A.**, Kabir, I. E., Doyley, M. M., Sack, I., Uddin, M. N., Schifitto, G., "Preliminary mr elastography investigation on hiv+ cohort with cerebral small vessel disease," in *Proc. Intl. Soc. Mag. Reson. Med. 30*, 2021.

C5. Finkelstein, A., **Faiyaz, A.**, Uddin, M., Zhong, J., Schifitto, G., "Machine learning classification of hiv associated neurocognitive disorders (hand) based on fiber specific white matter change," in *27th Annual Meeting of the Organization for Human Brain Mapping*, 2021.

C6. Uddin, M. N., **Faiyaz, A.**, Schifitto, G., "Evaluation of white matter microstructure in an hiv population at risk of cerebral small vessel disease using microscopic fractional anisotropy," in *Proc. Intl. Soc. Mag. Reson. Med. 30*, 2021.

C7. **Faiyaz, A.**, Zhuang, Y., Doyley, M., Zhong, J., Descoteaux, M., MN, U., Schifitto, G., "Effect of free water correction in grey and white matter in cart treated hiv patients," in *26th Annual Meeting of the Organization for Human Brain Mapping*, 2020.

C8. Murray, K., **Faiyaz, A.**, Sahin, B., Tivarus, M., Uddin, M. N., Venkataraman, A., Wang, H., Zhuang, Y., Zhong, J., Maggirwar, S., "Tract-based spatial statistics of cerebral small vessel disease in an hiv population," in *26th Annual Meeting of the Organization for Human Brain Mapping*, 2020.

C9. Uddin, M. N., **Faiyaz, A.**, Zhuang, Y., Tivarus, M., Zhong, J., Descoteaux, M., Schifitto, G., "Relationship between free water and neuroinflammation/neurodegeneration markers in hiv before and after combination antiretroviral therapy," in *Proc. Intl. Soc. Mag. Reson. Med. 29*, 2020.

Academic Projects

Analyzing AlexNet Encodings: In a Computational Neuroscientist's Perspective
Course Instructor: Ralf Haefner *Spring 2021,* ***BCS451***

- Reconstructed Neuronal Receptive Fields of AlexNet Convolution Layer Neurons.
- Investigated alexnet tuning curves for comparison with neurons in human visual pathway.
- Report/Presentation

Deep learning based Ultrasound Image Generation: Beam forming alternative- Limitations and Possibilities
Course Instructor: Kevin J. Parker, ECE *Fall 2018,* ***ECE452***

- Enabled Ultrasound Beam forming with trained U-net architecture.
- Explored possibilities for Ultrasound Images with Deep Learner Applications
- Enabled characterizing Cysts with segmentation using raw US data without beam forming.
- Report/Presentation

Undergraduate Thesis

Abrar Faiyaz, Md Samiul Bashar, et al. **2016**, "Strain Estimation and Detection of Cancerous Breast Lesion through ultrasound image", Department of CSE, IUT, Dhaka, Bangladesh.
- Extracted and analyzed key features of malignant mammograms.
- Applied ML classifiers on optimized set of features to identify malignant and benign cases.
- Enabled early detection of malignant incidents.

Skills

Languages: C/ C++, Python, Keras, R, Bash, Matlab, LaTeX, Assembly (x86, MIPS)
Simulation Tools: COMSOL, Field-II, Paraview, Blender
Others: Git, High Performance computing, Cluster computing

Research Interest (Keywords)

Machine Learning, Deep Learning, Diffusion MRI, MR Elastography, MR Physics, Tissue Mechanics, Medical Image Processing, Computer Vision, Image Restoration, Ultrasound