

# MD ABUL HAYAT

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## EDUCATION

*PhD student of Electrical Engineering* Expected: May 2022  
University of Arkansas, Fayetteville, AR  
*Relevant Courses:* Deep Learning, Machine Learning, Information Theory, Stochastic Processes, Detection & Estimation

*Master of Science in Statistics* Expected: May 2021  
University of Arkansas, Fayetteville, AR  
*Relevant Courses:* Statistical Inference, Computational Statistics, Multivariate Analysis, Time Series Analysis

*Bachelor of Science in Electrical & Electronic Engineering* September 2015  
Bangladesh University of Engineering & Technology (BUET), Dhaka, Bangladesh  
*Relevant Courses:* Digital Signal Processing I & II, Microwave Engineering, Digital Communication, Power System Analysis

## TECHNICAL SKILLS

Programming Languages: Python, R, MATLAB, C++, C, SQL, AMPL  
Machine Learning Modules: PyTorch, Keras, TensorFlow, NumPy, scikit-learn, Jupyter  
Engineering Applications: Simulink, PSpice, PowerWorld, Tableau  
Other Skills: Git, Bash, L<sup>A</sup>T<sub>E</sub>X, Linux, High Performance Computing

## WORK EXPERIENCE

University of Arkansas, Fayetteville, AR August 2017 - Present  
*Graduate Assistant, Electrical Engineering*

- Analysis of peripheral venous pressure (PVP) signals under different clinical conditions using deep and statistical learning.
- Developed a Kalman filter and hidden Markov model based unsupervised anomaly detection algorithm for PVP signals.
- Applied deep learning techniques like CNN, Grad-CAM and Guided Backpropagation on PVP signals.
- Developed a Gaussian mixture model (GMM) based Bayesian unsupervised algorithm for rice panicle detection.
- Implementing time-frequency based cyclostationary and synchrosqueezing statistical models on PVP signals.
- Applied classical dimension reduction techniques like PCA, Kernel-PCA; regression techniques like GLM, Elastic net and classification algorithms like k-means, KNN, DBSCAN, SVM in MATLAB and Python.

Lawrence Berkeley National Laboratory, Berkeley, CA August 2020 - Present  
*Research Affiliate*  
*Summer Intern - Computing Sciences* May 2020 - August 2020

- Exploring self-supervised representation learning for photometric redshift prediction (ongoing).
- Trained and validated cosmological image dataset of ~100GB using distributed training on supercomputer Cori.
- Mentor: Mustafa Mustafa

Nokia Bell Labs, Murray Hill, NJ June 2019 - August 2019  
*Summer Intern - Math & Algorithms*

- Implemented U-Net and DenseNet based deep learning segmentation algorithms on OCT images.
- Mentors: Atefeh Mohajeri, William Sean Kennedy

Grameenphone, Dhaka, Bangladesh October 2015 - August 2017  
*System Engineer, Regional Operations Department*

- Grameenphone, part of the Norwegian Telenor Group, is the largest telecommunications operator in Bangladesh.
- Worked with more than 400 BTS/nodeBs of Huawei. Planned and implemented diversity techniques.
- Analyzed and solved performance issues like IPPM loss and Ping Packet loss, MPD degradation and TCH congestion.
- Implemented different radio aggregation techniques on wireless backhaul devices.

## PUBLICATIONS

- [C3] **M. A. Hayat**, Peter Harrington, et.al., “Estimating Galactic Distances From Images Using Self-supervised Representation Learning,” Machine Learning and the Physical Sciences Workshop, 34th Conference on Neural Information Processing Systems (NeurIPS), December 2020.
- [J4] **M. A. Hayat**, Jingxian Wu, et.al., “Unsupervised Anomaly Detection in Peripheral Venous Pressure Signals with Hidden Markov Models,” Biomedical Signal Processing & Control, September 2020. [IF: 3.321]
- [J3] **M. A. Hayat**, Jingxian Wu, et.al., “Unsupervised Bayesian Learning for Rice Panicle Segmentation with UAV Images,” Plant Methods, February 2020. [IF: 4.460]
- [J2] P. Bonasso, K. Sexton, **M. A. Hayat**, et. al., “Venous Physiology Predicts Dehydration in the Pediatric Population,” Journal of Surgical Research, March 2019.
- [J1] P. Bonasso, K. Sexton, S. Mehl, M. Golinko, **M. A. Hayat**, et. al., “Lessons learned measuring peripheral venous pressure waveforms in an anesthetized pediatric population,” Biomedical Physics & Engineering Express, February 2019.
- [C2] S. M. Hasan, **M. A. Hayat** and M. F. Hossain, “On the downlink SINR and outage probability of stochastic geometry based LTE cellular networks with multi-class services,” 18th International Conference on Computer and Information Technology (ICCIT), December 2015.
- [C1] S. M. Hasan, M. B. Monjil, F. Mohsin, **M. A. Hayat** and A. B. M. H. Rashid, “Adaptive beamforming with a Microphone Array,” 18th International Conference on Computer and Information Technology (ICCIT), December 2015.