Abdullah Al Bashit

CURRICULUM VITAE

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RESEARCH INTERESTS

Statistical Signal Processing, Machine Learning, Inverse Problems, Biomedical Imaging.

EDUCATION

Jul 2019–Dec 2024 **Northeastern University, Boston, MA, USA**
Ph.D. in Electrical Engineering
Thesis: Structural Characterization of Pathological Inclusions in Human Brain Tissue with Alzheimer's Disease.
Advisor: Prof. Lee Makowski

Aug 2017–Aug 2019 **Texas State University, San Marcos, TX, USA**
M.Sc. in Engineering (Electrical Engineering)
Thesis: A Comprehensive Solar Powered Remote Monitoring and Identification of Houston Toad Call Automatic Recognizing Device System Design.
Advisors: Prof. Damian Valles and Prof. Michael Forstner

Feb 2007–Jul 2011 **Rajshahi University of Engineering & Technology (RUET), Bangladesh**
B.Sc. in Electrical & Electronic Engineering
Thesis: Study of wavelength dependence of refractive index and material dispersion of various materials.
Advisors: Prof. S.M. Abdur Razzak and Prof. Md. Shahidul Islam

PROFESSIONAL EXPERIENCE

Jan 2025–present **Postdoctoral Research Associate**
Northeastern University, Boston, MA, USA
Advisor: Prof. Lee Makowski

Jul 2019–Dec 2024 **Graduate Research and Teaching Assistant**
Northeastern University, Boston, MA, USA

Sep 2022–Dec 2022 **Research Intern**
Harvard Medical School, Boston, MA, USA
Host: Prof. Stephen C. Harrison

Aug 2017–Jun 2019 **Graduate Research and Teaching Assistant**
Texas State University, San Marcos, Texas

Apr 2014–Aug 2017 **Assistant Engineer**
Bangladesh Power Development Board (BPDB), Dhaka, Bangladesh

Feb 2012–Mar 2014 **Lecturer, Department of Electrical and Electronic Engineering**
Prime University, Dhaka, Bangladesh

RESEARCH SUPPORT

Nov 2025–present **NIH K08 Career Development Award**
Multi-omic Risk Prediction of Chronic Obstructive Pulmonary Disease in European- and African-Ancestry Populations.
PI: Mathew Moll, M.D., Brigham and Women's Hospital (BWH), Boston, MA
Role: Ancillary Co-Principal Investigator

Honors & Awards

2024 **Student Travel Grant Award**
American Crystallographic Association (ACA), 74th Annual Meeting, Denver, Colorado.

2023, 2021 **Margaret C. Etter Student Lecturer Award**
ACA, 73rd Annual Meeting, Baltimore, Maryland (2023) and 71st Annual Meeting, Virtual (2021).

2022–2024 **Ph.D. Network Travel Grant**
Northeastern University, for ACA (2023) and BPS, Philadelphia, Pennsylvania (2024) and San Francisco, California (2022).

2018–2019 **Ingram School of Engineering "Director's List" Award**
Texas State University.

2018–2019 **Graduate College Scholarship**
Texas State University.

Spring 2019 **Graduate Thesis Research Support Fellowship**
Texas State University.

Fall 2017 **Ingram Graduate Scholarship**
Texas State University.

2010 **1st Place, IEEE Ethics Competition**
SPAC, IEEE Region 10, Bangladesh.

2007–2011 **Merit Scholarship**
Rajshahi University of Engineering & Technology (RUET), Bangladesh.

Journal Publications

[J9] **A. A. Bashit**, P. Nepal, and L. Makowski, "A Multicollinearity-Aware Signal-Processing Framework for Cross-β Identification via X-ray Scattering of Alzheimer's Tissue," *under review*, 2025 [arXiv preprint at arXiv].

[J8] P. Nepal, **A. A. Bashit**, and L. Makowski, "Characterization of sub-micrometre-sized voids in fixed human brain tissue using scanning X-ray microdiffraction," *Journal of Applied Crystallography (IUCr)*, 2024.

[J7] P. Nepal, **A. A. Bashit**, L. Yang, and L. Makowski, "Small-angle X-ray microdiffraction from fibrils embedded in tissue thin sections," *Journal of Applied Crystallography (IUCr)*, 2022.

[J6] J. Martinez-Lorenzo, J. Hudack, Y. Jing, M. Shaham, Z. Liang, **A. A. Bashit**, [5 authors], and A. Fox, "Preliminary Experimental Results of Context-Aware Teams of Multiple Autonomous Agents Operating under Constrained Communications," *Robotics*, 2022.

[J5] **A. A. Bashit**, P. Nepal, T. Connors, D. H. Oakley, B. T. Hyman, L. Yang, and L. Makowski, "Mapping the Spatial Distribution of Fibrillar Polymorphs in Human Brain Tissue," *Frontiers in Neuroscience*, 2022.

[J4] F. S. Saeed, **A. A. Bashit**, V. Viswanathan, and D. Valles, "An Initial Machine Learning-Based Victim's Scream Detection Analysis for Burning Sites," *Applied Sciences*, 2021.

[J3] M. R. Islam, G. K. Beng, and **A. A. Bashit**, "Design and Fabrication of Segment Display Architecture for Displaying Bengali and English Numerals," *Australian Journal of Basic and Applied Sciences (AJBAS)*, 2014.

[J2] A. A. Mansur, **A. A. Bashit**, M. R. Islam, "Harmonic Analysis of Front-End Current of Three-Phase Single-Switch Boost Converter," *International Journal of Applied Information Systems (IJAIS)*, 2013.

In Preparation

[J1] P. Nepal, **A. A. Bashit**, T. Connors, D. H. Oakley, B. T. Hyman, and L. Makowski, "Study of Protein Deposition in Alzheimer's Disease using Correlated Scanning X-ray Microdiffraction and Silver Staining,"*in preparation*.

Conference Publications

[C4] **A. A. Bashit** and D. Valles, "MFCC-based Houston Toad Call Detection using LSTM," *Proceedings of the 2019 IEEE International Symposium on Measurement and Control in Robotics (ISMCR)*, Houston, Texas, USA, 2019.

[C3] **A. A. Bashit** and D. Valles, "A Solar Powered Raspberry Pi Houston Toad Call Detection System Using Neural Network Model," *Proceedings of the 2018 International Conference on Computational Science and Computational Intelligence (CSCI)*, Las Vegas, Nevada, USA, 2018.

[C2] **A. A. Bashit** and D. Valles, "A Mel-Filterbank and MFCC-based Neural Network Approach to Train the Houston Toad Call Detection System Design," *Proceedings of the 2018 IEEE 9th Annual Information Technology, Electronics and Mobile Communication Conference (IEMCON)*, Vancouver, British Columbia, Canada, 2018.

[C1] **A. A. Bashit** and D. Valles, "An Embedded Approach for Controlling Automatic Water Pump and Monitoring Real-Time Remote Data on Desktop, Android, and Web-based Application," *Proceedings of the 16th International Conference on Embedded Systems, Cyber-physical Systems, and Applications (ESCS)*, Las Vegas, Nevada, USA, 2018.

Conference Talks

[CT5] **A. A. Bashit**, P. Nepal, and L. Makowski, "Integrating semi-supervised learning and transformer neural networks for lesion classification in Alzheimer's disease pathology,", American Crystallographic Association (ACA) 74th Annual Meeting, Denver, Colorado, USA, 2024.

[CT4] **A. A. Bashit**, P. Nepal, and L. Makowski, "Probing the microstructure of pathological protein deposits in Alzheimer's disease,", *Biophysical Society (BPS) 68th Annual Meeting*, Philadelphia, Pennsylvania, USA, 2024.

[CT3] **A. A. Bashit**, P. Nepal, and L. Makowski, "Mapping of pathological inclusions in human brain tissue with Alzheimer's disease,", *American Crystallographic Association (ACA) 73rd Annual Meeting*, Baltimore, Maryland, USA, 2023.

[CT2] **A. A. Bashit**, P. Nepal, and L. Makowski, "Unsupervised learning approach for mapping of pathological lesions in X-ray scanning microdiffraction studies of Alzheimer's disease,", *Biophysical Society (BPS) 66th Annual Meeting*, San Francisco, California, USA, 2022.

[CT1] **A. A. Bashit**, P. Nepal, and L. Makowski, "Classification of tissue variations in X-ray scanning microdiffraction from thin sections of human brain,", *American Crystallographic Association (ACA) 71st Annual Meeting*, Virtual, 2021.

Invited Talks

[T2] Discovering the Hidden Secrets: Understanding Pathological Inclusions in Alzheimer's Brain Tissue, Systems Pharmacology, Brigham and Women's Hospital, Sep. 2025.

[T1] Classification of tissue in X-ray scanning microdiffraction from thin sections of human brain, Brookhaven National Laboratory (BNL), Mar. 2023.

Research in the News

2021 **Newswise**, "Understanding Alzheimer's Progression with Improvements to Imaging, Image Processing, Machine Learning"

2019 **SmugMug**, "Drone demonstrations at Air Force Pitch Day"

Teaching

Sep 2020–Dec 2020 **Teaching Assistant**, Northeastern University, Boston, MA.

EECE 2323: Fundamentals of Digital Design and Computer Organization – Led recitation lectures and designed/conducted laboratory experiments for a class of approximately 40 undergraduate students.

Aug 2017–Dec 2017 **Graduate Instructional Assistant**, Texas State University, San Marcos, TX.

MFGE 4392/4394: Microelectronics Manufacturing I/II – Supervised cleanroom laboratories on full CMOS-compatible semiconductor device fabrication (wafer preparation through final test) for a class of approximately 10 undergraduate students.

Feb 2012–Mar 2014 **Lecturer**, Prime University, Dhaka, Bangladesh.

Delivered classroom lectures, designed and graded exams, supervised labs, and held office hours for classes of approximately 20–80 undergraduate students.

- EEE 157: Electrical Circuit II (Fall 2012)
- EEE 210: Electronic Circuit Simulation Lab (Spring 2012)
- EEE 235: Energy Conversion I (Summer 2012)
- EEE 325: Energy Conversion II (Summer 2012, Spring 2013)
- EEE 326: Energy Conversion II Lab (Spring 2013)
- EEE 407: Microprocessor Systems and Interfacing (Spring 2012)
- EEE 425: Power System I (Summer 2012, Spring 2013)
- EEE 431: Power System II (Fall 2012)
- EEE 473: Power System Protection (Fall 2012)

Mentorship

2025 Durga Gomathi Arumuganainar, MS Department of Bioinformatics (NEU, 2026)

2024 Wendao Li, BS+MS Department of Bioengineering (NEU, 2026)

2023 Devyn Stringfellow, BS in Behavioral Neuroscience and Bioengineering (NEU, 2026)

2020–2021 Fairuz Samiha Saeed, MS Department of Electrical Engineering (TXSTATE, 2021)

Membership & Extracurricular Activities

2021, 2023, 2024 **Graduate Student Member**, American Crystallographic Association (ACA).

2022, 2024 **Graduate Student Member**, Biophysical Society (BPS).

2018–2019 **Graduate Student Member**, IEEE, Texas State University.

2009–2011 **Student Coordinator**, IEEE RUET Student Branch.

2009 **Trainer**, Workshop on PIC and AVR microcontrollers at RUET, Bangladesh.

References

Prof. Lee Makowski
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Department of Bioengineering
Northeastern University, Boston, MA
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Dr. Lin Yang
Lead Beamline Scientist
National Synchrotron Light Source II
Brookhaven National Laboratory, New York
✉ lyang@bnl.gov

Dr. Mathew Moll
Assistant Professor of Medicine
Channing Division of Network Medicine
Brigham and Women's Hospital, Boston, MA
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