Abdullah Al Bashit

CURRICULUM VITAE

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RESEARCH INTERESTS

Statistical Signal Processing, Machine Learning, Bioinformatics, Computational Biology.

APPOINTMENTS

Jan 2025–present

Postdoctoral Research Associate
Department of Bioengineering
Northeastern University, Boston, MA, USA
Advisor: Prof. Lee Makowski
Grant support: NIH/NIA RF1-AG079946

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–Jun 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

Jul 2019–Dec 2024

Graduate Research and Teaching Assistant
Northeastern University, Boston, MA, USA
Grant supports: NIH/NIA R21-AG068972; AFRL FA8750-18-S-7007

Sep 2022–Dec 2022

Research Intern
Harvard Medical School, Boston, MA, USA
Host: Prof. Stephen Harrison

Aug 2017–Jun 2019

Graduate Research and Teaching Assistant
Texas State University, San Marcos, Texas
Advisor: Prof. Damian Valles
Grant support: USFWS (F16AP00942) via TPWD

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 Collaborations

Nov 2025–present — Pathophysiology and Biomarker Identification of Mechanically Affected Lung
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.

Peer-Reviewed 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*, Nov. 2025. [Preprint: 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)*, Oct. 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)*, Dec. 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*, Sep. 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*, May 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*, Sep. 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)*, Nov. 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)*, Mar. 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*.

Peer-Reviewed 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, Sep. 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, Dec. 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, Nov. 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, Aug. 2018.

Conference Presentations

[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, Jul. 2024. [Oral Presentation]

[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, Feb. 2024. [Oral Presentation]

[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, Jul. 2023. [Oral Presentation]

[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, Feb. 2022. [Oral Presentation]

[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, Aug. 2021. [Oral Presentation]

Invited Talks

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

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

Posters

[P2] P. Nepal, **A. A. Bashit**, T. R. Stewart, B. T. Hyman, and L. Makowski, "Mapping of the molecular architecture of pathological protein deposits in Alzheimer's disease,", *Biophysical Society (BPS) 69th Annual Meeting*, Los Angeles, California, USA, Feb. 2025.

[P1] P. Nepal, **A. A. Bashit**, and L. Makowski, "Small-angle X-ray microdiffraction from fixed human brain tissue exhibits power-law behavior that provides insights into the structural organization of neuropathological lesions,", *Biophysical Society (BPS) 68th Annual Meeting*, Philadelphia, Pennsylvania, USA, Feb. 2024.

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 20 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 Bioengineering and Biochemistry with a minor in Behavioral Neuroscience (NEU, 2025)

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

Professional Memberships & Service

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

Dr. Lee Makowski
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Department of Bioengineering
Northeastern University, Boston, MA
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Dr. Mathew Moll
Assistant Professor of Medicine
Channing Division of Network Medicine
Brigham and Women's Hospital, Boston, MA
✉ remol@channing.harvard.edu

Dr. Lin Yang
Lead Beamline Scientist
National Synchrotron Light Source II
Brookhaven National Laboratory, New York
✉ lyang@bnl.gov