

# AROMA HOQUE

[aroma.hoque@gmail.com](mailto:aroma.hoque@gmail.com) | (+1) 617-602-6842 | Boston, MA, USA

*Prospective PhD Student (Fall 2026)*

## RESEARCH INTEREST

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Database, Storage Systems, Machine Learning for Systems

## EDUCATION

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**Bangladesh University of Engineering and Technology (BUET)**

April 2019 – July 2024

*Bachelor of Science in Computer Science and Engineering*

*CGPA: 3.64/4.00*

## RESEARCH EXPERIENCE

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**Buffer Cache Eviction Algorithms for PostgreSQL**

November 2025 – Present

*Research Intern advised by Prof. Tarikul Islam Papon, UMass Boston*

- Designed and implemented SIEVE-DB, a buffer cache eviction algorithm for PostgreSQL, alongside multiple baseline algorithms including Clock, Sieve, LRU, CFLRU, and LRUWSR.
- Conducting comprehensive performance benchmarks using industry-standard workloads.
- Analyzing detailed performance metrics to evaluate and compare algorithm efficiency.
- Deploying and managing large-scale experiments on cloud computing infrastructure.

**Overlapping Community Detection in Protein-Protein Interaction Networks**

June 2023 – June 2024

*Undergraduate Thesis advised by Prof. Sadia Sharmin and Prof. Saidur Rahman, BUET*

- Developed a novel Edge Graph Convolution Network (EGCN) model that integrates node and edge attributes for accurate community detection.
- Incorporated advanced attention mechanisms to prioritize important interactions and improve model performance.
- Preprocessed and normalized real-world protein-protein interaction datasets for graph-based model compatibility.
- Evaluated the model using metrics such as Overlapping Normalized Mutual Information (ONMI), achieving superior results.
- Provided insights into overlapping protein communities, with applications in bioinformatics and disease-related pathways.

## POSTERS AND PRESENTATIONS

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**SIEVE-DB: Adapting the SIEVE Policy for DB Bufferpools**

*Aroma Hoque, Tarikul Islam Papon*

*January, 2026*

- Poster at Northeast Database (NEDB) Day, UMass Boston, Boston, USA

## AWARDS AND SCHOLARSHIPS

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**Dean's List Award, Merit Scholarship, and Technical Scholarship**

2019 – 2022

*Bangladesh University of Engineering and Technology*

- Awarded in multiple terms for academic excellence.

## PROJECTS (SELECTED)

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- Tutor Hub - An Online Tuition Management System** | *Node.js, React* 2023
- Developed an online platform for students and tutors to post and approve tuition requests.
- Combined Engineering Admission System** | *Python, Flask, Oracle, Bootstrap* 2022
- Implemented a demo centralized system to streamline the admission process for engineering universities in BD.
- Paging Framework and Scheduler for xv6 Operating System** 2023
- Implemented a simple paging framework and a lottery scheduler for the xv6 OS.
- Minimalist C Compiler** 2022
- Built a tiny C compiler using C++ that translates C code into assembly code.
- AI for Minesweeper Game** 2023
- Built a knowledge-based AI agent to play the Minesweeper Game.
- HTTP Server** 2022
- Built a multi-threaded HTTP server using Java and socket programming.
- 4-Bit MIPS CPU** 2022
- Built hardware and a virtual simulation for the MIPS CPU pipeline.
- Modified F2-TCP Implementation in NS-2** 2023
- Implemented a modified version of F2-TCP for High-speed Networks in Computer Networks Lab.
- Microcontroller-based Smart Mask** 2022
- Built an automated air-purifying and temperature-controlling mask using Arduino.
- DXBall Game** 2019
- Built the DXBall game with unique features, using iGraphics.

## ACTIVITIES

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**Volunteer, Northeast Database Day (NEDB) 2026** January 2026  
*UMass Boston*

## LANGUAGES

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**English:** IELTS 7.0/9.0  
**Bengali:** Native Proficiency

## SKILLS

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**Programming:** C/C++, Python, Java, Bash, JavaScript, SQL, HTML/CSS, L<sup>A</sup>T<sub>E</sub>X, OpenGL  
**Frameworks and Libraries:** Node.js, Express.js, pandas, NumPy, Matplotlib  
**Development Tools:** Git, Vim, Emacs, Visual Studio, PyCharm, IntelliJ, Eclipse  
**System Software and Tools:** NS-2, YACC, Flex, POSIX Threads

## REFERENCE

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**Dr. Tarikul Islam Papon** University of Massachusetts Boston  
*Assistant Professor, Computer Science* *t.papon@umb.edu*

**Dr. Sadia Sharmin** Bangladesh University of Engineering and Technology  
*Associate Professor, Computer Science and Engineering* *sadiasharmin@cse.buet.ac.bd*

**Dr. A.K.M. Ashikur Rahman** Bangladesh University of Engineering and Technology  
*Professor, Computer Science and Engineering* *ashikur@cse.buet.ac.bd*