Abdullah Nayem Wasi Emran

CS PhD (Fall 2026) Applicant
Lecturer, Brac University (CSE)
BSc. Graduate of 2025,
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RESEARCH INTEREST

Bioinformatics, Algorithms, Data Mining, AI for Healthcare

EDUCATION

- **Bangladesh University of Engineering and Technology (BUET)** — Feb 2020 - Mar 2025
  BSc. (Engg.) in Computer Science and Engineering — Dhaka, Bangladesh
  - **CGPA:** 3.82/4.00 [Final year: 3.98/4.00]
  - **Honors:** Dean's list award and university merit scholarship recipient in four out of eight semesters
  - **Relevant Coursework:** Machine Learning, Computer Security, Introduction to Bioinformatics, Computer Networks, Data Structures and Algorithms, Database, Linear Algebra, Software Engineering

TEACHING EXPERIENCE

- **BRAC University** — June 2025 - Present
  Lecturer, Department of Computer Science and Engineering — Dhaka, Bangladesh
  - **Teaching:** Compiler Design, Computer Networks

PUBLICATIONS

- **Abdullah Nayem Wasi Emran**, A. B. M. Alim Al Islam, "Mental Health Across Contexts: A Cross-Dataset Study Covering Medical Students, Quarantined Individuals, and Psychiatric-Disordered Subjects," *Humanities & Social Sciences Communications (Nature Portfolio)*, 2025. DOI: 10.1057/s41599-025-05053-x

MANUSCRIPTS UNDER REVIEW OR IN PREPARATION

- **Abdullah Nayem Wasi Emran**, Majisha Jahan Disha, Rezwana Reaz, "Fusing Exploration and Exploitation: Hybrid Fireworks–Whale Optimization for Multi-Objective Independent Task Scheduling in Cloud Environments," *under review at Cluster Computing (Springer)*, 2025. Preprint: 10.21203/rs.3.rs-6807131/v1

RESEARCH EXPERIENCE

- **Efficient RNA–Protein Interaction Prediction with Foundation-Model Embeddings** — May 2025 – Present
  Supervised by Dr. Mohammad Saifur Rahman
  (Bioinformatics, Deep Learning)
  - Curating human RBP/non-RBP datasets (EuRBPDB, UniProt) and building a reproducible sequence-first preprocessing pipeline (SeqKit, MMseqs2); extensions to structural/network features planned.
  - Prototyping scalable models with pre-trained embeddings (ESM-2, ProtBERT) and lightweight classifiers for RBP identification, designed to run on modest compute.

- **Domain-Adaptive Causal Uplift Modeling across Heterogeneous Mental-Health Cohorts** — Apr 2025 – Present
  Supervised by Dr. A. B. M. Alim Al Islam
  (Causal Inference, Machine Learning)
  - Harmonizing heterogeneous cohort data (students, quarantined, clinical) into a comparable schema.
  - Training a domain-adversarial uplift model with fairness-aware regularization and evaluating with leave-one-cohort-out AUUC.

- **Studying** cohort-specific calibration to handle inverted or unstable treatment effects.

- **Hybrid Fireworks–Whale Optimization for Multi-Objective Cloud Task Scheduling** — Nov 2023 – Mar 2025
  Supervised by Dr. Rezwana Reaz
  (Cloud Computing, Optimization)

  - Designing hybrid meta-heuristics that fuse exploration (FWA) with exploitation (WOA) for cloud task scheduling.
  - Benchmarking methods and analyzing trade-offs in makespan, monetary cost, and CPU/RAM/bandwidth usage.

- **Mental Health Across Contexts: A Cross-Dataset Study** — Jul 2024 – Jan 2025
  Supervised by Dr. A. B. M. Alim Al Islam
  (Data Mining, Network Analysis)

  - Analyzing mental-health outcomes across medical students, quarantined individuals, and psychiatric-patient cohorts.
  - Applying statistical modeling, network analysis, and causal methods to uncover robust cross-dataset trends.

- **Large-Language-Model-Enhanced IoT Threat Detection** — Nov 2024 – Present
  Supervised by Dr. A. B. M. Alim Al Islam
  (IoT Security, Explainable ML)

  - Exploratory analysis and baseline modeling on NF-ToN-IoT-v2 with attention to minority-class recall and class imbalance.
  - Integrating lightweight LLM-based features to improve cross-dataset robustness and interpretability.

ACADEMIC PROJECTS

- **SCOPES: Cross-Platform Gene Signature Selection**
  Bioinformatics Course Project [repo]

  - Built a leak-free, multi-objective pipeline (AUC, Kuncheva stability, MMD) to select platform-invariant gene subsets on Agilent that transfer to RNA-Seq without retraining.
  - On TCGA-BRCA (505 tumor / 25 normal), achieved $AUC_{Agilent}$=0.69, $AUC_{RNA\text{-}Seq}$=0.61 (ΔAUC=−0.08) with a 1-gene model; contrasted with a 30-gene model (near-perfect source AUC, poor transfer).
  - **Tools:** Python (scikit-learn, pymoo), NSGA-II, MAD filter, AUC/MMD/Kuncheva

- **Lightweight Deep Learning Models for Histopathological Cancer Cell Classification**
  Machine Learning Course Project [repo]

  - Designed and implemented lightweight models using EfficientNet-B0 to classify histopathological cancer cells.
  - Integrated attention mechanisms like SEBlock, MSFF, and CBAM to enhance feature recalibration and spatial learning.
  - Used transfer learning (PathMNIST) and augmentations, achieving 98% accuracy on CRC-VAL-HE-7K dataset.
  - **Tools & Technology:** Python (PyTorch), SEBlock, CBAM, EfficientNet-B0, Matplotlib

- **Ray-Tracing Pipeline**
  Computer Graphics Sessional repo

  - Developed a raster-based graphics pipeline and implemented ray tracing using C++ and OpenGL.
  - Applied Phong Lighting model (ambient, diffuse, specular, recursive reflection) to render realistic shapes.
  - **Tools & Technology:** C++, OpenGL

- **RecipeShare**
  Software Development Project repo

  - Developed a recipe-sharing web application with features for upload, editing, blog posts, and meal planning.
  - Implemented recipe generation from images of ingredients using backend processing.
  - **Tools & Technology:** Next.js, Django, PostgreSQL

- **Building a Subset C Compiler**
  Compiler Sessional repo

  - Developed a compiler from scratch in C++ using Bison and Flex.
  - Implemented symbol table, lexical analyzer, semantic analyzer, and three-address code generation.
  - **Tools & Technology:** C++, Bison, Flex

- **BookExchange**

  Database Course Project repo

  – Built a platform for users to sell, borrow, rent, or exchange books with reviews and search functionality.
  – **Tools & Technology:** Next.js, Django, PostgreSQL

- **Network Simulations & TCP Adaptive Reno**

  Networking Sessional repo

  – Implemented socket programming in Java for inter-system communication.
  – Simulated network architectures with NS-3 and explored TCP Adaptive Reno congestion control.
  – **Tools & Technology:** Java, NS-3

Skills

- **Programming Languages:** Python, C/C++, Java, JavaScript, Bash, MySQL, HTML/CSS
- **Tools & Frameworks:** NS-3, Next.js, Django, Oracle DBMS, Git, LaTeX, Autopsy
- **Libraries:** OpenGL, Scikit-learn, Pandas, Matplotlib, Seaborn
- **Software:** Navicat, Wireshark, MS Office, Adobe Photoshop

References

- **Dr. Rezwana Reaz**   Email: **rimpi@cse.buet.ac.bd**

  Associate Professor, Department of CSE, BUET [Thesis Supervisor]

- **Dr. A. B. M. Alim Al Islam**   Email: **alim_razi@cse.buet.ac.bd**

  Professor, Department of CSE, BUET [Research Supervisor]