# MD SHAWMOON AZAD

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## PROFILE SUMMARY

I am a researcher in Quantum-Secure Systems and XAI, focusing on hybrid quantum–classical frameworks in Cybersecurity and eXplainable AI in Healthcare. I have published **5 Q1**-indexed journal papers (Cumulative **IF:23+**), supervised **20+** research projects, contributed to **4** grants, and collaborated across multidisciplinary research groups to advance quantum-resilient communication and intelligent security frameworks. **My Research Interest(s):**

(I) **NIST-Aligned Hybrid Quantum–Classical Cryptography**
(II) **Post Quantum Communication Protocols**
(III) **Efficient QML for Constrained Hardware**
(IV) **Translational Quantum × AI Applications**

## EDUCATION

**Cleveland State University (CSU)** — **Aug 2025 – Present**
Ph.D. in Engineering - Computer Science — Cleveland, OH
**Research Theme:** Hybrid Quantum-Classical Frameworks for Cybersecurity

**North South University (NSU)** — **Jan 2019 – Jun 2023**
B.Sc. in Computer Science and Engineering — Dhaka, BD
Distinction: *manga cum laude*
CGPA: 3.74/4.00 ($\approx 93.5\%$ marks)

## EXPERIENCE

### Graduate Research Assistant — **Aug 2025 – Present**
Intelligent Secure Cyber-Systems and Applications Research Lab, CSU — Cleveland, OH.

- Currently, working on designing and implementing Hybrid Post Quantum TLS for Quantum Safe Cloud.
- Investigating hybrid authentication mechanisms and key exchange optimization to enhance confidentiality, integrity, and downgrade resistance in modern transport protocols.
- Contributing to the development of resilient, scalable, and quantum-ready Internet security standards aligned with emerging post-quantum migration strategies.

### Quantum Research Assistant — **(1 year 9 month) Oct 2023 – Jul 2025**
NSU Optics-Quantum & AI lab, NSU — Dhaka, BD.

- Developed secure hybrid Quantum-Classical security protocols using QKD (BB84, B92, E91, W-state) and classical cryptography for imperfect communication channels.
- Completed QKD integrated **4** research projects (**3 Q1 publication, Cumulative Impact: 14.9**)
- Co-supervised undergraduate quantum computing projects.
- Supported research proposal writing for Google Research Grant 2025 and World Bank HEAT Project.
- Delivered **3** NSU CTRGC grant-funded research projects;

### AI Research Assistant — **(1 year) Jan 2024 – Jan 2025**
Dept. of Electrical and Computer Engineering, NSU — Dhaka, BD

- Designed data collection pipelines while maintaining ethical data guidelines.
- Built AI framework predicting consumer behavior (91% accuracy) using TPB + ML models.
- Developed mental health analysis tool (99.14% accuracy) with NLP and explainable AI features.
- Fine-tuned BERT-based LLMs, engineered prompts on Gen AI, and applied ensemble + statistical ML techniques.
- Published **2 Q1 journal** papers as $1^{st}$ author, Total Impact: 8.2; Led **1** NSU CTRGC grant-funded research project.

### Quantum & AI Research Instructor — **Jan 2024 – Present**
Mahdy Research Academy — Remote

- Delivered research workshops to **800+** students on ML and Quantum Cryptography.
- Conducted workshops on QKD protocols and Post-Quantum schemes (BB84, E91, Kyber PQC).
- Supervised **6** student-led projects across Quantum Security and Applied ML.

### Teaching Assistant
**(2 years) Jun 2022 – Jun 2024**

Dept. of Electrical and Computer Engineering, NSU — Dhaka, BD

- **Operating Systems** (CSE323): Covered OS structures, process and memory management, and security.
- **Programming Language I** (CSE115): Focused on C programming fundamentals.
- Mentored over **400** students across **25** sections; developed assessments and review materials.

## PEER-REVIEWED JOURNAL PUBLICATIONS

[Google Scholar]

1. **"Quantum Secure Image Transmission: A Chaos-Assisted Quantum Key Distribution Approach Using Entanglement."** *IET Quantum Communication*, 6(1), e70016. https://doi.org/10.1049/qtc2.70016
   *Equal Contribution* $1^{st}$ *Author • Q2 Scopus Indexed • Impact Factor: 3.3*

2. **"Multi-layered Security System: Integrating Quantum Key Distribution with Classical Cryptography to Enhance Steganographic Security."** *Alexandria Engineering Journal*, 121, 167–182. https://doi.org/10.1016/j.aej.2025.02.056
   $2^{nd}$ *Co-author • Q1 Scopus Indexed • Impact Factor: 6.2*

3. **"QSAC: Quantum-assisted Secure Audio Communication using Quantum Entanglement, Audio Steganography, and Classical Encryption."** *Engineering Science and Technology*, 70, 102167. https://doi.org/10.1016/j.jestch.2025.102167
   *Co-Supervised • Q1 Scopus Indexed • Impact Factor: 5.4*

4. **"SAD: Self-assessment of Depression for Bangladeshi University Students Using Machine Learning and NLP."** *Array*, 100372. https://doi.org/10.1016/j.array.2024.100372
   $1^{st}$ *Author • Q1 Scopus Indexed • Impact Factor: 4.5*

5. **"Predictive Modeling of Consumer Purchase Behavior on Social Media: Integrating the Theory of Planned Behavior and Machine Learning for Actionable Insights."** *PLOS ONE*, 18(12), e0296336. https://doi.org/10.1371/journal.pone.0296336
   $1^{st}$ *Author • Q1 Scopus Indexed • Impact Factor: 3.7*

6. **"Explainable AI for Predicting Problematic Internet Use Among Bangladeshi University Students: The Role of Loneliness, Low Self-Esteem, and Psychological Distress."** *Under Review in PLOS ONE.*
   *Co-Supervised • Q1-Submission • Under Review*

7. **"Enhancing Cloud Storage Security with Quantum Key Distribution and Post-Quantum Cryptography Using Custom Proxy Re-Encryption."** *Under Review in Quantum Information Processing.*
   *Co-Supervised • Q1-Submission • Under Review*

## PROJECTS

- **Undergraduate Thesis:** Towards Accurate AI-Driven ItihashQA: Developed Bangladeshi history-focused QA system using RAG & LLMs (92% accuracy, mitigated hallucinations). [Paper Link] — Spring 2023
- **Undergraduate Capstone Project Showcase:** A Secure Image Transmission Scheme Using Chaotic System and Quantum Entanglement.[Poster Link] — Spring 2023

## SELECTED CERTIFICATIONS

- **Quantum Mechanics & Quantum Computing:** Theory, COMSOL simulation, and IBM QISKIT learning. [Certificate Link]

## SKILLS

- **Quantum Tools:** QISKIT, TensorFlow Quantum, NumPy.
- **Programming Languages** : Python, C/C++.
- **Machine Learning Tools**: PyTorch, Scikit-learn.
- **DevOps**: GitHub, Trello.
- **Writing Tools**: Latex and Office Suits
- **Language**: English (Professional), Bangla (Native).

## HONORS & AWARDS

- ***Magna Cum Laude***, awarded by North South University. — Dec 2024
- **Top 10** (of 104 teams), Innovation Challenge 13, NSU ACM. — Spring 2023
- **50% Merit-Based Scholarship** for Academic Excellence. — Spring 2020 – Fall 2022
- **NSU CTRGC Grant** funding across four research projects. — Oct 2023 – Present