Syed Emad Uddin Shubha

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Citizenship: Bangladesh , US Visa Status: F-1 Student

RESEARCH INTEREST

- Quantum Communication
- Quantum Algorithm
- Quantum Hardware Security
- Quantum Error Correction
- Quantum Cryptography
- Deep Learning

EDUCATION

Louisiana State University — **January 2025 – Present**
Computer Science Graduate Student — **CGPA: 4.00/4.00**

Bangladesh University of Engineering and Technology — **February 2017 – May 2022**
B.Sc. in Electrical and Electronic Engineering — **CGPA: 3.24/4.00**

RESEARCH EXPERIENCE

Graduate Research Assistant — Louisiana State University, USA — January 2025 - Present

- Investigating security vulnerabilities in multi-tenant quantum hardware under the supervision of Dr. Tasnuva Farheen, and studying the role of quantum correlations (discord & entanglement) in quantum communication.
- Authored two first-author papers accepted to the IEEE Quantum Week 2025 (Workshop Track); another first-authored paper acceptance in ACM QSec 2025.

Research Assistant — North South University, Dhaka — June 2022 - May 2024

- Pioneered Bangladesh's first research initiatives in quantum computing, under the supervision of Dr. Mahdy Rahman Chowdhury and published a high-impact journal article as the first author on quantum communication.
- Mentored junior researchers, formulated and directed some research projects, resulting a conference paper and two more journal articles.

Undergraduate Research — Bangladesh University of Engineering and Technology (BUET)

- Completed an undergraduate thesis on quantum communication under the supervision of Dr. Md. Saifur Rahman, and another research on deep learning in MI - BCI task classification.
- Both of these works were conducted during the undergraduate final year and have been presented in IEEE conferences.

JOURNAL PUBLICATIONS

1. "Secure and Efficient n-Qubit Entangled StateTeleportation Using Partially Entangled GHZ Channels and Optimal POVM." (**Corresponding author**; accepted in AVS Quantum Science, Q1-indexed, IF: 3.0), **doi: 10.1116/5.0284072**.

2. "Significant improvement of fidelity for encoded quantum bell pairs at long and short-distance communication along with a generalized circuit." (**1st author**; accepted in Heliyon, Q1-indexed, IF: 3.6), **doi: 10.1016/j.heliyon.2023.e19700**.

3. "Multi-Layered Security System: Integrating Quantum Key Distribution with Classical Cryptography to Enhance Steganographic Security". (Co-supervised, accepted in Alexandria Engineering Journal, Q1-indexed, IF=6.8), **doi: 10.1016/j.aej.2025.02.056**.

4. "Enhancing the security of image transmission in Quantum era: a chaos-assisted QKD approach using entanglement." (Co-supervised, accepted in IET Quantum Communication, Q2-indexed, IF=2.8), **doi: 10.1049/qtc2.70016**.

SELECTED PEER-REVIEWED CONFERENCE PROCEEDINGS

5. "Pulse-to-Circuit Characterization of Stealthy Crosstalk Attack on Multi-Tenant Superconducting Quantum Hardware" (**1st author**). Accepted for publication in ACM Quantum Security Workshop 2025, **doi: 10.1145/3733825.3765282**.

6. "Testbed Protocol for Adaptive Superdense Coding in Distributed Quantum Networks" (**1st author**). Presented in Distributed Quantum Computing Workshop, IEEE Quantum Week, 2025. **doi: 10.1109/QCE65121.2025.10350**.

7. "Pulse-Level Simulation of Crosstalk Attacks on Superconducting Quantum Hardware" (**1st author**). Presented in Security, Privacy & Resilience Workshop, IEEE Quantum Week, 2025. **doi: 10.48550/arXiv.2507.16181**.

TEACHING EXPERIENCE

Graduate Teaching Assistant — Louisiana State University, USA August 2025 - Present

- Supporting the instructional activities for CSC 4501 (Computer Networks)
- Grading assignments and providing feedback to students.

Teaching Assistant — BRAC University, Dhaka June 2023 - December 2024

- Conducted CSE 482 (Quantum Computing II) tutorials and problem-solving classes.
- Conducted lab sessions of MAT120 (Integral Calculus and Ordinary Differential Equations), teaching relevant numerical methods and Python libraries.

NOTABLE PROJECTS

- **Preparing the W State on Superconducting Qubits Using QISKIT PULSE** — ***GitHub Link***.
  - Used real calibration data of ibm_sherbrooke to design necessary gate and measurement pulses to prepare W states.
  - Performed Rabi Experiment and Eco-CR calibration to adjust pulse amplitudes.
- **Quantum Image Encoding and Decoding using QISKIT** — ***GitHub Link***.
  - Implemented quantum image encoding algorithm using FRQI and NEQR method.
  - Generalized both encoding circuit, developed the decoding method and reconstructed the output image.
- **Load Flow Analysis for n Bus using Gauss-Siedel Algorithm** — ***GitHub Link***.
  - Developed a load flow analysis program for n-bus power systems during the junior year of undergraduate studies.
  - Implemented generalized Gauss-Siedel algorithm and generated output for user defined tolerance.

SKILLS SUMMARY

Programming Language : Python, MATLAB, C, C++, Assembly language.
Simulation Software : PSpice, Proteus, Quartus, Simulink.
Office Application : Microsoft Office Suite, LaTeX.
Soft Skills : Organizing, Collaborating, Teaching, Writing.

HONORS & AWARDS

- Recipient of the **NSF Student Travel Grant** ($1250), to present two first-author papers at QCE 2025
- Presented at Q-Net Symposium by LSU APS Chapter (2025).
- Invited Speaker at SQuIC, BRACU on Quantum Communication (2024).
- Instructor at the 3^{rd} PSI-Tensor Winter School for theoretical physics (2024).
- Keynote Speaker for an IEEE NSU Student Branch event on Quantum Computing (2022).
- First Place, University-Level Math Olympiad, organized by Bangladesh Mathematical Society (2021).
- Technical Scholarship (up to all semesters) at BUET (2017 to 2022).
- Ranked 47th among 10,000 candidates in the BUET Admission Test (2016), earning a University Admission Test Scholarship (2017).

RECOGNITION & MEDIA COVERAGE

- Research published in ACM QSec 2025 was featured in the industry publication **Quantum Zeitgeist**.
- Recognized by the **LSU Division of CSE** for research contributions at IEEE Quantum Week 2025.

SELECTED CERTIFICATIONS

- Completed "Tensor PSI Winter School for Theoretical Physics". (2023)
- Completed "Qiskit Global Quantum Summer School" organized by The Coding School. (2021)

LEADERSHIP & OUTREACH

- Assisted in the distribution of PPE during the COVID-19 emergency.
- Volunteered in the distribution of winter clothes in remote villages.
- Organized a nationwide online course on quantum mechanics and quantum computing.
- Engaged in numerous science outreach initiatives through writing blogs and articles.