Soumyadip Paul

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EDUCATION

Indian Institute of Technology Delhi(IITD), Delhi, India — July 2025
Doctor of Philosophy (PhD) in Applied Research in Electronics
Research Area: Quantum Machine Learning QML and Optimization for 6G and beyond wireless networks

Government College of Engineering & Ceramic Technology, Kolkata, India — May 2025
Master of Technology in Information Technology — Cumulative GPA: 8.76/10.0
Thesis Title: Quantum Cryptography and Post-Quantum Cryptographic Algorithms

University of Engineering and Management, Kolkata, India — June 2022
Bachelor of Technology in Computer Science and Engineering — Cumulative GPA: 8.15/10.0
(First Class with Distinction)

RESEARCH EXPERIENCE

M.Tech Thesis: Quantum Cryptography and Post-Quantum Cryptographic Algorithms — GCECT, Kolkata, India
Thesis Work — July 2024 – May 2025

- **Advisor:** Dr. Mausumi Maitra (Mazumdar), Professor, Dept of Information Technology, Government College of Engineering & Ceramic Technology, Kolkata, India
- **Aim:** Investigating post-quantum cryptographic algorithms for enhanced data security. Developing a quantum-resistant blockchain algorithm utilizing quantum hash functions and novel consensus mechanisms. I conduct simulations of quantum cryptographic protocols using Python and quantum computing libraries for this thesis work.

Research Project: Hybrid Quantum Approximate Optimization Algorithm (HQAOA) for Efficient Blockchain Transaction Scheduling — GCELT, Kolkata, India
Project work under the supervision of Prof. Dr. Sarit Chakraborty — December 2024 - February 2025

- Designed a hybrid quantum Optimization Algorithm.
- Theoretically integrated MA-QAOA and AL-QAOA to a hybrid Algorithm for efficient blockchain transaction scheduling.
- This work was presented at the IEEE International Conference ISACC 2025.

Research Project: Quantum Resistance Blockchain Algorithm using QHF and Novel Consensus Mechanism — GCECT, Kolkata, India
Course project for ITPRJ301: Dissertation (Part 2) — August 2024 – December 2024

- Designed a quantum consensus mechanism for blockchain.
- Theoretically integrated quantum hashing function to blockchain hash function.
- Proposed and designed the Quantum Proof of Stake and Behavior(QPoSB) for malicious behavior detection.
- This work is presented at IEEE International Conference SCEECS 2025.

Research Intern: SERB sponsored project — GCELT, Kolkata, India
Project Work — January 2024 – July 2024

- **Project Title:** Design Optimization of Micro-Electrode-Dot-Array based Digital Microfluidic Biochips (MEDA DMFBs) for Cyber-physical.
- **Sponsored:** Science and Engineering Research Board (SERB), DST, Govt. of India.
- **Advisor:** Dr. Sarit Chakraborty (Principal Investigator) Assistant Professor, Dept. of CSE, Government College of Engineering and Leather Technology, Kolkata, India.

- **Achievements:** Optimizing routing of microfluidic in the biochips and reducing self-contamination.

Research Project: Blockchain-based Supply Chain Management for RCS GCELT, Kolkata, India
Project work under the supervision of Prof. Dr. Sarit Chakraborty October 2023 – January 2024

- Developed a blockchain solution for railway cargo systems (RCS) using Solidity on Ethereum.
- This work is presented in International Conference on Artificial Intelligence and Sustainable Computing AISC 2024.

PUBLICATIONS

D. Das, A.K. Paul, R.S. Ray, S. Paul "Automated Alignment of Course Outcomes with Program Outcomes and Program Educational Objectives Using NLP Techniques," 2025 International Conference on Computing, Intelligence, and Application (CIACON), Durgapur, India, 2025, pp. 1-6, doi: 10.1109/CIACON65473.2025.11189748.

S. Paul and S. Chakraborty, "Hybrid Quantum Approximate Optimization Algorithm (HQAOA) for Efficient Blockchain Transaction Scheduling," 2025 3rd International Conference on Intelligent Systems, Advanced Computing and Communication (ISACC), Silchar, India, 2025, pp. 864-869, doi: 10.1109/ISACC65211.2025.10969380.

A. Sinharay, S. Paul, S. Chakraborty and K. Chatterjee "Partition Matching Maximum Zero-Sum Algorithm to Address VLSI Thermal Placement Issues," 2025 6th International Conference on Recent Advances in Information Technology (RAIT), Dhanbad, India, 2025, pp. 1-6, doi: 10.1109/RAIT65068.2025.11088908.

S. Paul, M.M.Maitra, S. Chakraborty. (2025). "Quantum Resistance Blockchain Algorithm using QHF and Novel Consensus Mechanism," 2025 IEEE International Students' Conference on Electrical, Electronics and Computer Science (SCEECS), Bhopal, India, 2025, pp. 1-6, doi: 10.1109/SCEECS64059.2025.10940775.

S. Paul, S. Chakraborty, H. Rahaman. (2024). A Novel Technique for Optimizing Supply Chain Operations in Railway Cargo System (RCS) using Blockchain Technology. presented at the International Conference on Artificial Intelligence and Sustainable Computing AISC 2024. (Paper has been presented and is Currently under Proceeding of **Information and Communication Technologies Book series**)

RELEVANT COURSES

Advanced Engineering Mathematics, Advanced Software Engineering, Pattern Recognition, Advanced Algorithm, Machine Learning, Research Methodology and IPR, Quantum Computing and Quantum Information.

SKILLS

- **Technical Skills:** Python (familiar with Scipy, Numpy, Qiskit), C++, MATLAB, LaTeX
- **Soft Skills:** Research, Technical Writing, Collaboration, Problem-Solving, Interpersonal Skills, Fast Learner, Work-ethic

MISCELLANEOUS EXPERIENCE

Workshop and Conference participation

- 3rd International Conference on Intelligent Systems, Advanced Computing and Communication ISACC 2025. (oral paper presentation)
- IEEE International Students' Conference on Electrical, Electronics, and Computer Science (SCEECS) 2025. (oral paper presentation)(Certificate Link)
- 2nd International Conference on Recent Advances in Artificial Intelligence & Smart Applications (RAAISA) 2024
- International Conference on Artificial Intelligence and Sustainable Computing AISC 2024 (oral paper presentation)
- 37th International Conference on VLSI Design 2024 & 23rd International Conference on Embedded Systems 2024 (Fellowship)

Certification

- IEEE India Council Industry Academia Young Professionals Committee (IAYPC) as a *student mentee* Aug 2024 – Dec 2024 (Certificate Link)
- QT-05 Quantum Computation, E & ICT Academy, Dept of CSE MNIT Jaipur(Certificate Link)