M Rifat Hossain

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Research Interests

- ✓ Nano-electronics
- ✓ Digital Twinning
- ✓ Optoelectronic Devices
- ✓ FPGA
- ✓ Computer Architecture
- ✓ Power-electronics

Education

B.Sc. (Engg) in Electrical and Electronic Engineering — Jan 2019 – Apr 2024
Shahjalal University of Science and Technology, Sylhet

- CGPA: 3.52/4.00

Research Work

- Design and Simulation of PIN Double Heterostructure GeSnC LED (Undergraduate Thesis)
  - Simulating LED with new material GeSnC and determining its usage
  - Completion date: Mar 2024
- Digital data encryption and decryption following the Enigma Machine technology and designing of an Encryption IC
  - Designing HDL model for the digital circuit
  - Practical implementation on an FPGA board.
  - Completion date: Jan 2025
- Design and Implementation of a Light-duty Electric Vehicle Incorporated with Wireless Charging System
  - Wireless Power Transfer using induction technology
  - Building a basic light-duty EV
  - Completion date: Nov 2023
- Wireless Communication System over N-Byte AES Encrypted Channel
  - Audio encoding and decoding
  - Encryption-Transfer-Decryption systems
  - Completion date: Jan 2023
- Enigma Encrypted Wireless Communication Device (ongoing)

Funding

- **Research Fund** — Aug 2022 – Nov 2023
  Funded by SUST Research Council
  Role on the project: Research Student
  Brief description of the research: Made a prototype of a light-duty electric vehicle that is capable of being charged wirelessly. The experimental prototype of the vehicle was created in the university's power electronics lab.

Publications

- M. R. Hossain, S. A. Shorna and M. A. A. Chy, "ENIGMA IC/SoC: A Digital Encryption System Following the Enigma Machine Technology," 2025 International Conference on Quantum Photonics, Artificial Intelligence, and Networking (QPAIN), Rangpur, Bangladesh, 2025, pp. 1-6
- R. Hossain, T. Alam, M. R. Adnan, N. S. A. Supti, "Design and Performance Simulation of a GeSnC-Based LED for Si/Ge-Compatible Photonics" in IEEE CS BDC Summer Symposium 2025 (2025)

Standardized Test Scores

GRE: Overall - 305 (Quant - 166)
TOEFL: Overall - 98 (R-27, L-27, S-23, W-21)

Experience

Lecturer, Daffodil International University, May 2025 - Present
Department of Computer Science and Engineering

Undergraduate Research Student, Aug 2022 – Nov 2023
Shahjalal University of Science and Technology, Sylhet

- Supervisor: Dr. Ifte Khairul Amin
- Project Completion: Design and Implementation of a Light-duty Electric Vehicle Incorporated with Wireless Charging System
- Reaching out to media personnel

Technical Skills

COMSOL Simulation Having experience in creating photodiode, phototransistor, and LED using custom-made semiconductor material (for example GeSnC); Building 1D, 2D, Axisymmetric, and 3D geometry on various complexity; Custom meshing that helps to reach an optimal state (on both the required time and quality) in simulation.	***Xilinx Vivado*** Coding on an FPGA (i.e., designing a cipher IC that mimics the properties of the enigma machine) using Verilog and their performance analysis (size, power consumption, etc.).
Circuit Simulation (LTSpice, Simulink) Being used to simulate various analog circuitries.	***Programming Languages*** Python, C++, Java, Verilog, Assembly (8086), MATLAB, SQL, PHP, Godot
PCB Design (KICAD) Able to design PCBs with preset components along with custom symbols and footprints.	***Frameworks*** Arduino, .NET, Android, Bootstrap, Mkdocs, Tkinter, Pandas, Scikit-learn

Language Proficiency

Bangla	Native
English	Advanced (CEFR Level: C1)

Awards/Achievements

- Certificate of Excellence: for holding the esteemed position of General Secretary, EEE Society, SUST - 2023
- Secured CGPA 4.00 (A+) in industrial training at Training Institute for Chemical Industries (TICI), Narshingdi - Sep 2023
- Certificate of Appreciation: for serving as the Vice President of Shahjalal University Speakers Club (SUSC) - (Mar 2022 - Nov 2023)
- Silver Medalist in National Olympiad in Software Innovation (NOSI) - 2014