

MD. SAYED HASAN RIFAT

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EDUCATION

- **Master of Science (M.Sc.)** in Electrical and Electronic Engineering
Bangladesh University of Engineering and Technology (BUET) CGPA: **3.83/4.00**
April 2021-May 2024
- **Bachelor of Science (B.Sc.)** in Electrical and Electronic Engineering
Islamic University of Technology (IUT) CGPA: **3.95/4.00**
January 2017-March 2021
Ranked **2nd** in a class of 165 students
- **Higher Secondary Certificate (HSC)** Exam (Completion of 12th grade) Dhaka CGPA: **5.00/5.00**
2015-2016
Residential Model College, Dhaka, Bangladesh

RESEARCH INTERESTS

Solar cell, Fabrication, modeling, characterization, and application of Solid State Devices, Optoelectronic Devices, Power System Optimization, Medical Electronics.

PUBLICATIONS

- **Journal Articles**
 1. **M. S. H. Rifat** and M. Jahangir Alam, "Exploring the Potential of Lead-Free Perovskite/ Kesterite Double Absorber Structure With Diverse Transport Layer Materials to Enhance Tandem Solar Cell Performance," in **IEEE Access**, vol. 12, pp. 85115-85133, doi: 10.1109/ACCESS.2024.3415110, (2024).
 2. **M. S. H. Rifat**, M.A. Niloy, M.F. Rizvi, A. Ahmed, R. Ahshan, S.H. Nengroo, and Lee, S. "Application of Binary Slime Mould Algorithm for Solving Unit Commitment Problem," in **IEEE Access**, vol. 11, pp. 45279-45300, doi: 10.1109/ACCESS.2023.3273928, (2023).
- **Conference Proceedings**
 1. **M. S. H. Rifat** and M. Jahangir Alam, "Device Modeling and Optimization of Lead-Free Perovskite/Kesterite Tandem solar cell using SCAPS-1D simulation", Energy Conference 2023: National and Global issues, 14-15 December 2023, BUET, Dhaka, Bangladesh, Accepted, (2023).
 2. M. A. Niloy and **M. S. H. Rifat**, "Solution of Combined Economic and Emission Dispatch using Slime Mould Optimization Algorithm," International Conference on Science & Contemporary Technologies (ICSCT), Dhaka, Bangladesh, pp. 1-6, doi: 10.1109/ICSCT53883.2021.9642577, (2021).

GRADUATE (M.SC.) RESEARCH EXPERIENCE

- **M.Sc. Thesis:** Supervisor: Professor Dr. Mohammad Jahangir Alam, EEE, BUET
"Investigation of lead-free Perovskite/Kesterite materials for enhancing tandem solar cell performance"
- **Modeling and Optimization of lead free Perovskite/Kesterite Tandem Solar Cell:**
Explored and optimized lead-free perovskite/kesterite materials for tandem solar cells, including different organic and inorganic hole and electron transport layers. ■ Determination of optimal thicknesses for top and bottom absorber layers, HTL, and ETL to maximize light absorption and carrier transport. ■ Investigation of the effects of defect density variations, series resistance, back contact materials, and operating temperature on tandem solar cell performance. ■ Analysis of the impact of different light spectra (AM 0, AM 1.5 G, AM 1.5 D), back reflecting coatings, and bandgap grading on the efficiency of tandem solar cells. ■ Proposed and modeled a novel tandem solar cell structure using SCAPS 1D software to simulate performance and optimize device design.

UNDERGRADUATE (B.SC.) RESEARCH EXPERIENCE

- **B.Sc. Thesis:** Supervisor: Professor Dr. Ashik Ahmed, EEE, IUT
"Application of Binary Slime Mould optimization algorithm for solving Unit Commitment problem"

- **Optimization of Thermal Unit Commitment Using Binarized Slime Mould Algorithm (BSMA):**
Development of a binarized slime mould algorithm (BSMA) for solving the single-objective thermal Unit Commitment Problem (UCP), using MATLAB software to model foraging behavior and nutritional source search procedures. ■ Adaptation of the original slime mould algorithm (SMA) to discrete values using a sigmoid transform, with fitness values determined through lambda iteration-based Economic Load Dispatch and heuristic adjustments for complex UCP constraints. ■ Performance evaluation of BSMA across 10, 20, 40, 60, 80, and 100-unit test systems, demonstrating superior production cost reduction and faster convergence compared to 20 classical, heuristic-metaheuristic, and hybridized approaches. ■ Achievement of minimal production cost and quicker convergence with lower standard deviation for medium and large-scale test systems, showcasing BSMA's effectiveness for larger systems.

RELEVANT COURSEWORK

- **Graduate (M.Sc.) Courses**
■ MOS Devices ■ Solar Cells ■ Carbon Nanotechnology ■ Power Semiconductor Circuits ■ Optical Waveguide Theory ■ Electric and Magnetic Properties of Materials
- **Undergraduate (B.Sc.) Courses**
■ Semiconductor Devices ■ Engineering Materials ■ Optical Communication ■ Electromagnetic Fields and Waves ■ Artificial Neural Networks and Fuzzy Logic

PROFESSIONAL EXPERIENCE

- **Lecturer**, Department of Electrical and Electronic Engineering, Islamic University of Technology (IUT) Nov.'2021-Present
Theory Courses Instructed: Electronics I, Electrical Devices and Circuits, Utilization of Electrical Energy
Laboratory Courses Instructed: Power Electronics Lab, Electronics lab, Power System II lab, Signals and Systems lab

INDUSTRIAL TRAINING

- **Ghorashal Training Center**, Bangladesh Power Development Board (BPDB), Palash, Narsingdi Nov.'2019
- **Center for Research Reactor (CRR)**, Atomic Energy Research Establishment (AERE), Savar, Dhaka Nov.'2019

CERTIFICATIONS AND ONLINE COURSES

- Machine Learning by Andrew Ng Stanford University, Coursera
- Programming with MATLAB Vanderbilt University, Coursera
- Getting Started with Python University of Michigan, Coursera
- Python Data Structures University of Michigan, Coursera
- Introduction to Electronics Georgia Institute of Technology, Coursera

TECHNICAL SKILLS

- **Language:** C/C++, Python, Assembly
- **Software:** MATLAB, COMSOL Multiphysics, Proteus, PSIM, Pspice, SCAPS 1D.

AWARDS AND SCHOLARSHIPS

- **Publication Incentive Award, 2023**, Islamic University of Technology (IUT)
Awarded for a Q1 journal publication as the first author, with a reward of \$600.
- **HSC Education Board Scholarship**, in Talent-pool, by The Ministry of Education, Bangladesh (2016).