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# Shuvagata Nath Souumma

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Home: Chattogram (Bangladesh)

## EDUCATION AND TRAINING

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### Bachelor of Science in Mechanical Engineering

**Bangladesh University of Engineering and Technology** [ Apr 2019 – Jul 2024 ]

Final grade: 3.32 / 4.00

**Thesis:** Thermal Analysis and Design of an Intelligent Energy-Efficient Cooling System with Solar-Assisted Operation

**Supervisor:** Dr. Md. Ehsan.

**Thesis Grade :** 4.00 / 4.00 (Highest Distinction)

- Conducted thermal analysis of vehicle cabins using heat-balance calculations and CFD simulations in ANSYS Fluent.
- Designed optimized low-power ventilation system with experimentally validated fan flow rates and performance.
- Evaluated technical and economic feasibility of solar-powered operation through energy generation and battery storage calculations .
- Published findings in peer-reviewed international conference proceedings (BSME ICTE 2024).

## PUBLICATIONS

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### A Study of Enhancing Thermal Comfort and Development of an Intelligent Efficient Cooling System for Parked Car Interiors

**Authors:** S. T. Ahmed, S. N. Souumma, M. Ehsan, and C. R. Shaishab | **Journal Name:** Proceedings of the 9th BSME International Conference on Thermal Engineering (ICTE), 2024.

### Design and Fabrication of a Cost-Effective, Refreshable Mechanical Braille Display for Visually Impaired Students in Bangladesh

**Authors:** U. W. Tabassum, S. N. Souumma, A. Sengupta, and T. Tabassumut | **Journal Name:** Proceedings of the 14th International Conference on Mechanical Engineering (ICME), 2023.

## SELECTED PROJECTS

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### Hybrid Solar-Biomass Thermal System Design for Textile Manufacturing Facility

Energy & Environment Course Project, **Course Grade:** 4.00 / 4.00

- Designed renewable thermal system combining solar collectors ( $500\text{ m}^2$ ) and biomass boiler (2 TPH) for garment factory, calculating 35% renewable energy fraction.
- Evaluated thermal storage (10,000 L stratified tank) for load-demand matching across production shifts.
- Conducted techno-economic assessment demonstrating 450 tons CO<sub>2</sub>/year reduction with competitive levelized cost.

### Comparative Performance Analysis of Coal-Fired vs. Natural Gas Power Plants with Carbon Capture Integration (2023)

Power Plant Engineering Sessional Project, **Course Grade :** 3.75 / 4.00

- Performed thermodynamic analysis comparing coal plant (500 MW) and gas turbine (400 MW), evaluating efficiency, emissions, and flexibility under varying loads.
- Assessed energy penalties of carbon capture integration, calculating 8-12% efficiency reduction and auxiliary power for CO<sub>2</sub> separation and compression.
- Evaluated economic trade-offs through LCOE analysis with and without carbon capture.

### Energy Balance and Performance Assessment of a Solar-Assisted Thermal System

- Developed energy balance model comparing electric heating with solar-assisted configuration, quantifying thermal demand, solar contribution, and losses
- Calculated 60% reduction in auxiliary energy through solar integration with collector efficiency and performance analysis
- Evaluated seasonal variations and economic feasibility, determining 5-year payback period

### Gasketed Plate Heat Exchanger Design, Simulation and Testing

Thermo - Fluid System Design Project, **Course Grade :** 3.75 / 4.00

- Performed thermal and hydraulic design including LMTD analysis, fouling considerations, and pressure-drop evaluation for industrial cooling
- Developed CFD model in ANSYS Fluent to analyze temperature distribution, validate NTU-effectiveness calculations, and optimize chevron angle
- Fabricated prototype and conducted experimental validation through leakage testing (5 bar) and performance measurements, achieving 85% effectiveness

## WORK EXPERIENCE

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### A.O. Smith Bangladesh Private Ltd.

#### Assistant Manager - Quality & Capability Development

[ Dec 2024 – Current ]

- Coordinated installation and commissioning of a 50 kW grid-connected solar PV system, achieving seamless integration with facility power supply and safety compliance.
- Estimated annual energy generation ( around 75,000 kWh/year) and corresponding carbon offset ( around 50 tCO<sub>2</sub>/year) using system ratings and standard grid emission factors.

- Performed load analysis and demand calculations, monitoring real-time generation data to assess performance and on-site demand reduction..
- Managed technical documentation, vendor coordination, and handover, supporting corporate renewable energy initiatives.

## **United Ashuganj 250 MW Powerplant**

### **Trainee Engineer**

[ Oct 2023 – Dec 2023 ]

- Completed structured training at **250 MW** combined-cycle power plant comprising gas turbines, waste heat recovery boilers (WHRB), and steam turbine systems, analyzing thermal energy conversion across Brayton and Rankine cycles .
- Evaluated plant thermal efficiency through energy balance calculations, calculating **52% overall efficiency** and identifying waste heat recovery optimization opportunities -
- Gained practical exposure to auxiliary systems including boiler operations, cooling circuits, control systems, and operational constraints in large-scale energy generation

### **STANDARDIZED TEST SCORE**

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#### **IELTS Academic**

**Overall Score:** 8.0/9.0 | Listening 8.5/9.0 | Reading 7.5/9.0 | Writing: 7.5/9.0 | Speaking 7.5/9.0

### **TECHNICAL SKILLS.**

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#### **Skill Type:**

**Thermal & Energy Modelling:** ANSYS Fluent, ANSYS Mechanical, HTRE Xchanger Suite, 3E Plus

**Programming & Data Analysis:** Python (NumPy, Pandas, Matplotlib), MATLAB, Scikit-learn

**Design & CAD:** SolidWorks, AutoCAD, Fusion 360

**Sustainability Tools:** OpenLCA

**Documentation & Visualisation:** LaTeX, Tecplot 360

## LEADERSHIP EXPERIENCE

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### Team Leader, AUTOMAESTRO: Formula Student Team of BUET

- Led 40-member engineering team in international competitions, achieving Top-15 finish in Formula Student UK; coordinated design, fabrication, and international component procurement.

### Vice President, BUET Automobile Club

- Organized BUET AutoFest and technical workshops; instructed 50+ students on CAD modeling and FEA fundamentals.

### Organizing Lead, Institute of Mechanical Engineers (IMechE), BUET

- Planned and executed technical seminars and career talks with national and international speakers.

### Class Representative, Dept. of Mechanical Engineering, BUET

- Facilitated faculty-student communication and managed academic coordination for cohort of 180 students.

## HONORS AND AWARDS

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### Award Title:

Best Project Proposal Award, Energy & Environment Coursework, BUET [YYYY]

Invited Technical Speaker, Institution of Mechanical Engineers (IMechE), BUET [YYYY]

Academic Excellence Scholarship, Government of Bangladesh [YYYY-YYYY]

4th Place (International), European Rover Challenge (ERC), Poland [YYYY]

Top-15 International Finish, Lap Time Simulation Event, Formula Student UK [YYYY]

Certified SolidWorks Professional (CSWP), Mechanical Design [YYYY]