SHUVAGATA NATH SOUMMA

+8801934272458 | shuvagata.buet@gmail.com | shuvagata-nath.github.io

Education

Bangladesh University of Engineering and Technology (BUET) Dhaka, Bangladesh
Bachelor of Science in Mechanical Engineering Apr. 2019 – Jul. 2024
CGPA: 3.32/4.00

Test Scores

IELTS Academic Sep. 2025
Overall Score 8/9 | Listening 8.5/9 | Reading 7.5/9 | Writing: 7.5/9 | Speaking 7.5/9

Research Interests

- Additive Manufacturing
- Material Design
- Fracture Mechanics
- Numerical Modelling
- Material Behavior
- Bio-inspired Materials
- Computational Mechanics
- Machine Learning

Undergraduate Thesis

Title: *A Study of Enhancing Thermal Comfort and Development of an Intelligent Efficient Cooling System for Parked Car Interiors*
Supervisor: Dr. Md. Ehsan, Professor, Dept. of Mechanical Engineering, BUET. Jul. 2023 – Jul. 2024
Thesis Grade: 4.00/4.00

- Investigated transient thermal behavior in parked vehicle cabins through controlled experiments, identifying key parameters driving cabin temperature rise to 50–52 °C.
- Developed and validated a computational fluid dynamics (CFD) model based on CAD geometry to analyze solar heat gain and optimize airflow, achieving a 15–18 °C reduction in cabin temperature.
- Designed a low-cost microcontroller-based automated cooling system with 12 V power input to enhance passenger comfort.

Publications

1. U. W. Tabassum, **S. N. Soumma**, A. Sengupta, and T. Tabassumut, "Design and Fabrication of a Cost-Effective, Refreshable Mechanical Braille Display for Visually Impaired Students in Bangladesh," *Proceedings of the 14th International Conference on Mechanical Engineering (ICME)*, 2023.
2. S. T. Ahmed, **S. N. Soumma**, M. Ehsan, and C. R. Shaishab, "A Study of Enhancing Thermal Comfort and Development of an Intelligent Efficient Cooling System for Parked Car Interiors," *Proceedings of the 9th BSME International Conference on Thermal Engineering (ICTE)*, 2024.

Selected Projects

Design and FDM Prototyping of a Refreshable Braille Display Apr. 2022 – Aug. 2022
Electromechanical System Design Coursework

- Designed and fabricated multi-component PLA parts using FDM 3D printing for a cost-effective Braille display.
- Developed text-to-Braille algorithms for accurate character rendering.
- Engineered a lead-screw-driven linear motion system with stepper motors for smooth sequential Braille output.

Microstructure Characterization and Mechanical Testing of Metals Nov. 2022 – Jan. 2023
Materials and Metallurgy Laboratory

- Prepared specimens by sectioning, grinding, polishing, and etching; examined microstructures under optical microscopy and linked them to mechanical response.
- Applied phase-diagram and heat-treatment concepts to study processing effects on microstructure and properties.
- Analyzed strength–ductility trends and failure behavior from hardness and tensile tests.

Topology Optimization and Fabrication of a FSAE Bell Crank Sep. 2023 – Mar. 2024
Formula Student Competition

- Performed topology optimization in ANSYS to achieve weight reduction while maintaining stiffness.
- Conducted FEA under braking and cornering loads to validate factor of safety and fatigue life.
- Fabricated the optimized bell crank via CNC machining using Mild Steel (MS).

Renaissance V1.0: Mars Rover Design and Prototyping Apr. 2022 – Oct. 2022
University Rover Challenge

- Designed and fabricated a truss-based rover structure with optimized triangulation.
- Manufactured rover arm components (base plate, bearing holder) via sheet metal laser cutting.

SmartAQI: Machine Learning Based Air Quality Prediction Jun. 2021 – Nov. 2021
Computer Programming Language Coursework

- Developed a Random Forest regression model for Dhaka's AQI prediction.
- Performed data preprocessing, train-test split, and model evaluation (MAE, R^2).
- Analyzed feature importance and created an interactive real-time prediction tool.

FSAE Standard Chassis Design and Fabrication Jun. 2022 – Aug. 2022
Formula Student Competition

- Optimized a spaceframe chassis across 34 design iterations and 500+ simulations, maximizing safety factor while minimizing weight.
- Selected BS1387 steel for optimal strength-to-weight ratio; fabricated chassis using CAD drawings, jigs, and precision welding.

Industry Experience

Assistant Manager – Product Quality Sep. 2024 – Present
A.O. Smith Corporation

- Worked on injection and blow molding of engineering polymers such as ABS, HIPS, GPPS, PPCP, optimizing mold design and process parameters to enhance field performance.
- Supervised end-to-end molded Expanded Polystyrene (EPS) packaging production for food-grade polymer materials, ensuring spec compliance, process control, and defect prevention.
- Improved valve reliability by replacing silicone with EPDM in solenoid diaphragms after root cause analysis.

Research & Development Engineer Jun. 2023 – Oct. 2023
Spectrum Engineering Consortium (Pvt.) Ltd.

- Designed robotic subsystems including a rover elbow with integrated linear actuator in SolidWorks.
- Conducted structural and stability analyses using ANSYS and analytical calculations.
- Manufactured rover components via CNC machining, validating design through prototyping.

Technical Skills

Simulation: ANSYS Fluent, ANSYS Structural
CAD: SolidWorks, AutoCAD, Fusion 360
Programming: Python, MATLAB, C
ML-Framework: Scikit-learn
Thermal Design Tools: HTRI Xchanger Suite 6.0, 3E Plus
Documentation & Presentation: Office Suite, LaTeX, Tecplot 360, Matplotlib, NumPy

Affiliations

Team Leader, AUTOMAESTRO: Formula Student Team of BUET Nov. 2022 – Jul. 2024
Led a 40-member team in Formula Student competitions; coordinated with BITAC for CNC machining, supervised fabrication of chassis and components, and managed sourcing of engines and suspension from abroad.

Vice President, BUET Automobile Club May. 2023 – Jul. 2024
Organized BUET AutoFest and technical workshops; instructed students on CAD modeling and FEA fundamentals to build design and analysis skills.

Event Organizer, Mechanical Engineering Association (MEA) & IMechE, BUET Apr. 2019 – Jul. 2024
Planned and executed departmental seminars, career talks, and competitions with national and international speakers.

Mechanical Sub-Team Member, INTERPLANETER: Mars Rover Team of BUET Apr. 2022 – Oct. 2022
Contributed to the design and fabrication of rover subsystems for University Rover Challenge, focusing on structural optimization and manufacturing support.

Class Representative, Dept. of Mechanical Engineering, BUET Apr. 2019 – Apr. 2023
Facilitated communication between faculty and students; managed academic coordination for a cohort of 180 peers.

Achievements & Certifications

Academic Excellence Scholarship, Government of Bangladesh Jun. 2018 – Jul. 2024
4th Place, European Rover Challenge (ERC), Poland Sep. 2022
23rd Place, University Rover Challenge (URC), USA Jun. 2022
11th Place, Lap Time Simulation, Formula Student UK May. 2022
Certified SolidWorks Professional (CSWP), Mechanical Design Jun. 2021
Champion, Creative Talent Hunt, Government of Bangladesh Jan. 2016
1st Runner Up, BAS Physics Olympiad Jan. 2015