SHUVAGATA NATH SOUMMA

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Education

Bangladesh University of Engineering and Technology (BUET) Dhaka, Bangladesh
Bachelor of Science in Mechanical Engineering Apr. 2019 – July 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 Behavior
- Material Design
- Bio-inspired Materials
- Fracture Mechanics
- Computational Mechanics
- Numerical Modelling
- Machine Learning

Research Experience

Undergraduate Thesis July 2023 – July 2024
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

- Investigated solar heat transfer and thermal behavior in parked car interiors through controlled experiments, where cabin temperatures rose to 50–52 °C.
- Developed and validated an ANSYS Fluent CFD model using SolidWorks-based CAD to simulate solar load and optimize airflow, achieving a 15–18 °C cabin temperature reduction.
- Designed a low-cost Arduino-controlled console-box cooling device costing about USD 50 with 12 V power usage 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

Braille-X: Refreshable Mechanical Braille Display Apr. 2022 – Aug. 2022
Electromechanical System Design Coursework

- Designed and 3D-printed custom octagonal Braille disks for a low-cost refreshable display.
- Developed text-to-Braille algorithms for accurate character rendering.
- Engineered a linear motion system with stepper motors to align disks for smooth sequential Braille output.

SmartAQI – Machine Learning Based Air Quality Prediction Jun. 2021 – Nov. 2021
Computer Progamming 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 Vehicle Chassis 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.

Renaissance V1.0: Mars Rover 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.

Gasketed Plate Heat Exchanger Nov. 2022 – Feb. 2023
Heat Transfer Equipment Design Coursework

- Built a 9-plate exchanger using aluminum, rubber gaskets, and steel endplates.
- Assembled and tested prototype; confirmed leak-free operation up to 15 kPa.

Topology Optimization and Fabrication of a Formula Student 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)

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

Work Experience

Assistant Manager – Quality & Capability Development Sep. 2024 – Present
A.O. Smith Corporation

- Improved valve reliability by replacing silicon with EPDM in solenoid diaphragms following root cause analysis.
- Reduced assembly defects by correcting mold design and introducing post-molding air cleaning; improved sealing performance in final assemblies.
- Lowered complaint rate below 5% while leading and developing a nationwide team of 350 technicians serving over 10M consumers.

Research & Development Engineer June 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.

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 design competitions with national and international speakers.

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

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.

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