Emon Roy Bappy

Level-6, BDBL Bhaban, 12 Kazi Nazrul Islam Avenue, Karwan Bazar, Dhaka-1215

+8801914825156 | emonroy4058@gmail.com | github.com/Emon4058 | linkedin.com/in/erb4058/

Research Interests

During my undergraduate studies, I developed a strong technical foundation in electromechanical systems, bio-inspired soft robotics, computer-aided design and finite element analysis of structural components. These technical skills shaped my contributions in the field of military robotics over the past two years, where I am focused on design for manufacturing and assembly, structural topology optimization, composite materials, and both subtractive and additive manufacturing. These experiences have motivated me to build a career in robotics and advanced manufacturing methods. Currently, I am pursuing research opportunities that integrate robotics automation with manufacturing methodologies to develop a high-performance solution.

Education

Bangladesh University of Engineering and Technology *Dhaka, Bangladesh*

BSc in Mechanical Engineering *Sept 2018 - July 2024*

- CGPA 3.43/4.00

Notre Dame College *Dhaka, Bangladesh*

Higher Secondary School Certificate *2016 - 2018*

- Group-Science, GPA 5.00/5.00
- General grade scholarship, Dhaka Board

Work Experience

Cybernetics Hi-Tech Solutions (Pvt.) Ltd. *Dhaka, Bangladesh*

Research and Development Engineer *01 July 2024 - Present*

- Developing a man-portable EOD ROV with 7 DoF robotic arm for military applications.
- Analyzed the performance of fixed-wing UAVs and multirotor drones designed to carry high payloads of upto 50 kg.
- Acquired hands-on experience in manufacturing processes like CNC machining, fused deposition modeling, composite manufacturing, and molding.
- **Technical Skills:** Composite Manufacturing, Additive Manufacturing, Finite Element Analysis, Soft Robotics, Structural Analysis.

Spectrum Engineering Consortium (Pvt.) Ltd. *Dhaka, Bangladesh*

Intern, Research and Development Team *01 June 2023 - 30 June 2024*

- Engineered an ROV with a 6 DoF arm, meticulously designed to operate and sustain functionality in harsh and challenging environments, ensuring robustness and reliability.
- Verified the structural integrity of the mechanical designs of an ROV through finite element analysis (FEA), identifying potential stress points and weaknesses.
- **Technical Skills:** Computer Aided Design, 3d Printing, Finite Element Analysis, Mechanical Assembly, Non-Linear Analysis.

Runner Automobiles PLC *Mymensingh, Bangladesh*

Intern, 3 Wheeler Manufacturing Section *01 Nov 2023 - 20 Nov 2023*

- Acquired comprehensive knowledge of the three-wheeler manufacturing process, encompassing welding, painting, and assembly sections.
- Developed a thorough understanding of industrial automation processes and the application of industrial robotic arms.
- Conducted a detailed analysis to identify and recommend improvements to make the manufacturing process more efficient.
- **Technical Skills:** Engine Assembly, Vehicle Assembly, Spot Welding, Robotic Welding, Welding Inspection, Painting.

Team Interplanetar *Dhaka, Bangladesh*

Member, Electrical and Communication Subteam *May 2020 - August 2023*

- Built a Mars Rover capable of traversing through rocky terrain, collecting and processing specimens from the environment, and performing various tasks.
- Designed and implemented the PCB for the rover's power distribution system, actuators, and sensors for onboard scientific experiment.
- Constructed a 6 DoF robotic arm from scratch, capable of holding a 5 kg payload in extended position.
- **Technical Skills:** PCB Design, Soldering, CAD Design, Robot Operating System.

Automaestro *Dhaka, Bangladesh*

Member, Suspension Subteam *Dec 2021 - July 2024*

- Contributed to the development of a competitive Formula Student automobile, taking part in the design, manufacturing, and experiments.
- Led the suspension team successfully, guiding the design and fabrication of critical components such as the upright, control arm, and bell crank.
- **Technical Skills:** CAD Design, Stress Analysis, Arc Welding, CNC Machining, Design for Assembly

Project and Thesis

Hilsha Bot, A Bio-Inspired Soft Robot *May 2022 - Sep 2022*

Bangladesh University of Engineering and Technology

- An underwater electromechanical system, capable of moving like a fish with its soft tail actuator, and controlling its depth utilizing a buoyancy control system.
- An appliance for underwater investigation, marine environment protection, and inspection of any underwater construction.

Design and Fabrication of a Universal Soft Actuator for Surgical Applications *April 2023 - June 2024*

Bangladesh University of Engineering and Technology

- A flexible surgical actuator made of bio-compatible silicone rubber that reduces the number of incisions needed, speeds up recovery.
- The actuator's end effector can hold various surgical tools and has three degrees of freedom, allowing it to reach any location within its range.

Skills

Computational Analysis	Ansys Mechanical, Structural Optimization, Ansys Composite PrePost
Computer-Aided Design	Solidworks, Ansys SpaceCalim, Ansys DesignModeler, AutoCAD, Blender
Printer Circuit Board Design	Altium PCB Designer, Proteus, EasyEDA
Programming	C, Python, Matlab
Robotics	Arduino IDE, Robot Operating System
Miscellaneous	Microsoft Office, Ubuntu, LaTeX, Git.
Soft Skills	Teamwork, Problem-solving, Logical Thinking

Achievements

2022	**Finalist**, University Rover Challenge	*The Mars Society*
2022	**Merit Award**, BASIS NATIONAL ICT AWARDS	*BASIS*
2021	**Champion**, Sustainable Energy Innovation Challenge	*Bikiron*
2021	**Champion**, National Stem Competition	*bdSTEM*
2021	**4th place**, 2nd Kibo Robot Programming Challenge National Round	*JAXA*
2021	**Innovation Award**, International Planetary Aerial Systems Challenge	*Mars Society South Asia*
2016	**8th position**, National Round of 6th Bangladesh Physics Olympiad	*BdPhO*

Accomplishment

Topology Optimization Using Ansys Mechanical *Ansys*

Credential URL *July 2025*

Learned structural optimization of FSAE bell crank and upright to enable a cost-effective manufacturing plan.

Stress Analysis in Solid Mechanics *Ansys*

Credential URL *Dec 2024*

Learned the applications of stress analysis as well as the importance of an engineer's role in computational simulation of stress analysis.

SOLIDWORKS CAD Design Professional (CSWP) *Dassault Systèmes*

Credential ID C-HM7QU4C6VD *Nov 2024*

Proves the ability to design and analyze parametric parts and movable assemblies using various complex features in SOLIDWORKS software.

Mechanical Design Solidworks Associate (CSWA) *Dassault Systèmes*

Credential ID C-9G7EDFK4NZ *Feb 2022*

Proof of SOLIDWORKS expertise with sketch, boss and cut features, feature conditions, mass and materials, mates and reference geometry

References

Dr. Md. Afsar Ali

Professor, Department of Mechanical Engineering

Bangladesh University of Engineering and Technology (BUET)

Email: mdafsarali@me.buet.ac.bd

Website: www.me.buet.ac.bd/faculty/dr-md-afsar-ali