# Chowdhury Ahmed Hossain

+8801811204753 ahmedhossain.buet@gmail.com ahmed-hossain.github.io github.com/ahmed-hossain

## Education

**Bangladesh University of Engineering and Technology (BUET)** **Dhaka, Bangladesh**

*Bachelor of Science in Mechanical Engineering* ***Apr. 2019 – July 2024***

CGPA: 3.48 out of 4.00

## Research Interest

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

## Relevant Coursework

- Composite Materials
- Bioengineering
- Mechanics of Solids
- Metalic Materials
- Mechanics of Machineries
- Electro Mechanical System Design
- Numerical Analysis
- Production Processes
- Machine Tools

## Research Experience

**Undergrad Thesis** ***July 2023 – July 2024***

Thesis title: *Atomistic Investigation of Crack Propagation and Parameterization of Cohesive Traction-Separation of Single Crystal Cobalt-Titanium Alloy*

Supervisor: Dr. Jane Alam Khan, Assistant Professor, ME, BUET

- Investigated crack propagation in B2 phase Cobalt-Titanium alloy using molecular dynamics simulations.
- Analyzed stress developments and lattice structure evolution during crack propagation at different temperatures.
- Developed temperature-dependent traction-separation curves through python scripting for cohesive zone modeling

**University Funded Project (Collaboration)** ***Nov. 2023 – July 2024***

Project title: *Comprehensive performance analysis of horizontal axis hydrokinetic turbine.*

Funded by: Research and Innovation Center for Science and Technology (RISE), BUET

The research compares the output power of a hydrokinetic turbine with two different airfoil sections using computer simulations and practical experiments, involving BEM algorithm for blade design, CFD simulations, and experimental testing with a physical model. My contributions were:

- Designing the experimental arrangements in 3D CAD for testing the hydrokinetic turbines
- Manufacturing the experimental setup using traditional methods and 3d printing and conducting the necessary experiments.

## Selected Projects

**Ear Pressure Wave Monitoring Device (In Progress)** ***August 2024 – present***

*Biomedical Product Design Project*

- Designed a device that can predict potential health issues by monitoring pressure variations in tympanic membrane.
- Building a functioning prototype, conducting a medical trial and potentially proceeding to mass producing.

**Mechanized Gaussian Cannon with Head-Tracked Targeting System** ***June 2022 – August 2022***

*Electromechanical System Design Coursework*

- Improvised and developed multiple functional and synchronous mechanisms to mechanically and sequentially shoot, reload and reset a Gaussian cannon.
- Built a head-mounted tracking system consisting of an accelerometer, Arduino microcontroller and wireless RF modules to control a 2-DOF arm that imitates the user's head movement.

**Biometric Door Lock** ***July 2023***

*Consumer Product Design Project*

- Designed a novel mechanism for a dual mode door lock combining manual cylinder lock with fingerprint recognition that can operate on both mode independently.
- Successfully fabricated a 3D printed prototype and verified its flawless functionality.

**Child-Safe Oven Door Lock** ***May 2023***

*Consumer Product Design Project (Design Competition)*

- Designed and optimized a mechanical lock to prevent children from opening an oven door without adult supervision.
- Built 3D printed prototypes to test for functionality, durability, ease of assembly and use.
- Recognized as the top designer among 62 participants.

**Double Pipe Heat Exchanger** ***November 2022 – February 2023***

*Heat Transfer Equipment Design Coursework*

- Calculated necessary design parameters for the intended use case.
- Built and assembled the double pipe exchanger utilizing machine shop facilities.
- Tested the heat exchanger to ensure that heat and pressure requirements are met.

## Technical Skills

**Simulation Software**: LAMMPS, Abaqus CAE, Ansys Mechanical
**CAD Software**: SolidWorks (CSWP), AutoCAD, Fusion 360
**Programming Language**: Python, Matlab, C
**Hardware Skill**: 3d printing, Product design and manufacturing, Microcontroller (Arduino)
**Miscellaneous**: Microsoft office (Word, Excel, Powerpoint), LaTeX, Zotero, Techplot, Matplotlib

## Test Scores

**Graduate Record Exam (GRE)** ***September 2024***

Overall Score 331/340 | Quantitative Reasoning 168/170 | Verbal Reasoning 163/170 | AWA 3.5/6

**International English Language Testing System (IELTS)** ***October 2024***

Overall Score 8/9 | Listening 9/9 | Reading 8.5/9 | Writing: 6.5/9 | Speaking 7/9

## Startup Experience

**Protodesk** ***Jan. 2023 – Feb. 2024***

*Product Design and 3D Printing Services* *Dhaka, Bangladesh*

- Applied mechanical engineering and product designing principles to develop and prototype end-user products that are user-friendly, cost-effective, and easy to manufacture
- Managed fabrication of over 60 electromechanical and architectural projects utilizing 3d printing.

## Technical Experience

**Mechanical Engineering Intern** ***Nov. 2023***

*BSRM Steels Ltd* *Chittagong, Bangladesh*

- Gained in-depth knowledge about steel re-rolling process utilizing cutting edge technologies.
- Experienced various industrial systems such as Induction Furnace, WTP, overhead cranes, and power supply.
- Learned about industry practices such as TPM, quality control, and inventory management.

**Leader, Brake and Vehicle Safety Sub-team** ***Jan. 2023 – July 2024***

*AutoMaestro (Formula Student Team)*

- Designed and optimized the braking system utilizing CAD & CAE.
- Initiated manufacturing and testing of the braking system.

**Head of Project and Competition** ***July. 2022 – July 2024***

*BUET Robotics Society*

- Organized and instructed several workshops on robotics.
- Organized national level inter-university robotics competitions including Robo Carnival 2023 and 2024

## Achievements and Certifications

**1$^{st}$ Runners-up, CADQuest (Intra BUET CAD Competition)** ***July 2023***

*BUET Automobile Club*

**Certified SolidWorks Professional (CSWP) – Mechanical Design** ***Mar. 2023***

*Dassault Systémes*

**Champion, Poster Presentation Competition)** ***Feb. 2024***

*NAME Week 2024*