Curriculum Vitae
Tanvir Hossain

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Tanvir Hossain TH-Rishad

Education

Islamic University of Technology — *Gazipur, Bangladesh* Jan 2020 – June 2024
BSc in Mechanical Engineering

- GPA: **3.9**/4.0; Class Rank: **3**/36
- Relevant Coursework: 3D Solid Modelling and Assembly, Mechanics of Materials, Measurement, Instrumentation and Control, Machine Design I & II, Capstone Design I & II, Mechanics of Machines, Mechanical Vibration, Control System and Industrial Automation

Publications **(click the link to read the full PDF)**

- Ahmed, H., **Hossain, T.**, Ahmed, A., Hossain, Z. Investigation of Clamp Numbers and Positions to Mitigate Flow-Induced Vibration in High-Speed Superheated Steam Flow Through a Pipe Elbow.Draft. *Journal of Sound and Vibration* **(in preparation)**
- Khan, T.E., Sakib, S.H., Sakib, N. **Hossain, T.**, Ehsan, M.. Thermal Analysis and Multi-objective Optimization of Supercritical CO2 Brayton Cycle Cascaded with Ejector Enhanced Transcritical CO2 Refrigeration Cycle and Flash Tank Enhanced Compression-absorption Refrigeration Cycle. Draft. *Energy and AI* **(in preparation)**

Research Experience **(click the link to read the full PDF)**

1. *Investigation of Clamp Numbers and Positions to Mitigate Flow-Induced Vibration in High-Speed Superheated Steam Flow Through a Pipe Elbow* Jan 2024 – May 2024
Undergraduate Thesis — Supervisor: Dr. Md. Zahid Hossain

- Modelled the methodology for testing clamp location and numbers in bent pipe section from a boiler outlet.
- Wrote a Python code using the FFT algorithm to test the dynamic behaviour in the frequency domain.
- Resulted in a **33%** reduction in acceleration and a **35%** reduction in displacement using just two clamps.

2. *Experimental Study on Non-linear Vibration of Sandwich Composite Specimen* Pre-defense Doc Aug 2023 – Dec 2023
Research Project — Supervisor: Dr. Md. Zahid Hossain

- Fabricated two sandwich composite specimens of different lengths, each with a Butyl Rubber core sandwiched between two stainless steel plates.
- Designed a simple 3DOF spring mass damper system in MATLAB-Simulink and compared the simulation plot with the experimental setup result.
- Wrote a Python code using the FFT algorithm to extract the experimental setup data and test the frequency domain's dynamic behaviour to detect non-linearity.

3. *Supercritical CO2 Recompression Brayton Power Cycle cascaded with Transcritical CO2 Ejector Refrigeration Cycle and Flash Tank Enhanced VAR system* Jan 2024 – May 2024
Research Project — Supervisor: Dr. Mohammad Monjurul Ehsan

- Analyzed the exergy destruction across the components using CoolProp library in Python.
- Illustrated the Ph diagram, integrated power and cooling cycle, and exergy analysis using Adobe Illustrator.
- The Final cascaded model resulted in a **4.4%** reduction in overall exergy destruction compared to the standalone system.

Research Interests

- Legged Robots
- Dynamic Locomotion
- Exoskeleton
- Controller Design
- Motion Planning
- Robot Manipulation

Skills

- **Design and Simulation**: SOLIDWORKS, ANSYS
- **Programming**: ROS, Python, Arduino
- **Control and Automation**: MATLAB, LABVIEW, Ardupilot

Projects **(click the link to read the full PDF)**

4 Degrees of Freedom Robotic Arm for Picking and Sorting Objects Report — Jan 2023 – Jan 2024
Undergraduate Capstone Project
Supervised by Dr. Md. Rezwanul Karim

- Finalized the control system architecture for the robotic arm using a laptop as the power source and Arduino Mega as the Microcontroller.
- Built a GUI interface in Python using the Tkinter library to test the actuators.
- Wrote the arm manipulation code in Python using Numpy based on Forward Kinematics.
- The final arm had a reach of **25.4cm** fully extended and a load capacity of **100g**.

Chassis of Project Altair Mars Rover - Musafir — June 2023 – Jan 2024
European Rover Challenge 2023, Kielce, Poland

- Designed a **6kg** Mars rover chassis frame on SOLIDWORKS using Stainless Steel.
- Tested load-carrying capacity and structural dynamics using ANSYS to maintain it under 75kg.
- Designed the placement for electric box and the science module.

Electric Box of Project Altair Mars Rover — June 2023 – Jan 2024
European Rover Challenge 2023, Kielce, Poland

- Designed a vertical cabinet system electric box SOLIDWORKS using **12mm** thick plywood for ease of access.
- Tested load-carrying capacity and structural dynamics using ANSYS.
- Created a custom conduit system for wire access through and across the chassis length.

Teaching Experience

- Tutored Higher Maths, General Maths and Physics – **Grades: XI-XII** — Feb 2020 – Dec 2023

Language Proficiency

- Bangla - Native Speaker
- English – **IELTS - 8.5** (Listening: 9, Reading: 9, Writing: 7, Speaking: 8) — 29 Sept 2024

Leadership Activities

- **Chief Editor** - *IUT Robotics Society* — Oct 2023 – July 2024
  Led the magazine team for publication of a brand new robotics magazine - *Genesis*
- **Chassis Design Architect** - *Project Altair* — June 2023 – May 2024
  Led the chassis subteam for manufacturing a new body for IUT Mars Rover for the European Rover Challenge, 2023, onsite
- **Chief of Robotics** - *IMechE IUT Student Chapter* — Aug 2023 – May 2024
  Organized robotics competitions and took workshops

Achievements

- International Rover Challenge 2024 - Best Science Team, India (Team Achievement) 2024
- International Rover Challenge 2024 - 6th Position, India (Team Achievement) 2024
- European Rover Challenge 2023 - 17th Position, Poland (Team Achievement) 2023
- International Rover Design Challenge 2022 - 13th Position, Virtual (Team Achievement) 2022
- European Rover Challenge 2021 - 10th Position, Virtual (Team Achievement) 2021
- IMechE UAS Challenge 2021, Design Challenge Award (Team Achievement) 2021
- OIC Partial Scholarship, Bangladesh 2020

Certifications

- Supervised Machine Learning: Regression and Classification . June 2024
  Stanford Online, Coursera
- ERC Space and Robotics Industry Standard Practice Program . Sept 2023
  European Space Foundation
- Industrial Training Course . June 2023
  BPDB, Rajshahi, Bangladesh

Reference

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Dr. Md. Rezwanul Karim
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