

# Tanvir Shahriar | Curriculum Vitae

Mechanical Engineering Ph.D. Student at UT Austin • He/Him/His  
Austin, Texas

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## Education

### The University of Texas at Austin

PH.D. IN MECHANICAL ENGINEERING

*Austin, Texas*

*Aug. 2023 – Present*

- CGPA: 4.00/4.00 (Fall 2023 – Present)
- Awards: Engineering Fellowship (2023 – Present)
- Lab: CRIOS Group (Oden Institute)
- Advisor: Prof. Patrick Heimbach
- Specialization: Thermal/Fluid Systems



### Islamic University of Technology (IUT)

M.Sc. IN MECHANICAL ENGINEERING

*Dhaka, Bangladesh*

*Jan. 2019 – Aug. 2022*

B.Sc. IN MECHANICAL ENGINEERING

*Jan. 2015 – Nov. 2018*

- M.Sc. CGPA: 3.92/4.00 (First class with honors)
- B.Sc. CGPA: 3.96/4.00 (First class with honors)
- B.Sc. Rank: 1<sup>st</sup> out of 55 students
- Awards: IUT Gold Medal (2018), OIC Scholarship (2015)



## Relevant Coursework Completed at UT Austin

- ME 397: Computational and Variational Methods for Inverse Problems (Dr. O. Ghattas, Spring 2024)
- ME 382N2: Computational Methods for Thermal/Fluid Systems (Dr. G. Biros, Spring 2024)
- ME 381P1: Fundamentals of Incompressible Flow (Dr. L. Raja, Fall 2023)
- ME 382P1: Advanced Experimental Methods for Thermal/Fluid Systems (Dr. D. Bogard, Fall 2023)
- ME 397: Microelectronics Packaging & Thermal Management (Dr. V. Bahadur, Fall 2023).

## Research Interests

- Applied Machine Learning ◦ Marine Renewable Energy ◦ Ocean Engineering ◦ Reliability Engineering
- Alternative Fuels ◦ Desalination.

## Research Experience

### Master's Thesis

**Title:** Assessment and Characterization of Wave Energy in the Littoral Countries of Bay-of-Bengal: A Machine Learning Approach (2022) | **Advisor:** Mohammad Ahsan Habib, Ph.D. (NUS, Singapore)

- Collected and analyzed the SRTM30+ v6 bathymetry dataset and 13 years of 3-hourly data outputted from the WAVEWATCH-III<sup>®</sup> model within the exclusive economic zones (EEZs) of the Bay of Bengal.

- Visualized spatiotemporal distributions of wave characteristics using GIS and Python tools.
- Identified eight potential WEC deployment locations in the EEZs based on long-term wave statistics.
- Evaluated the selected locations using various wave resource characterization methods, including sea-states analysis, wave climate stability, site accessibility analysis, extreme event analysis, etc.
- Assessed the performance of state-of-the-art WECs at the selected locations.
- Developed generalized "wave energy flux" forecasting models for Bay-of-Bengal using *deep learning* algorithms.

## Undergraduate Thesis.....

**Title:** *Micro-hydro Power Plant Design by Harnessing Ocean Wave Energy with "Searaser": A Case Study for Saint Martin's Island* (2018) | **Advisor:** Mohammad Ahsan Habib, Ph.D. (NUS, Singapore) | Collaborated with Dr. Md. Hasanuzzaman (University of Malaya)

- Conducted a field survey on Saint Martin's Island to assess the local power demand.
- Hindcasted the wave characteristics in the shelf regions of Saint Martin's Island using *Young and Verhagen* (1996) wave model—a parametric shallow water wave growth model.
- Concluded that the Searaser WEC can produce  $\approx 35$  m of water-head using the available wave power.
- Modeled a Searaser-based 144 kW decentralized hydroelectric power plant to meet the island's electricity demand, providing a cost-effective and eco-friendly alternative to the existing diesel-generators.

## Research Grants.....

- [1] **IUT Research Seed Grants** (REASP/IUT-RSG/2021/OL/07/002). M. A. Habib (PI), **T. Shahriar** (Co-Researcher), *A Machine Learning based Assessment of Ocean Wave and Thermal Energy Resource Along the Bangladeshi Coast and its Harvesting Approach*, **Awarded \$3,000** (Aug. 2021 – Aug. 2022).
  - Conceptualized the research problem and authored the original draft of the research proposal.
  - Planned the budget and prepared a Gantt chart illustrating the project timeline with milestones.
  - Published 3 original research articles and 1 review article in SCIE/Scopus-indexed journals.

## Journal Publications.....

- [7] **T. Shahriar** and M. A. Habib, *A Reconnaissance-level Characterization of Wave Energy Resource in the Exclusive Economic Zones of Bay-of-Bengal*, **Renewable Energy**, Vol. 225, Art. 120352 (2024).
- [6] A. Hasan, I. Kayes, M. Alam, **T. Shahriar**, and M. A. Habib, *Generalized Machine Learning Models to Predict Significant Wave Height Utilizing Wind and Atmospheric Parameters*, **Energy Conversion and Management: X**, Vol. 23, Art. 100623 (2024).
- [5] M. Tasnim, T.I. Rifa, **T. Shahriar**, M. A. Habib, *Wind Energy Deployment in Bangladesh: Investigating Feasible Locations and Their Characteristics*, **Energy Reports**, Vol. 11, pp. 4338–4355 (2024).
- [4] A. Rashid, T.H. Nakib, **T. Shahriar**, M. A. Habib, and M. Hasanuzzaman, *Energy and Economic Analysis of an Ocean Thermal Energy Conversion Plant for Bangladesh: A Case Study*, **Ocean Engineering**, Vol. 293, Art. 116625 (2024).
- [3] M. Alam, I. Kayes, A. Hasan, **T. Shahriar**, and M. A. Habib, *Exploring SAARC's Ocean Energy Potential: Current Status and Future Policies*, **Energy Reports**, Vol. 11, pp. 754–778 (2024).
- [2] M.M. Hossain, **T. Shahriar**, M. A. Habib, M. Hasanuzzaman, and M. N. Inan, *Techno-economic and Environment Assessment of Landfill and Sewage Treatment Plant-based Combined Power Generation System: A Case Study for Dhaka*, **Biomass Conversion and Biorefinery**, Vol. 14, pp. 701–717 (2024).
- [1] **T. Shahriar**, M. A. Habib, M. Hasanuzzaman, and M. Shahrear-Bin-Zaman, *Modelling and Optimization of Searaser Wave Energy Converter based Hydroelectric Power Generation for Saint Martin's Island in*

## Projects

### Developing a Thermal Management Solution for D1 Silicon Chips

2023

SOLO | Course project (ME 397), supervised by Prof. Vaibhav Bahadur (UT Austin)

- Developed a thermal management solution to dissipate a total of 15 kW heat from 25 D1 silicon chips.
- Utilized coolants with a *Global Warming Potential*  $< 10$  and an *Ozone Depletion Potential*  $= 0$ .

### Safety Manual for MPE Workshops and Laboratories

2022

TEAM LEAD | Departmental project, supervised by Dr. Md. Anayet Ullah Patwari

- Drafted and compiled a safety manual outlining essential machine shop and laboratory safety guidelines for dissemination among students, staff, and faculty members of the MPE department at IUT.

### Helicopter Angular Position Controller Design with MATLAB & Simulink

2019

MENTOR | A capstone project for 3rd-year undergraduate students

- Taught students the fundamentals of helicopter control and elucidated the Swashplate Mechanism.
- Illustrated the application of MATLAB's *Control System Toolbox* and Simulink to guide students in designing a lead-lag compensator, motivating them to meet the design goals and constraints.

### Fabrication and Performance Assessment of a Wave Energy Converter (WEC)

2018

TEAM LEAD | B.Sc. thesis related project, supervised by Dr. Mohammad Ahsan Habib

- Modeled a Searaser WEC using SolidWorks and constructed a small-scale prototype from scratch.
- Evaluated the hydrodynamic performance of the WEC in a rectangular water tank, simulating the wave conditions of Saint Martin's Island in the Bay-of-Bengal with scaled-down wave characteristics.

### A Review of the Power Generation Scenario of Bangladesh

2018

TEAM LEAD | Optional course project, supervised by Mr. Sayedus Salehin (Assistant Professor)

- Gathered information, conducted literature reviews, and prepared the initial draft of a technical report as part of the course on power plant engineering.

### Lunar Lander Controller Design with MATLAB & Simulink

2017

TEAM LEAD | Capstone project, supervised by Mr. Ifat Rabbil Qudrat Ovi (Lecturer)

- Derived the equations of motion for a 2D lunar lander module and solved them using Simulink.
- Conducted simulations of the lander's dynamic model in Simulink and designed a controller using the Control System Toolbox.

### Feasibility Study of Conventional Nuclear Waste Disposal Method in Bangladesh

2016

TEAM LEAD | Extra-curricular project

- Conducted a systematic literature review on various nuclear waste disposal methods and assessed the techno-economic feasibility of the conventional *geological disposal with vitrification* scheme for the Rooppur Nuclear Power Plant in Bangladesh.

## Work & Teaching Experience

### The University of Texas at Austin

TEACHING ASSISTANT, ME 139L: EXPERIMENTAL HEAT TRANSFER LAB

Austin, Texas  
Spring 2024

Under Prof. Vaibhav Bahadur | Average TA Rating: 4.43/5.00

TEACHING ASSISTANT, ME 130L: EXPERIMENTAL FLUID MECHANICS LAB

Fall 2023

Under Prof. Janet Ellzey | Average TA Rating: 3.94/5.00

- Conducted lectures and delivered hands-on demonstrations of lab procedures to three undergraduate student groups, totaling 27 – 30 students, for 20 hours/week.
- Evaluated and graded lab assignments promptly, offering constructive feedback.
- Led interactive problem-solving sessions using inquiry-based learning to foster student engagement and critical thinking.
- Contributed to organizing a *flow visualization competition* (in ME 130L), assessing student-submitted photographs.

## Islamic University of Technology (IUT)

Dhaka, Bangladesh

ASSISTANT PROFESSOR, DEPT. OF MECHANICAL & PRODUCTION ENGINEERING Feb. 2023 – Aug. 2023

LECTURER, DEPT. OF MECHANICAL & PRODUCTION ENGINEERING

Jan. 2019 – Feb. 2023

- Instructed theory and lab courses for undergraduate students, including Basic Thermodynamics, Fluid Mechanics and Machinery, Programming Lab, CAD Lab, Numerical Analysis Lab, Control Engineering Lab, Mechanics of Materials Lab, Mechanics of Machines Lab, and Material Engineering Lab.
- Collaborated with senior faculty members to address industrial research problems.
- Co-supervised final-year theses of undergraduate mechanical engineering students.
- Developed course materials; contributed to program development and student assessment.
- Actively participated in accreditation processes, curriculum development, course registration, result tabulation, and committees overseeing exam question control and distribution.

## Skills & Certifications

### Software Skills

- **Engineering Packages**  $\Rightarrow$  SolidWorks, MATLAB & Simulink, Wolfram Mathematica, ANSYS (Fluent, Aqwa), ArcGIS, NASA Panoply, PIVlab, System Advisor Model (SAM).
- **Programming**  $\Rightarrow$  Python, C/C++, Octave, use of Linux bash scripts for batch processing, CNC programming (G-code).
- **Finite Element Toolkits**  $\Rightarrow$  FEniCS.
- **Data Extraction**  $\Rightarrow$  ERDDAP, OPeNDAP, OBIS.
- **Data Acquisition**  $\Rightarrow$  LabVIEW.
- **Python Libraries**  $\Rightarrow$  hIPPYlib, autograd, pandas, NumPy, SciPy, GeoPandas, xarray, Requests, Matplotlib, seaborn, plotly, cartopy, basemap, MetPy.
- **ML Frameworks**  $\Rightarrow$  scikit-learn, Darts, TensorFlow (basic), PyTorch (basic).
- **Illustration Tools**  $\Rightarrow$  Adobe Illustrator, Inkscape, Adobe Photoshop.
- **Operating Systems**  $\Rightarrow$  Linux (Unix) and Windows.
- **Miscellaneous**  $\Rightarrow$  WordPress, MS Office Suite, L<sup>A</sup>T<sub>E</sub>X.

### Experimental Methods

- **Flow Measurement and Visualization Techniques**  $\Rightarrow$  Hot-wire Anemometry, Laser Doppler Velocimetry (LDV), Particle Image Velocimetry (PIV) | Dye and Smoke Flow Visualization, H<sub>2</sub>-bubble Visualization.

- **Instrumentation Skills**  $\Rightarrow$  Proficient in calibrating pressure transducers, orifice meters, and hot-wire probes. | Keithley 2700 Multimeter, Omega HHM290 Supermeter, Forward-looking Infrared (FLIR) Cameras, WL 362 Thermal Radiation Unit.
- **Miscellaneous**  $\Rightarrow$  Familiar with laser operation for experimental purposes | Experienced in operating wind tunnel/water channel facilities.

## Language Skills

- **English:** Full Professional Proficiency
- **Hindi/Urdu:** Limited Working Proficiency
- **Bengali:** Native
- **Arabic:** Elementary Proficiency

## Professional Certificates

[1] **Certified Engineering Teaching Assistant**, Cockrell School of Engineering, UT Austin (Dec. 2023).

- Awarded upon successful completion of Engineering TA Training, including a one-day institute and teaching practicum, student surveys of teaching effectiveness, and classroom observation.

## Select Awards & Achievements

- 2023 **Engineering Fellowship** — \$6,000 *multi-year* fellowship from Cockrell School of Engineering and UTGS for outstanding academic record. *UT Austin*
- 2022 **Publication Incentive Award** — For publishing an original research article in a Q2 quartile journal. *IUT, Bangladesh*
- 2018 **IUT Gold Medal** — For academic excellence from MPE department. *IUT, Bangladesh*
- 2017 **2nd Runners-up** — *Energy Hackathon*, organized by the Ministry of Power, Energy, and Mineral Resources. *Bangladesh Govt.*
- **Champions** — *Project Showcasing* in the Mecceleration and ICT Fest. *IUT, Bangladesh*
- **Runner-up** — *Speak Out for Engineering (SOFE)*, Bangladesh Finals. *IMechE*
- **Champions** — *Poster Presentation* in the Civil Rivalry Fest. *AUST, Bangladesh*
- 2016 **Champion** — *Engineering Olympiad* in the Mecceleration Fest. *IUT, Bangladesh*
- **Runner-up** — *Mechanics Olympiad* in the Cennovation Fest. *IUT, Bangladesh*
- 2015 **OIC Scholarship** — \$7,500 *waiver* to pursue B.Sc. in Mechanical Engineering. *IUT, Bangladesh*
- 2014 **2nd Runners-up** — *Math Olympiad*, Sylhet Region, Bangladesh. *BdMO Committee*
- 2013 **2nd Runners-up** — *Physics Olympiad*, Sylhet Region, Bangladesh. *BdPhO Committee*

## Professional & Community Affiliations

- ASME: UT Austin Chapter** *UT Austin*  
MEMBER *Aug. 2023 – Present*
- IUT Alumni Association (IUTAA)** *IUT, Bangladesh*  
MEMBER *Jan. 2019 – Present*
- Mecceleration-2019: A National Mechanical Festival** *IUT, Bangladesh*  
JUDGE: PROJECT SHOWCASING COMPETITION *Aug. 2019*
- IMechE IUT Student Chapter** *IUT, Bangladesh*  
RESEARCH & TECHNOLOGY ADMINISTRATOR *2017 – 2018*



- Monitored technical activities, encouraged research initiatives, and organized research seminars.
- Assisted in the production of technical videos aimed at promoting club activities to online audiences.

## Miscellaneous

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### Review Works.....

- A registered reviewer at *Alexandria Engineering Journal* (Elsevier)
- Reviewed 2 articles for the *International Journal of Renewable Energy Resources* (U. of Malaya)
- Reviewed 4 articles for the *International Postgraduate Conference for Energy Research 2022* (U. of Malaya)

### Standardized Tests.....

- TOEFL (Oct. 2022)  $\Rightarrow$  Total: 98/120, Reading: 24/30 (advanced), Listening: 23/30 (advanced), Speaking: 24/30 (high-intermediate), Writing: 27/30 (advanced) | [Score report](#)

### Industrial Attachments.....

- 2017 Intern at Power Development Board (PDB) | Duration: 12 days *Rajshahi, Bangladesh*
- 2015 Intern at Peoples Ceramic Industries Ltd., National Polymer Industries Ltd., and National Tubes Ltd. | Duration: 1 week *Tongi, Bangladesh*

### Workshops.....

- 2022 Workshop on *Quality Education through Effective Teaching* *IUT*
- 2021 NOAA CoastWatch Satellite Course | [Certificate](#) *NOAA*
- 2018 International workshop on *Computational Fluid Dynamics (CFD) and its Applications*, powered by ANSYS Inc. *IUT MPE Dept.*

## References

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**Dr. Mohammad Ahsan Habib**

*Thesis Advisor*

PROFESSOR — Islamic University of Technology (IUT)

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**Dr. Md. Hasanuzzaman**

*Research Mentor*

ASSOCIATE PROFESSOR — University of Malaya (UM)

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