SAYED TANVIR AHMED

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PROFILE

An ambitious Mechanical Engineering graduate with a strong focus on research-driven academic pursuits. Passionate about aerodynamics, wind energy, hypersonic aerothermodynamics, and CFD simulations, with aspirations to pursue an M.Sc. in Mechanical Engineering Proficient in ANSYS Fluent, ANSYS FEA, Matlab, and programming languages. A proactive collaborator with strong communication, leadership, and interpersonal skills.

RESEARCH INTEREST

- Aerodynamics
- Hypersonic Aero-thermodynamics
- Wind Energy
- Computational Fluid Dynamics (CFD)
- Concentrating Solar Power
- Physics Informed Neural Network

EDUCATION

Shahjalal University of Science and Technology, (SUST) , Sylhet   **Jan 2019 - Jan 2024**
BSc. In Mechanical Engineering

- **CGPA:** 3.51/4.00
- Presented research findings at international conferences

RESEARCH EXPERIENCE

Undergraduate Thesis   **Jan 2023 - Jan 2024**
Mechanical Engineering Department, SUST
Titled: Investigation on the potential of Hill Track Sites as solar fields for Concentrated Solar Powerplants incorporating Optical Efficiency as the primary parameter.
Supervisor: Tahmidul Haque Ruvo, Department of MEE, SUST

- Structured entire research scheme under supervision to conduct thesis within timeframe
- Modelled field layout using geographical data, Filtered and processed data with Python, used SolarPILOT to carry out the simulation
- Processed and visualized data using OriginLab and Tecplot, wrote a thesis report, and presented a conference paper

Research Assistant (Non-funded)   **Sep 2023 - Present**
CAD-CAM Simulation Laboratory, Mechanical Engineering, SUST
Supervisor: Mostafa Rafid, Department of MEE, SUST

- Designed the entire research methodology under supervision
- Modeled required solid and fluid geometries, discretized computational domain using ANSYS ICEM CFD Meshing tool, and developed different boundary conditions
- Implemented ANSYS Fluent for conducting numerical simulations
- Processed and visualized data using OriginLab, Tecplot and ANSYS CFD-Post, wrote a research paper

Research Intern   **Aug 2022 - Aug 2023**
CAD-CAM Simulation Laboratory, Mechanical Engineering, SUST
Supervisor: A K M Ashikuzzaman, Department of MEE, SUST(Doctoral candidate, University of Minnesota, USA)

- Prepared Airfoil geometries, designed fluid domain, discretized computational domain using ANSYS ICEM CFD Meshing tool, and developed different boundary conditions
- Processed and visualized data using OriginLab and Tecplot, wrote multiple research paper, one poster paper accepted and two paper being reviewed

TEACHING EXPERIENCE	**Mathematics Instructor**	**Sep 2021 - May 2023**

- Grade 11 & 12 (Canadian Curriculum)
- **Courses:** Mathematics IB SL1 & IB SL2, Mathematics HL, MathPower 10, Advanced Functions.

PUBLICATION HIGHLIGHTS

 # Peer-reviewed Conference Proceedings, (Elsevier SSRN and AIP publishing).

- Anwoy Talukder Ranjak, **Sayed Tanvir Ahmed**, A. K. M. Ashikuzzaman,Tahmidul Haque Ruvo, *Investigation of Optical Efficiency of the Concentrated Solar Power System Located on the Inclined Hillside Areas*, 14th International Conference on Mechanical Engineering (ICME2023), Department of Mechanical Engineering, BUET, Bangladesh. (Full Paper)

- **Sayed Tanvir Ahmed**, Tripta Sarker, Ratul Das, *Thermohydraulic Performance Optimization of Solar Air Heater via Tailored Invert L Shaped Rib: A CFD Investigation*, 2nd International Conference on Mechanical, Manufacturing and Process Engineering (ICMMPE-2024), Dhaka, Bangladesh.

- **Sayed Tanvir Ahmed**, Ratul Das, Tripta Sarker, Mahadi Hasan Shanto, *Aerodynamic Effects of Leading Edge Flap Angle on NACA 4412 Airfoil Performance at Low Reynolds Numbers: A CFD Investigation*, 2nd International Conference on Mechanical, Manufacturing and Process Engineering (ICMMPE-2024), Dhaka, Bangladesh.

- Tripta Sarker, Ratul Das, **Sayed Tanvir Ahmed**, *Numerical Investigation of the Hydraulic and Thermal Performance of Plain Fin Compact Heat Exchangers with Modified Flat Tubes*, 2nd International Conference on Mechanical, Manufacturing and Process Engineering (ICMMPE-2024), Dhaka, Bangladesh.

 # Preprint Articles (arXiv)

- **Sayed Tanvir Ahmed** and Mahadi Hasan Shanto, *Effects of Trailing Edge Thickness on NACA 4412 Airfoil Performance at Low Reynolds Numbers: A CFD Analysis* (Full Paper)

- Mahadi Hasan Shanto, **Sayed Tanvir Ahmed** and A. K. M. Ashikuzzaman, *Improvement of NACA 6309 Airfoil with Passive Air-Flow Control by Using Trailing Edge Flap.* (Full Paper)

 # Works In Progress

- *CFD-Based Analysis of Transpiration Cooling for Thermal Protection in Hypersonic Vehicles*
- *Optimizing Thermohydraulic Performance of Solar Air Heaters Using Novel Rib Configurations.*

PROJECT

- Solar System Dynamics Simulator, Designed and developed entire software, used python 3. [**Under Stanford's CS106A**] (2023) (Link)
- Karel Robot, (7 projects), **(Under Stanford's CS106A)** (2023) (Link)
- Finite Difference Method (FDM) for Heat transfer and Solid Mechanics. used python 3. (Link)
- Gravity Light, [**Academic project under MEE-368 course**] (Link)

HONORS & AWARDS

- Champion in Mechnovation Depiction V3.0 CAD Competition, **MECHNOVATION - National Mechanical Festival, 2022**
- Placed 20th/1200 globally in ITPO, **International Theoretical Physics Olympiad, 2021**

TECHNICAL SKILLS

Programming Languages: Python, C, MATLAB

Simulation Software: ANSYS fluent, ANSYS Static Structural, SolarPILOT

CAD Software: SolidWorks, AutoCAD, Fusion 360, Ansys SpaceClaim

Other Software: STecplot, Origin Lab, Latex, Microsoft Office (Excel, PowerPoint & Word)

CERTIFICATION

- **Stanford University's Code in Place**, (3 Units), Obtained Section & Diagnostic Badge Link
- **Supervised Machine Learning: Regression and Classification**, by DeepLearning.AI (Link)
- **Programming for Everybody**, by University of Michigan via Coursera (Link)
- **Autodesk Fusion 360**, by Autodesk, Inc. (Link)
- **Work Smarter with Microsoft Excel**, by Microsoft via Coursera (Link)

VOLUNTEER EXPERIENCE

Founder, **SUSTCADSociety, SUST**

- SUSTCADSociety, is a official CAD club, founded in 2023 for SUST students passionate about CAD, Simulation and manufacturing.

Assistant Organizing Secretary, **Public University Student Association Sunamganj**

- Planned and executed organizational events for seamless participant experience
- Organized complimentary academic sessions in schools and colleges in Sunamganj

General Member, **RoboSUST, SUST**

REFREES

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- **A K M Ashikuzzaman**
  Graduate Research Assistant
  Department of Mechanical Engineering, University of Minnesota, USA
  Lecturer (On leave), Department of Mechanical Engineering
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