

Sayed Tanvir Ahmed

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PROFILE	An ambitious Mechanical Engineering graduate specializing in CFD, Aerodynamics, and Heat transfer. Aspiring PhD candidate with proficiency in mathematics, programming, and computational research.	
RESEARCH INTEREST	<ul style="list-style-type: none"> • Aerodynamics • Thermo-Fluids • Hypersonic Aerothermodynamics • Computational Fluid Dynamics (CFD) • Computational Solid Mechanics • Physics-Informed Neural Network • Control and Dynamics • Mobile Robotics 	
EDUCATION	Shahjalal University of Science and Technology, Sylhet, Bangladesh BSc. In Mechanical Engineering	Jan 2019 - Jan 2024
	<ul style="list-style-type: none"> • CGPA: 3.51 / 4.00 	
PROFESSIONAL EXPERIENCE	Mechanical Engineer (Remote) - CAD, FEA & CFD SolidWorks, ANSYS AmeriStruct, USA <ul style="list-style-type: none"> • Execute CAD projects for 3D printing, CNC machining, fabrication, and develop prototypes. • Perform FEA analysis to assess safety and life, and CFD to optimize flow and heat transfer. Journal Manager - OJS, L ^A T _E X, Scopus, EndNote American Society for Inclusion, Diversity, and Equity in Healthcare (ASIDE Journals) Supervisor: Dr. Mahmoud Nassar, Assistant Professor, University of Vermont, USA <ul style="list-style-type: none"> • Oversee the editorial workflow and peer-review process, coordinating with authors, reviewers. • Manage submissions, revisions, and publication scheduling in OJS to ensure timely publication. 	Mar 2025 - Present
RESEARCH EXPERIENCE	Thermohydraulic Analysis of SAH via CFD - ICEM CFD, ANSYS Fluent Independent Research <ul style="list-style-type: none"> • Optimized thermal-hydraulic performance using novel ribs, used RNG $k-\varepsilon$ turbulence model • Analyzed flow and heat transfer, identified influential rib configurations, published findings Concentrating Solar Power (CSP) - SolarPILOT, Python Undergraduate Thesis CAD, CAM & Simulation Laboratory, ME, SUST Titled: Novel CSP Field Layouts for Hill Tracts using Optical Efficiency as the primary parameter Supervisor: Tahmidul Haque Ruvo, Lecturer, Dept. of ME, SUST <ul style="list-style-type: none"> • Developed ideal V-shaped CSP field layouts and evaluated them at hill surfaces in Texas, Arizona • Evaluated optical performance, optimized heliostat arrangement, published findings at SSRN CFD Analysis of Fin-Tube Heat Exchanger ICEM CFD, ANSYS Fluent Research Collaboration CAD, CAM & Simulation Laboratory, ME, SUST Supervisor: Mostafa Rafid, Lecturer, Dept. of ME, SUST <ul style="list-style-type: none"> • Collaborated on thesis, studied five cases, optimized tube, used laminar and turbulent models. • Analyzed heat transfer, pressure drop, pumping power, THPP & published a case at AIP 	Aug 2023 - Present

CFD Study of VAWT Flow Control | ICEM CFD & ANSYS Fluent

Aug 2022 - Aug 2023

Undergraduate Research Assistant | CAD, CAM & Simulation Laboratory, ME, SUST

Supervisor: A K M Ashikuzzaman, Lecturer, Dept. of ME, SUST

- Studied various airfoils for VAWT, applied Spalart–Allmaras turbulence model, optimized C_l/C_d
- Implemented passive flow control using flap and trailing-edge gap, published at AIP and arXiv

PUBLICATION HIGHLIGHTS**Peer-reviewed Conference Proceedings**

- [1] S. T. Ahmed, T. Sarker, and R. Das, "Thermohydraulic Performance Optimization of Solar Air Heater via Tailored Inverted L-Shaped Rib: A CFD Investigation," in *AIP Conf. Proc.*, vol. 3307, no. 1, 2025. doi: 10.1063/5.0262221.
- [2] S. T. Ahmed, R. Das, T. Sarker, and M. H. Shanto, "Aerodynamic Effects of Leading-Edge Flap Angle on NACA 4412 Airfoil Performance at Low Reynolds Numbers: A CFD Investigation," in *AIP Conf. Proc.*, vol. 3307, no. 1, 2025. doi: 10.1063/5.0262220.
- [3] A. T. Ranjak, S. T. Ahmed, A. K. M. Ashikuzzaman, and T. H. Ruvo, "Investigation of Optical Efficiency of the Concentrated Solar Power System Located on the Inclined Hillside Areas," in *SSRN Electron. J.*, 2024. doi: 10.2139/ssrn.4862794.
- [4] T. Sarker, R. Das, and S. T. Ahmed, "Numerical Investigation of the Hydraulic and Thermal Performance of Plain Fin Compact Heat Exchangers with Modified Flat Tubes," in *AIP Conf. Proc.*, vol. 3307, no. 1, 2025. doi: 10.1063/5.0262425.
- [5] A. Ahamed, S. T. Ahmed, M. N. R. Mehedi, and R. Das, "Advancing SLAM Evaluation: Introducing New Metrics for Map Quality and Performance Assessment for Mobile Robots in ROS," in *Proc. 15th Int. Conf. on Mechanical Engineering (ICME 2025)*, Dhaka, Bangladesh. (Accepted)

Preprint Articles (arXiv)

- [5] S. T. Ahmed and M. H. Shanto, "Effects of Trailing Edge Thickness on NACA 4412 Airfoil Performance at Low Reynolds Numbers: A CFD Analysis," *arXiv*, 2024. doi: 10.48550/arXiv.2409.13922.
- [6] M. H. Shanto, S. T. Ahmed, and A. K. M. Ashikuzzaman, "Improvement of NACA 6309 Airfoil with Passive Air-Flow Control by Using Trailing Edge Flap," *arXiv*. doi: 10.48550/arXiv.2409.14258.

Work in Progress / Forthcoming Publications

- [7] S. T. Ahmed, R. Das, and T. Sarker, "Thermohydraulic Performance Optimization of a Solar Air Heater Using Concave Arc Ribs," **manuscript in preparation**.

PROJECT**Physics-Informed Machine Learning - Python, TensorFlow**

- **2D Internal Pipe Flow:** Built a PINN model and validated it against CFD data. ([Link](#))

Professional Engineering Projects (Mechanical Design) - SolidWorks, ANSYS Mechanical

- **US Patent 9388558 & 8893321:** Hydraulically Controlled $\frac{1}{4}$ -Turn Valve & Anti-Rotation Drain.
- **FEA of Heavy Duty Hinge:** Structural analysis using ANSYS to check strength, life & safety.
- **Heavy-Duty Industrial Gate (2 Models):** 3D modeling, 2D drawing, and FEA analysis.

Numerical Modeling - Python & MATLAB

- FDM code for Heat Transfer and Structural Analysis in Solid Bar, used Python. ([Link](#))
- Drag Calculation of Sport Bike; Applied Runge-Kutta method, implemented in MATLAB.

Interactive Computational Systems Modeling - Python [Projects under Stanford's CSI06A-2023]

- Pendulum and Projectile Motion Simulations Across Solar Planets. ([Link](#))
- Function Plotter (Fourier & Trigonometric functions) ([Link](#))
- Karel Robot (7 projects) ([Link](#))

Mechanical Design & CAD

- Gravity Light – Designed and manufactured an integrated mechanical-electrical system to generate electricity. [Academic project under MEE-368 course]. ([Link](#))
- CAD (12 projects) - Mechanical systems (IC Engine, Landing Gear, etc). ([Link](#))
- Champion in MechNovation Depiction V3.0 CAD Competition, MECHNOVATION - National Mechanical Festival, 2022, (Awarded BDT 10,000)
- Placed 20th /1200 globally in ITPO, International Theoretical Physics Olympiad, 2021

HONORS & AWARDS

TECHNICAL SKILLS

Programming Languages: Python, C, MATLAB

Simulation Software: SolarPILOT, ANSYS FLUENT, ICEM CFD, ANSYS Static Structural

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

Other Software: Tecplot, Origin Lab, LATEX, Microsoft Office (Excel, PowerPoint & Word)

CERTIFICATION

- Stanford University's Code in Place, (3 Units), Obtained Section & Diagnostic Badges [Link](#)
- Supervised Machine Learning: Regression and Classification, by DeepLearning.AI
- Programming for Everybody, by University of Michigan via Coursera
- Autodesk Fusion 360, by Autodesk, Inc.

TEACHING EXPERIENCE

Mathematics Instructor

Sep 2021 - May 2023

- Taught Grade 11 & 12 (Canadian Curriculum), courses: IB SL1 & SL2, HL, MathPower 10

VOLUNTEER EXPERIENCE

Founder, SUSTCADSociety, SUST

- 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 and academic sessions in schools and colleges

General Member, RoboSUST, SUST

REFEREES

- Dr. Mahmoud Nassar, MD, PhD, MSc, MHA, MPA, CPHQ, SSBB
Assistant Professor, Division of Endocrinology and Diabetes
University of Vermont, Burlington, Vermont, USA
Founder, American Society for Inclusion, Diversity, and Equity in Healthcare (ASIDE)
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- A. K. M. Ashikuzzaman
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