

Sayed Tanvir Ahmed

BSc In Mechanical Engineering
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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	<div><ul style="list-style-type: none">AerodynamicsThermo-FluidsHypersonic AerothermodynamicsComputational Fluid Dynamics (CFD)</div> <div><ul style="list-style-type: none">Computational Solid MechanicsPhysics-Informed Neural NetworkControl and DynamicsMobile Robotics</div>	
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	Mar 2025 - Present
	<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 Jounnals) Supervisor: Dr. Mahmoud Nassar, Assistant Professor, University of Vermont, USA	May 2025 - Present
	<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.	
RESEARCH EXPERIENCE	Thermohydraulic Analysis of SAH via CFD - ICEM CFD, ANSYS Fluent Independent Research	Aug 2023 - Present
	<ul style="list-style-type: none">Optimized thermal-hydraulic performance using novel ribs, used RNG $k-\epsilon$ turbulence modelAnalyzed 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	Jan 2023 - Jan 2024
	<ul style="list-style-type: none">Developed ideal V-shaped CSP field layouts and evaluated them at hill surfaces in Texas, ArizonaEvaluated 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	Sep 2022 - Jun 2024
	<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	

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 ¼-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 CS106A-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, L^AT_EX, 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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