

Tanvir Ahmed

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EDUCATION

Doctor of Philosophy in Mechanical and Manufacturing Engineering August 2025 - December 2028 (Expected)
Texas State University, San Marcos, TX.
GPA: **4.00/4.00**

Master of Science in Mechanical and Manufacturing Engineering August 2023 - August 2025
Texas State University, San Marcos, TX.
GPA: **4.00/4.00**
Thesis: Development of a wearable sensor unit for cattle behavior prediction using machine learning.

Bachelor of Science in Mechanical Engineering January 2015 - November 2018
Islamic University of Technology, Dhaka, Bangladesh
GPA: **3.39/4.00**
Thesis: Activated carbon development from agricultural waste for implementing cost-effective water purification and refractory organic and inorganic compounds removal.

RESEARCH INTERESTS

Wearable Sensor Systems, Applied Machine Learning, Precision Agriculture, Agricultural Robotics, Cyber-Physical Systems.

RESEARCH EXPERIENCE

- Designed, developed, and deployed ML-based wearable cattle-collar using motion sensors, achieving high behavior-classification accuracy and supporting USDA autonomous livestock research.
- Development of Passive Self-Righting Robot Design for Cattle Farming, USDA-NIFA-funded research project for cattle management in Freeman Ranch, Texas.
- Autonomous Navigation and Control of an Animal Care Robot Using SLAM, USDA-NIFA-funded research project for cattle management in Freeman Ranch, Texas.
- Performed advanced human-motion and gait analysis using IMU sensor fusion and activity-recognition algorithms to model movement patterns for health-monitoring applications.
- Implemented a blockchain-based trust and Sybil-attack detection model for underwater wireless sensor networks, integrating consensus mechanisms and node-behavior validation to improve network security.
- Contributed to an MA-DRL-based optimization framework for improving fairness-aware data freshness and energy-efficient data collection in air-ground UAV networks.
- Fabricated TPMS lattice structures (Gyroid, Schwarz) using multi-axis machining to support AWG productivity.
- Evaluated magnetic properties of Polyamide-4.6 nanocomposite filaments, conducting extrusion, materials processing, and magnetic-response testing to optimize bonded-magnet performance.
- Produced high-surface-area activated carbon from agricultural waste, conducting thermal treatment and adsorption experiments for low-cost purification and removal of refractory contaminants.

PUBLICATIONS

1. M. M. Alam, M. A. Kabir, M. F. A. Omei, S. Ahmed, **T. Ahmed**, M. Y. Arafat, "Integrated Trajectory and Resource Allocation for Air-Ground Networks," IEEE Open Journal of the Communications Society, 2026.
2. **T. Ahmed**, M.S.U. Khan, H. Chen, "A Review of IoT for Animal Health Farming," IEEE CYBER, 2025.
3. M.S.U. Khan, **T. Ahmed**, H. Chen, "A Review of SLAM Techniques for Agricultural Robotics: Challenges, Architectures, and Future Directions," IEEE CYBER, 2025.
4. P. Karkhanis, OK. Arigbabowo, AJ. Gonzalez, S. Inamdar, **T. Ahmed**, A. Herrera, WJ. Geerts, JS. Tate., "Magnetic Properties Evaluation of Polyamide 4.6 Bonded Magnetic Composite," SAMPE Conference, 2024.
5. **T. Ahmed**, H. Chen, P. Panta, "Human Motion Gait Analysis Using IMU Sensors," IEEE CYBER, 2024.
6. M.M. Arifeen, A. Al Mamun, **T. Ahmed**, et al., "A Blockchain-Based Scheme for Sybil Attack Detection in Underwater Wireless Sensor Networks," Springer AISC 2021.

POSTERS AND PRESENTATIONS

1. Magnetic Properties Evaluation of Polyamide 4.6 Bonded Magnetic Composite, 2024 TXST GSRC.
2. Development of a Self-Righting Mobile Robot and Wearable Sensor Unit for Cattle Monitoring and Behavior Analysis, U.S. Department of Energy (DOE) EM Symposium and TXST CoSE Advisory Council Meeting 2025
3. Autonomous Navigation and Control of Animal Care Robot Using SLAM, 2024 TXST Graduate Student Research Conference (GSRC) and 2025 TXST STEM Conference.

WORK, TEACHING, AND LEADERSHIP EXPERIENCE

GIA/ GRA/ DIA, *Ingram School of Engineering, TXST, USA*

August 2023 - Present

- Graded, proctored assignments, projects, and term papers for over 200 students, contributing to the academic progression of 7 undergraduate and graduate courses and lab classes.
- Guided and taught students in implementing control and automation systems, including PID control, FANUC and ABB robotic arms, and hands-on experiments with PLCs, focusing on sensor integration and device communication.
- Contributed to 3 major research projects under Dr. Chen, resulting in multiple scholarly publications.

Co-founder and Project Manager, *Monochrome Limited, Bangladesh*

July 2021 - August 2023

- Negotiated and managed contracts with various vendors and identified and improved cost optimization.
- Led a 7-member team and coordinated project execution, task delegation, and cross-functional collaboration, including digital content development and client progress tracking.
- Oversaw company growth activities such as financial management, tax compliance, and investor communication, ensuring smooth organizational development.

Digital Content Producer and Editor, *Codesign Limited, Bangladesh*

May 2019 - May 2020

- Managed end-to-end production workflows, coordinating small teams and overseeing camera, lighting, audio, and storyboarding to ensure technically consistent outputs.
- Edited and designed digital content while diagnosing critical business needs and implementing strategic, technically driven solutions to improve project outcomes.

Maintenance Intern, *Millennium Service Center Limited, Bangladesh*

January 2019 - Mar 2019

- Assisted in a range of automotive maintenance tasks while collaborating with training vendors to support the delivery of high-quality automobile maintenance training programs.

TECHNICAL SKILLS

Workshop: Trained in operating lathes, milling, drilling, shaping, CNC, 3D printing, waterjet, laser cutters.

Programming Skills: Python (NumPy, Pandas, Seaborn, Matplotlib, Scikit-learn, TensorFlow, etc.), Bash Scripting in Linux (High-Performance Computing).

CAD/CAM/Simulation Skills: SolidWorks (3D CAD, Simulation), Mastercam (CAM, G-code generation), KiCad (PCB Design), Autodesk Fusion 360 (Simulation).

Other Software Skills: MS Excel (Pivot Tables, formulas, etc.), MS Power BI, SAP GUI, Adobe Photoshop, After Effects, Premiere Pro, MATLAB, LabVIEW.

Technical Writing: Author of 6 peer-reviewed publications with 43 total citations.

TRAINING EXPERIENCE

CFAN, TX: Undertook an in-depth plant tour at CFAN in San Marcos, TX, gaining insights into advanced aerospace fan blade manufacturing techniques and industry-leading production standards.

Toyota Motor Manufacturing, TX: Engaged in a comprehensive tour of Toyota's San Antonio facility, gaining valuable knowledge on innovative automotive manufacturing processes.

National Tubes Limited, Bangladesh: Practical knowledge gained on Annealing, Hot Dip Galvanizing process, and the production process of MS, GI, and API line pipes.

National Polymer Limited, Bangladesh: Practical knowledge gained on uPVC, PPR, CPVC production process.

AWARDS AND HONORS

- Graduate Merit Fellowship (Fall 2025, Spring 2025) at Texas State University.
- Featured Research Profile, "[*Intelligent Agriculture*](#)," TXST Hillviews Magazine (2026).
- Phi Kappa Phi and Alpha Chi National College Honor Society (Top 10% academic performance).
- Sole departmental nominee for presentation at TXST CoSE Advisory Board Meeting (2025).
- Full Tuition Waiver and OIC Scholarship at the Islamic University of Technology (IUT), Bangladesh.
- Bangladesh government scholarships for outstanding secondary and higher secondary performance.

CERTIFICATIONS, TRAININGS, AND ACTIVITIES

- HPC (High-Performance Computing) Summer Workshop 2024 by TXST CADS.
- AI/ML Education Series, Spring 2024, by TXST CADS.
- Applications for Data Science & AI by TXST CADS and Dept. of Agricultural Sciences
- Certified Supply Chain Analyst (CSCA), ISCEA, Training in demand forecasting, procurement, inventory management, and logistics optimization.
- Active Member of SAMPE (Society for the Advancement of Material and Process Engineering), IEEE.
- Volunteered as a Graduate Ambassador, assisting with student orientation, campus events, and incoming student support activities.