

MD HASIBUR RAHMAN

Certified TensorFlow Developer

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[LinkedIn](#) 

Introduction

Passionate Biosystems Engineer dedicated to integrating data-driven technologies into agriculture for enhanced food security and resource optimization. My research expertise lies in computer vision, machine learning, deep learning, and hyperspectral imaging, contributing to innovative solutions at the intersection of technology and agriculture.

Education

Ph.D. in Biosystems Engineering, Auburn University, Auburn, AL, 36849. Jan 2025 – Present

- I am pursuing my research for the development of smart systems for horticultural crops to streamline tasks and enhance production efficiency.*

M.Sc. in Biosystems Engineering, Auburn University, Auburn, AL, 36849. Jan 2023 – Dec 2024

- Thesis: High-throughput phenotyping applications in control and outdoor environments for stress tolerance analysis of kale and blueberries production.*

B.Sc. in Food Engineering, Bangladesh Agricultural University, Mymensingh, Bangladesh. Jan 2017 - Apr 2022

- Capstone Project: Application of NIR for classification and quality detection of Papaya.*

Awards

- Outstanding Master's Student Award**, Auburn University. Apr 2025
 - Awarded for outstanding master's student.
- AI Forum Graduate Student Poster Competition Winner** Apr 2025
 - Harnessing Data Science & AI for Collaborative Advances in Production Agriculture, Auburn University
- International Conference Travel Grant**, College of Agriculture, Auburn University. Mar 2025
- Presidential Graduate Research Fellowship**, Auburn University. Mar 2024
 - Awarded for outstanding incoming Ph.D. Student.
- Student Conference Travel Award, AG2PI** May 2024
 - Awarded for presenting research findings on *Transformer-Based Hyperspectral Image Analysis for Phenotyping Drought Tolerance in Blueberries* in ASABE AIM, 2024.

Publications

- Md Hasibur Rahman**, Savannah Busby, Sushan Ru, Sajid Hanif, Alvaro Sanz-Saez, Jingyi Zheng, Tanzeel U. Rehman (2025). "Transformer-Based Hyperspectral Image Analysis for Phenotyping Drought Tolerance in Blueberries". *Computer and electronics in Agriculture* 228, 109684.
- Md Hasibur Rahman**, Savannah Busby, Sajid Hanif, Md Mesbahul Maruf, Faraz Ahmad, Sushan Ru, Alvaro Sanz-Saez, Jingyi Zheng, Tanzeel U Rehman (2025). "A Graph Convolutional Network Approach for Hyperspectral Image Analysis of Blueberries Physiological Traits Under Drought Stress". *Smart Agricultural Technology*, 100743.
- Md Hasibur Rahman**, Emmanuel Ayipio, Dorcas Lukwesa, Jingyi Zheng, Daniel E. Wells, Tanzeel U Rehman. "Forecasting Plant Growth Patterns Dynamics in Controlled Environment Agriculture through Vision-Based Phenotyping and Time-Series Modeling". *Smart Agricultural Technology* (Under review).
- Afroz Toma, M., **Rahman, M. H.**, Rahman, M. S., Arif, M., Nazir, K. N. H., & Dufossé, L. (2023). Fungal Pigments: Carotenoids, Riboflavin, and Polyketides with Diverse Applications. *Journal of Fungi*, 9(4), 454.

Work Experience

Graduate Research Assistant, Smart Systems Lab, Auburn University

Jan 2023–Present

- Developing tools for smart horticultural systems.
- Developing data acquisition systems, processing pipeline, analysis.

Research Assistant, Bangladesh Agricultural University Research System

Jan 2022 –Apr 2022

- Evaluating the quality index of mangoes and papayas using computer vision.
- Developing models combining NIR spectral data and Image.

Internship, Data Science and Business Analytics, The Spark Foundation

Nov 2020 - Dec 2020

- Worked on both Supervised and Unsupervised machine learning.

Internship, BRAC Dairy and Food Project

Feb 2022 - Mar 2022

- Work with the quality assurance and production team
- Monitored production loss and quality control process.

Omdena Bangladesh Chapter Challenge, Open-source Contributor

Oct 2021 - Nov 2021

- Developing an AI-driven & Secure Online Marketplace.
- Build recommendation system and anomaly detector.

Research Experience

Transformer-Based Hyperspectral Image Analysis for Phenotyping Drought Tolerance in Blueberries (M.Sc. Thesis)

Jan 2023 – July 2024

- Designed and implemented a custom hyperspectral image acquisition platform to capture high-resolution spectral data of blueberries.
- Developed a Transformer-based model for predictive analysis using spectral reflectance data, focusing on plant drought tolerance phenotyping.
- Successfully addressed the multicollinearity issue inherent in spectral data, resulting in more robust and accurate predictions of plant physiological traits.

A Graph Convolutional Network approach for Hyperspectral Image Analysis of Blueberries Under Drought Stress (M.Sc. Thesis)

July 2024 – Aug 2024

- Developed a Graph Convolutional Network (GCN) model to analyze hyperspectral images of blueberries under drought stress.
- Demonstrated the model's effectiveness in predicting plant physiological properties with high accuracy and resilience to noise in the data.

A High-Throughput Phenotyping System Evaluating Salt Stress Tolerance in Kale Plants Cultivated in Aquaponics Environment (M.Sc. Thesis)

Jan 2023 – Aug 2024

- Designed and implemented a high-throughput phenotyping system to monitor and analyze the growth of kale plants exposed to four different levels of salt stress in an aquaponics environment.
- Developed a forecasting model to predict plant growth and optimize resource allocation, supporting decision-making in controlled environment agriculture (CEA) for improved yield and sustainability

Pyramid Feature Mixer for semantic segmentation

Nov 2021 – Feb 2022

- Developed a lightweight model for semantic segmentation using non-overlapping patch representation and a novel approach to replace the self-attention mechanism, reducing computational complexity.
- Designed the encoder with a multilevel CNN feature extractor, while the decoder incorporated ConvMixer layers arranged in a pyramidal hierarchy to efficiently generate segmentation masks.

Application of NIR for classification and quality detection of Papaya (B.Sc. Thesis)

Jan 2022 - Feb 2022

- Used NIR data to predict acidity, TSS, Vit-c, and lab value.
- Evaluated Chemometrics and machine learning approach.

Fungal Pigments: Polyketide with diverse applications.

Sep 2020 - Feb 2021

- Reviewed different pigments obtained from the diversified source of microbes.

- Developed surveillance drone for a competition.

Teaching and Mentoring

Mentor, First Year Experience (FYE) Peer Mentorship Program,
Graduate Student Council (GSC), Auburn University.

Aug 2023 - Dec 2023

- Officially assigned as a mentor by the GSC during the Fall 2023 season to support a new international graduate student (Ranveer Singh) in the Department of Biosystems Engineering.
- Assisted in helping the student transition smoothly into Auburn University's academic and cultural environment, providing guidance and support throughout the process.
- Shared insights from my first semester experience, including tips on managing coursework, balancing assistantship duties, and navigating Auburn's academic resources.

Mentor, Undergraduate research assistance, Smart Systems Lab,
Department of Biosystems Engineering, Auburn University.

Mar 2023 - Present

- Guided an undergraduate student (Carter Freeman) in learning new research concepts, methodologies, and techniques related to his research.
- Provided hands-on support in understanding and utilizing data collection tools, sensors, and software essential for his research project.
- Encouraged critical thinking and problem-solving skills to address challenges encountered during his research.

Grant Development

DSFAS: Leveraging Hyperspectral Imaging, Genomic Data, and Machine Learning to Expedite the Development of Drought-Tolerant Blueberries

- Assisted in proposal development and writing
- Collected and analyzed experimental data
- Developed imaging methodologies and machine learning models

PARTNERSHIP: Expanding Capabilities of AI-Driven Robotic Inventory Management and Quality Evaluation of Ornamental Nursery Crops

- Provided expertise in algorithm development and system integration
- Brainstormed ideas and procedures for the proposal
- Collaborated with cross-functional teams to enhance AI-driven protocols

Professional Presentation

Oral Presentation

1. Rahman, M. H. & Rehman, T. U. (2023). Assessing the salt stress tolerance of Kale plants grown in aquaponics system via spatial and spectral predictive regression models. *ASABE Annual International Meeting, Omaha, Nebraska USA. July 9-12, 2023.*
2. Rahman, M. H. & Rehman, T. U. (2024) A High-throughput Phenotyping System Evaluating Salt Stress Tolerance in Kale Plants Cultivated in Aquaponics Environments. *International Conference on Precision Agriculture Manhattan Conference Center, Manhattan, Kansas, USA, July 21-24. 2024*
3. Rahman, M. H. & Rehman, T. U. (2024). Drought Tolerance Assessment with Statistical and Deep Learning Models on Hyperspectral Images for High-throughput Plant Phenotyping. *International Conference on Precision Agriculture Manhattan Conference Center, Manhattan, Kansas, USA, July 21-24. 2024.*
4. Rahman, M. H. & Rehman, T. U. (2024). Assessing Drought Tolerance in plants with Statistical and Probabilistic Deep Learning Models on Hyperspectral Images for High-Throughput Plant Phenotyping. *American Society of Agricultural and Biological Engineers. Annual International Meeting Marriott Anaheim- Anaheim, CA. July 28-31, 2024*

Poster Presentation

1. Rahman, M. H. & Rehman, T. U. (2023). High-Throughput Phenotyping for Assessing Salt Stress Tolerance of Kale Plants Cultivated in Aquaponics. *Graduate Engineering Research Showcase, Auburn, Alabama, USA. October 12, 2023.*

Membership and Service

Member, American Society of Agricultural & Biological Engineers (ASABE). *Jan 2023 - Present*

Member, International Society of Precision Agriculture (ISPA). *Jan 2024 - Present*

Member, Alpha Epsilon Honor Society, Alabama Delta Beta Chapter. *Jan 2024 – Present*

Volunteer, 2024 Annual International Meeting, *July 28 - 31, 2024*

American Society of Agricultural & Biological Engineers (ASABE),

- Served as a hallway monitor, directing attendees to sessions and providing guidance throughout the venue
- Assisted at the membership booth, engaging with attendees and promoting ASABE membership benefits.
- Monitored the registration desk, managing check-ins and distributing event materials.
- Facilitated the Orange County Water District Facility Tour by managing tickets and attendee coordination.
- Supported the Career Fair by guiding participants and providing relevant information about career opportunities.

Volunteer, E-Day, Department of Biosystems Engineering, Auburn University *Feb 28 - 31, 2024*

- Engaged with visitors in BERL Multiuse #120, explaining the "why" and "how" of AI-driven solutions for challenges in modern agriculture.
- Highlighted the importance of leveraging AI to address sustainability challenges and improve agricultural efficiency.
- Encouraged prospective students to explore the potential of AI in solving complex agricultural problems.

Organizing Secretary, Bangladesh Student Organization, Auburn University. *Aug 2023- Aug 2024*

- Event planning.
- Logistics management.

Campus Ambassador, English Olympiad *Jan 2018 – Dec 2019*

- Co-ordinated teams from 40 educational institutes.
- Arranging competition.

IT and Documentation Secretary, Food Engineering Club, BAU *Jan 2018 – Dec 2019*

- Lead 2 national level competition.
- Arranged more than 20 workshops and seminars.

General Member, Volunteer for Bangladesh *Jan 2018 – Jan 2019*

- Fundraising for unprivileged children.
- Several social activities and awareness problems.

Skills

- Experience with data pre-processing and cleaning
- Optimization techniques
- Machine learning algorithms
- Hyperspectral Imaging

- TensorFlow and PyTorch
- Cloud computing (Azure)
- Time series analysis
- Computer vision
- Project management
- Strong communication skills
- Computer Programming
- Storyteller

Certifications

TensorFlow Developer Certificate from TensorFlow

July 2021