

# Mohammad Saif

I am a Ph.D. candidate in Imaging Science, dedicated to applying advanced imaging techniques to solve complex scientific problems. My research focuses on developing innovative imaging spectroscopy and structural algorithms, in this case using unmanned aerial systems (UAS) to collect data for agriculture as a proxy application area.

## Education

**Ph.D. in Imaging Science** / Rochester Institute of Technology, Rochester, NY

/ AUG 2020 – MAY 2025

Advisor: Dr. Jan van Aardt

/ CGPA: 3.87/4

**Research focus:** Advancing the capabilities of Unmanned Aerial Systems for Precision Agriculture: A focus on the utility of multispectral and hyperspectral imaging technologies to predict table beet root yield and assess disease severity. This research analyses the potential of UAS technology in enhancing crop management practices.

**Courses:** Radiometry, Image Processing and Computer Vision, Deep Learning for Vision, Advanced Environmental Applications in Remote Sensing, Spectral Image Analysis, Probability, noise and system modeling, Fourier methods for imaging, Applied Statistics

**Bachelor of Science in Electrical and Electronic Engineering** /

Bangladesh University of Engineering and Technology, Dhaka, Bangladesh

/ FEB 2013 – SEP 2017

**Notable projects:** Detection of Anemia from Anterior Conjunctiva of the eye by image processing and thresholding

/ CGPA: 3.31/4

## Skills

**Remote Sensing:** Radiative transfer modeling, atmospheric compensation (ELM, AARR), geometric correction, minimum noise fraction denoising, SMILE and keystone characterization of hyperspectral imagers

**Software and Tools:** QGIS, ENVI, Cloud Compare, LSTools, Pix4D

**Programming Languages:** Python, Matlab, IDL, R, VBA

**Python Libraries:** PyTorch, numPy, seaborn, scikit-learn, openCV, scipy, geopandas, rasterio, rioxarray, GDAL, spectral python.

**Image Processing:** Image stitching, corner detection, homographies, automatic image registration

**Machine learning:** Random forest, xgboost, SVM, gaussian process, CNN, transfer learning, generative adversarial network

## Experience

**Graduate Research Assistant/Rochester Institute of Technology, Rochester, NY**

/ JUNE 2021 - PRESENT

- Conducted research on the use of Unmanned Aerial Systems (UAS) to predict agricultural parameters in a project funded by the National Science Foundation (NSF), Love Beets USA, the New York Farm Viability Institute (NYFVI), and the United States Department of Agriculture (USDA).
- Planned UAS flights, collected multispectral and hyperspectral images in addition to LiDAR data, and processed them using tools such as Envi, QGIS, LSTools, and Pix4D.
- Utilized machine learning solutions to predict the yield of table beets and assess the severity of leaf spot diseases as well as compare its performance across various imaging systems.

**Graduate Teaching Assistant/Rochester Institute of Technology, Rochester, NY**

- Course: Advanced Environmental Applications in Remote Sensing.  
Topics: Spectral image analysis techniques, UAS hyperspectral image processing
- Course: Image processing for Computer Vision.  
Topics: ISP, CFA demosaicking, digital watermarking, automatic Image Registration, color balancing, image reconstruction, image and video compression, and morphological operations.

/ JAN 2025 – MAY 2025

/ JAN 2021 – MAY 2021

**Assistant Engineer/Energypac Engineering Ltd., Gazipur, Bangladesh**

/ FEB 2018 – DEC 2020

- Performed routine and special tests, in compliance with IEC/ANSI standards, on factory and onsite inoperative transformers (rated up to 150 MVA), which includes handling equipment capable of generating up to 16 million volts.
- Pioneered the establishment of the calibration laboratory while maintaining the calibration status of all the equipment in the factory.

## Journals / Conferences

- Saif, M.S.,** Chancia, P., Murphy, S.P., Pethybridge, S. and van Aardt, J., 2025. Comparison of UAS LiDAR, Hyperspectral and Multispectral Images for the multisession estimation of Table Beet Root Yield. (*Manuscript under preparation*).
- Saif, M.S.,** Chancia, R., Sharma, P., Murphy, S.P., Pethybridge, S. and van Aardt, J., 2024. Estimation of *Cercospora* Leaf Spot Disease Severity in Table Beets from UAS Multispectral Images. (*Under review, second round in Computer and Electronics in Agriculture*).
- Saif, M.S.,** Chancia, R., Pethybridge, S., Murphy, S.P., Hassanzadeh, A. and van Aardt, J., 2023. Forecasting Table Beet Root Yield Using Spectral and Textural Features from Hyperspectral UAS Imagery. *Remote Sensing*, 15(3), p.794.
- Saif, M.S.,** Chancia, P., Murphy, S.P., Pethybridge, S. and van Aardt, J., 2024. Assessing Multiseason Table Beet Root Yield from Unmanned Aerial Systems. *AGU 2024*.
- Saif, M.S.,** Chancia, R., Sharma, P., Murphy, S.P., Pethybridge, S. and van Aardt, J., 2024, May. Agricultural Disease Management: Estimation of *Cercospora* Leaf Spot Severity in Table Beets using UAS. *Stratus conference 2024*.
- Saif, M.S.,** Chancia, R., Pethybridge, S., Murphy, S.P., Hassanzadeh, A. and van Aardt, J., 2023, May. Predicting Table Beet Root Yield via UAS-based Hyperspectral Imagery. *Stratus conference 2023*
- Tamir, A., Jahan, C.S., **Saif, M.S.,** Zaman, S.U., Islam, M.M., Khan, A.I., Fattah, S.A. and Shahnaz, C., 2017, December. Detection of anemia from image of the anterior conjunctiva of the eye by image processing and thresholding. In *2017 IEEE Region 10 Humanitarian Technology Conference (R10-HTC)* (pp. 697-701). IEEE.