

# MD ASRAKUL HAQUE

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## EDUCATIONAL QUALIFICATIONS

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**(Sep 2025- In progress)**

**PhD student in Biological and Agricultural Engineering department**

University of California, Davis

Major: Biosystems Engineering

Current research:

1. Safety assessment protocol establishment for Autonomous vehicle (Not yet funded)
2. Project: Evaluation of Alternative Flares for Traffic Management  
Funded by: Caltrans

**(Mar 2022- Aug 2024)**

**Master of Science in Bio-production Machinery Engineering**

Chungnam National University, Daejeon, Republic of Korea

Major: Bio-production Machinery Engineering

GPA: 4.43 out of 4.50

***Thesis: "Ground-based Proximal Sensing of Rice and Wheat Growth for Fertilizer Recommendation"***

**(Jan 2016– Dec 2019)**

**Bachelor of Science in Agricultural Engineering**

Hajee Mohammad Danesh Science and Technology University, Bangladesh

Major: Agricultural Engineering

GPA: 3.19 out of 4.00

***Thesis: "A Real-Time Monitoring of Rice Field Condition Using Wireless Sensor Network"***

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## RESEARCH INTERESTS

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- GIS and remote sensing, Ground, UAV and satellite-based remote sensing, Spatial analytics,
  - Artificial intelligence in agriculture and Livestock
  - Plant factory, Controlled Environment Agriculture (CEA), Vertical farming, Plant phenotyping
  - Precision agriculture, Spray monitoring, Precision spray technology, Variable rate application
  - Machine learning, Deep learning approaches in disease detection and animal behavior monitoring
  - Agricultural robotics, Autonomous vehicle, Ag safety
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## PROFESSIONAL DEVELOPMENT

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### **Involvement in Professional and Social Societies (Membership)**

- Bangladesh Graduate Student Association (Treasurer)
- American Society of Agricultural and Biological Engineers (Member)
- Korean Society of Precision Agriculture (Member)
- Korean Society of Agricultural Machinery (Member)

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## RESEARCH PROJECT EXPERIENCES

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- 1. Safety assessment protocol establishment for Autonomous vehicle. (Not funded)**
    - Working field: Agricultural robotic safety
  - 2. Evaluation of Alternative Flares for Traffic Management (In progress)**
    - Identification and evaluation of alternative flare products or strategies for moving lane closures
  - 3. Research on nutrient diagnosis and additional fertilizer requirements for major crops based on drone images. (Project Duration: 2022.04.01 — 2024.12.31)**
    - UAV image-based nutrient diagnosis and supplementary fertilization recommendation.
    - Proximal sensing and mapping. Application of GIS software, ArcGIS, QGIS.
  - 4. Domestic production of high-precision soil sensing core technology. (Project Duration: 2022.04.01 — 2024.12.31)**
    - Soil sensor information utilization scenario demonstration, spatial analysis and mapping
  - 5. Big data-based smart seedling standardization technology development and demonstration. (Project Duration: 2022.01.01 — 2024.12.31)**
    - Development of an AI model for predicting growth, detecting disease for the prevention of seedlings.
    - Advancement and accuracy improvement of the AI model for predicting the growth of 6 vegetable seedlings (Lettuce, pakchoi, tomato, pepper, cucumber and watermelon)
  - 6. Development of livestock revitalization robots. (Project Duration: 2021.01.01 — 2024.12.31)**
    - Developed an AI system for real-time livestock health monitoring and early disease detection
    - Developed a big data platform integrating health data to enhance animal welfare
    - Used machine learning to boost farm productivity by predicting health issues
    - Enabled AI-powered decisions for sustainable, profitable livestock management
  - 7. Development of low-cost LiDAR sensor technology for autonomous driving applications to the agricultural operation environment. (Project Duration: 2021.01.01 — 2024.12.31)**
    - Development of test evaluation criteria and technology for work environment and object recognition  
LiDAR performance evaluation index
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## TEACHING ASSISTANTSHIP

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1. Precision agriculture machinery engineering (*Fall Semester/2023: 05/09/2023 —30/12/2023*)
2. Machine Learning for smart farming technology (*Spring semester/2023: 01/03/2023 —30/07/2023*)
3. Artificial Intelligence for Smart Agricultural Production Engineering. (*Spring semester/2023: 01/03/2023 —30/07/2023*)

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## ENGLISH PROFICIENCY TEST SCORE

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1. IELTS (Academic): **6.5** (Listening 8, Reading 6, Speaking 6, Writing 5.5)
2. Duolingo: **125** (Literacy 130, Comprehension 135, Conversation 120, Production 95)
3. GRE: **287** (Verbal Reasoning [138], Quantitative Reasoning [149], Analytical Writing [3.5])

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## JOURNAL PUBLICATIONS

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1. Khorsandi F. and **Haque M.A.** Bridging the Gap Between Safety Standards and Regulation for Autonomous Agricultural Vehicles: Lessons from California and ISO 18497. (ASABE 2026 Annual International Meeting) (**Under review**)
  2. **Haque, M. A.**; Reza, M. N.; Karim, M. R.; Ali, M. R.; Samsuzzaman; Lee, K.; Khang, Y. H.; Chung, S. O. Geometric Alignment Improves Wheat NDVI Calculation from Ground-based Multispectral Images. (*remote sensing, Q1, IF: 4.2*) (**2025**)
  3. Karim, M. R.; **Haque, M. A.**; Ahmed, S.; Reza, M. N.; Lee, K.; Khang, Y. H.; Chung, S. O. Effects of Data Collection Speed and Height on Active and Passive Proximal Canopy Reflectance Sensor Data for Rice Vegetation Index (NDVI) Calculation. (*agronomy, Q1, IF: 3.3*) (**2025**)
  4. Ali, M., Karim, M. R., Kabir, M. S., **Haque, M. A.**, Lee, K. H., & Chung, S. O. (2025). Recognition of pepper plant and ridge characteristics using an ultrasonic sensor for smart upland crop production. (*Journal of Agricultural Engineering, Q2, IF: 2.5*) (**2025**)
  5. Reza, M. N.; Lee, K. H.; Karim, M. R.; **Haque, M. A.**; Bicamumakuba, E.; Dey, P. K.; Jang, Y. Y.; Chung, S. O. Trends of Soil and Solution Nutrient Sensing for Open Field and Facilitated Smart Agriculture. (*sensors, Q1, IF: 3.4*) (**2025**)
  6. Ali, M. R., Reza, M. N., Lee, K. H., Samsuzzaman, Habineza, E., **Haque, M. A.**, Kang, B.S., and Chung, S. O. Operating Speed Analysis of a 1.54 kW Walking-Type One-Row Cam-Follower-Type Cabbage Transplanter for Biodegradable Seedling Pots. (*Agriculture, Q1, IF: 3.6*) (**2025**)
  7. Reza, M. N.; Ali, M. R.; **Haque, M. A.**; Jin, H.; Kyoung, H.; Choi, Y. K.; Kim, G.; Chung, S. O. Instance Segmentation and Automated Pig Posture Recognition for Smart Health Management. (*Journal of Animal Science and Technology, Q1, IF: 2.7*) (**2025**)
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8. Reza, M. N.; Ali, M. R.; **Haque, M. A.**; Jin, H.; Kyoung, H.; Choi, Y. K.; Kim, G.; Chung, S. O. A Review of Sound-based Pig Monitoring for Enhanced Precision Production. (*Journal of Animal Science and Technology*, Q1, IF: 2.7) (2025)
  9. **Haque, M. A.**; Reza, M. N.; Ali, M.; Karim, M. R.; Ahmed, S.; Lee, K. D.; Khang, Y. H.; Chung, S. O. Effects of Environmental Conditions on Vegetation Indices from Multispectral Images: A Review. (*Korean Journal of Remote Sensing*, Scopus, IF: 0.97) (2024)
  10. Gulandaz, M. A.; Kabir, M. S.; Kabir, M. S. N.; Ali, M.; Reza, M. N.; **Haque, M. A.**; Chung, S. O. Layout of suspension-type small-sized dehumidifiers affects humidity variability and energy consumption in greenhouses. (*Horticultrae*, Q1, IF:3.1) (2024)
  11. Ali, M.; **Haque, M. A.**; Ali, M. R.; Rahman, M. A.; Jin, H.; Jang, Y. Y.; Chung, S. O. Spatial, Vertical, Temporal Soil Water Content Variability Affected by Drip Irrigation Pressure in Sandy Loam Soil: A Soil Bin Experimental Study. (*Agronomy*, Q1, IF: 3.3) (2024)
  12. Ali, M.; **Haque, M. A.**; Rahman, M. A.; Moon, J.; Kim, H.; Chung, S. O. Mechanization trends of cabbage harvesting practices: A review. (*Precision Agriculture Science and Technology*, KCI, IF: 0.567). (2024)
  13. Karim, M. R.; Reza, M. N.; Jin, H.; **Haque, M. A.**; Lee, K. H.; Sung, J.; Chung, S. O. Application of LiDAR Sensor for Crop and Working Environment Recognition in Agriculture: A review. (*Remote Sensing*, Q1, IF: 4.2) (2024)
  14. Samsuzzaman, Reza, M. N.; Islam, S.; Lee, K.; **Haque, M. A.**; Ali, M. R.; Cho, Y. J.; Noh, D. H.; Chung, S. O. Image Features and Support Vector Machine to Automate Seedling Boundary Contour Determination and Segmentation from Background for Controlled Seedling Production. (*Agronomy*, Q1, IF: 3.1). (2024)
  15. Habineza, E.; Reza, M. N.; Bicamumakuba, E.; **Haque, M. A.**; Park, S. H.; Lee, D. H.; Chung, S. O.; Lee, Y. S. Pepper transplanting mechanisms and kinematic simulation analysis. (*Precision Agriculture Science and Technology*, KCI, IF: 0.567) (2024)
  16. Ali, M. R.; Reza, M. N.; Samsuzzaman; Habineza, E.; **Haque, M. A.**; Kang B. S.; Chung, S. O. Kinematic Analysis of a Cam-follower Double-parallel Hopper-type Transplanting Mechanism for a 1.54-kW Walking-type 1-row Biodegradable Potted Cabbage Transplanter. (*machines*, Q1, IF: 2.1) (2024)
  17. Ali, M.; Ali, M. R.; Gulandaz, M. A.; **Haque, M. A.**; Kabir, M. S.; Chung, S. O. Development of a sandy soil water content monitoring system for greenhouses using Internet of Things. (*Precision Agriculture Science and Technology*, KCI, IF: 0.567) (2023)
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## CONFERENCE PRESENTATIONS (International)

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1. The 6<sup>th</sup> CIGR International Conference 2024| Jeju, South Korea
2. 10th Asian-Australasian Conference on Precision Agriculture, 2023 | Putrajaya, Malaysia  
**Award: Best Poster Presenter**
3. The 10th International Symposium on Machinery and Mechatronics for Agriculture and Biosystems Engineering, 2022| Kaohsiung, Taiwan

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## CONFERENCE PRESENTATIONS (Domestic)

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1. Korean Society of Precision Agricultural (KSPA) Fall Conference, 2024| Busan, South Korea
2. Korean Society for Agricultural Machinery (KSAM) Conference Fall, 2024| Daegu, South Korea
3. Korean Society of Precision Agricultural (KSPA) Spring Conference, 2024| Daegu, South Korea
4. Korean Society for Agricultural Machinery (KSAM) Conference Fall, 2023| Yeosu, South Korea
5. Korean Society for Agricultural Machinery (KSAM) Conference Spring, 2023| Daejeon, South Korea

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## HONORS AND AWARDS

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1. Best Paper Presenter | 2024 | Korean Society of Precision Agriculture (KSPA), Fall Conference
2. University Project TA Working Scholarship | 2024 | Green Bio Innovation Convergence University Business Group, South Korea
3. Excellent Researcher | 2024 | College of Agriculture and Life Sciences, Chungnam National University
4. Best Poster Presenter | 2023 | 10th Asian-Australasian Conference on Precision Agriculture (ACPA 10), University Putra Malaysia

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## PROFESSIONAL SKILLS

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### Hardware

- MicaSense Rededge, Crop-circle (ACS-435, 430, Phenom)
- Dynamic sensing: Vibration sensor, Inclination sensor
- LiDAR (Velodyne -100), DHT sensor, Soil moisture sensor
- Camera: Thermal, Depth, and RGB camera
- GPS: Topcon Hiper VR, U-blox, Hemisphere-100
- UAV: Mavic DJI 300 RTK, Mavic 2 zoom
- Microcontroller: Raspberry Pi, Arduino UNO

### Software

- Programming language: Python
- Modelling: COMSOL
- Control: MPC
- UAV data processing: Pix4D, Python
- Mapping: ArcGIS, QGIS, Surfer, GS+
- LiDAR Data acquisition: Veloview
- Vibration data acquisition: Labview
- Computational Learning: ANN, CNN, PCA, YOLOv and SVM

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## REFERENCES

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