

Dr. Mrutyunjay Padhiary

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PROFILE

Agricultural engineer and researcher specializing in precision agriculture, agricultural robotics, and AI/ML-driven farm automation. Completed PhD at Assam University on the design and development of an autonomous all-terrain precision agriculture vehicle (PAVAT), integrating electric drivetrains, RTK-based navigation, CFD-optimized spraying systems, and modular smart-farming attachments. Author of over 70 peer-reviewed publications, book chapters, and reviews spanning Elsevier, Springer, and IGI Global venues, with sustained editorial and peer-review contributions across agricultural engineering, AI/ML, and precision-agriculture journals.

ALMA MATERS

Indian Institute of Technology, Kharagpur
Orissa University of Agriculture & Technology
National University of Singapore, Singapore
Assam University, Silchar, India

ACADEMIC & RESEARCH POSITIONS

Assistant Professor, Department of Agricultural Engineering

Triguna Sen School of Technology, Assam University, Silchar, India

Research Experience

- Faculty of Technology, Uttar Banga Krishi Viswavidyalaya (UBKV), West Bengal, India — teaching and research
- Tribhuvan University, Nepal — teaching and research collaboration
- IIT Kharagpur — research experience in agricultural and food engineering
- National University of Singapore (NUS), Department of Civil & Environmental Engineering — Research Scholar, International NUS Research Fellowship

RESEARCH INTERESTS

Precision agriculture and agricultural robotics · Autonomous all-terrain farm vehicles · AI/ML and computer vision for agriculture · IoT-based sensing and smart farming · 3D printing for agricultural machinery design · Renewable energy integration in agriculture (agrivoltaics, green hydrogen) · Systematic reviews and bibliometric analysis in agricultural technology.

SELECTED PUBLICATIONS

- Padhiary, M.**, Saha, D., & Kumar, K. (2026). Artificial intelligence and machine learning for automated drying of fruits and vegetables. *Food and Humanity*, 7, 101445. <https://doi.org/10.1016/j.foohum.2026.101445> (**IF-3.5**)
- Borah, S. K., **Padhiary, M.**, Sethi, L. N., Kumar, A., & Saikia, P. (2025). Precision Farming with Drone Sprayers: A Review of Auto Navigation and Vision-Based Optimization. *Journal of Biosystems Engineering*. <https://doi.org/10.1007/s42853-025-00263-2> (**IF-2.9**)
- Hoque, A., Roy, S., **Padhiary, M.**, Prasad, G., Swain, B., Saikia, P., & Saha, D. (2025). Integrating remote sensing and AI in smart greenhouse solar dryers: Enhancing efficiency, traceability, and sustainability in the drying of fruits and spices. *Journal of Agriculture and Food Research*, 23, 102310. <https://doi.org/10.1016/j.jafr.2025.102310> (**IF-7.2**)
- Hoque, A., Sethi, L. N., & **Padhiary, M.** (2025). Systematic Review on Refractance Window Drying for Preserving Heat Sensitive Agricultural Products. *Journal of Food Process Engineering*, 48(11), e70239. <https://doi.org/10.1111/jfpe.70239> (**IF-3.5**)
- Padhiary, M.**, Tikute, S. V., Saha, D., Barbhuiya, J. A., & Sethi, L. N. (2025). Development of an IOT-Based Semi-Autonomous Vehicle Sprayer. *Agricultural Research*, 14(1), 229–239. <https://doi.org/10.1007/s40003-024-00760-4> (**IF-1.8**)

6. Saha, D., **Padhiary, M.**, & Chandrakar, N. (2025). AI vision and machine learning for enhanced automation in food industry: A systematic review. *Food and Humanity*, 4, 100587. <https://doi.org/10.1016/j.foohum.2025.100587> (**IF-3.5**)
7. Saha, D., **Padhiary, M.**, Hoque, A., & Prasad, G. (2025). 3D printing technology for valorization of food processing wastes and byproducts: A systematic review. *Waste Management Bulletin*, 3(4), 100192. <https://doi.org/10.1016/j.wmb.2025.100192> (**IF-7.4**)
8. **Padhiary, M.**, Barbhuiya, J. A., Roy, D., & Roy, P. (2024). 3D printing applications in smart farming and food processing. *Smart Agricultural Technology*, 9, 100553. <https://doi.org/10.1016/j.atech.2024.100553> (**IF-7.1**)
9. **Padhiary, M.**, Saha, D., Kumar, R., Sethi, L. N., & Kumar, A. (2024). Enhancing precision agriculture: A comprehensive review of machine learning and AI vision applications in all-terrain vehicle for farm automation. *Smart Agricultural Technology*, 8, 100483. <https://doi.org/10.1016/j.atech.2024.100483> (**IF-7.1**)
10. Goyal, N., **Padhiary, M.**, Karimi, I. A., & Zhou, Z. (2015). Flux measurements and maintenance energy for carbon dioxide utilization by *Methanococcus maripaludis*. *Microbial Cell Factories*, 14(1) (**IF-6.7**)

DOCTORAL RESEARCH HIGHLIGHTS — PAVAT

- Six-wheeled electric all-terrain vehicle platform with cable-pulley steering, BLDC hub motors, and independent suspension
- RTK-based autonomous navigation and ANSYS FEA structural validation of the chassis
- CFD-optimized air-assisted turret sprayer with a techno-economic benefit-cost ratio of approximately 1.94
- Modular attachments: depth-controlled weeder, vision/sonar-assisted selective sprayer, and 4-DOF harvesting arm

EDITORIAL & PEER-REVIEW CONTRIBUTIONS

Associate Editor

Frontiers in Sustainable Food Systems

Frontiers in Artificial Intelligence

Frontiers in Insect Science

Editorial Board Member

Lat/A

Active peer reviewer for journals in agricultural engineering, AI/ML, and precision agriculture, covering manuscripts on sliding mode control for agricultural path tracking, fuzzy logic crop-chamber systems, IoT-based rubber tapping machines, AI in precision agriculture and horticulture, agrivoltaics, smart irrigation, hydrokinetic turbines, food-drying AI/ML, blockchain and ML in agriculture, nanotechnology in agriculture, and bibliometric/systematic reviews.

STUDENT SUPERVISION & MENTORSHIP

Supervises B.Tech and M.Tech students in the Department of Agricultural Engineering, Assam University, including project work on multilingual smart-farming assistant systems. Provides ongoing mentorship, recommendation, and testimonial support for former students.

AWARDS & FELLOWSHIPS

- International NUS Research Fellowship, National University of Singapore
- **GATE** (Graduate Aptitude Test in Engineering): **AIR-1**

TECHNICAL SKILLS

CAD & simulation: SolidWorks/ANSYS FEA, CFD analysis · Programming: Python (Raspberry Pi image processing) · Data analysis: R (meta-analysis, PRISMA systematic reviews) · Domain tools: RTK-GNSS navigation systems, IoT sensing platforms, 3D printing for machine design.