

Tharang

Quarterly Newsletter

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Amrita WNA Showcases Work at ICSRF 2025

The Amrita Center for Wireless Networks & Applications (AmritaWNA) actively participated in the International Conference on Sustainable & Resilient Futures (ICSRF 2025), a landmark event centered on the theme “Experiential Learning, Inclusiveness, & Sustainable Innovations.” Hosted by Amrita’s UNESCO Chair on Experiential Learning for Sustainable Innovation and Development, the School for Sustainable Futures, and the SustIN Network, the four-day conference brought together a diverse community of researchers, scientists, policymakers, civil society organizations, and industry leaders to co-create actionable pathways for global sustainability. Dr. Maneesha V. Ramesh, Director AmritaWNA delivers welcome address on the inaugural function. Dr. Rahul Krishnan, Assistant Professor, AmritaWNA delivers a keynote on Meeting Challenges of Global Health: Technology and The event, which united over 700 participants and 80 distinguished speakers from across the world, stands out as India’s first carbon-neutral academic conference. Through its inclusive and experiential approach, ICSRF 2025 fostered meaningful dialogue and collaboration aimed at building resilient and sustainable futures.



“The light of love and selflessness dispel the darkness of selfishness, hatred, and conflict. May goodness blossom as a beautiful new sunrise. May peace and happiness prevail every where.”

Sri. Mata Amritanandamayi Devi,
 Chancellor, Amrita Vishwa Vidyapeetham



Events & Activities

Discovering the Vibrant Beat of Our Research Community Through an Overview of Our Events and Endeavors.

Celebrating Excellence: Amrita's 28th Graduation Day

Amrita Vishwa Vidyapeetham recently held its 28th graduation ceremony at the Amritapuri campus, marking a proud milestone for its graduating students. From the Amrita Center for Wireless Networks and Applications (AmritaWNA), two scholars — Dr. Anjana M.S. and Dr. Meenu L. — were awarded PhDs. In addition, 22 students successfully completed their M.Tech degrees across three specialized programs. Also Dr. Harichandana, research Associate awarded PhD from Amrita School of Sustainable futures. The program was held on 14 Aug 2025. The ceremony commenced with the welcome address by Dr. Bipin Nair, Dean of the Amrita School for Life Sciences, followed by the benedictory address of Swami Poornamritananda Puri, General Secretary of the Mata Amritanandamayi Math. Dr. Chandrabhas Narayana, Director of the Rajiv Gandhi Centre for Biotechnology, graced the occasion as a distinguished guest. Delivering the keynote address, Dr. Sridhar Vembu, founder of Zoho Corporation, encouraged students to master technology and cultivate keen observational skills that empower them to answer all questions of life. In a video message, Mata Amritanandamayi Devi, Chancellor of Amrita Vishwa Vidyapeetham, highlighted the importance of applying acquired knowledge in real life, emphasizing that love, compassion, and social commitment will guide the world toward peace.



FAREWELL 2025

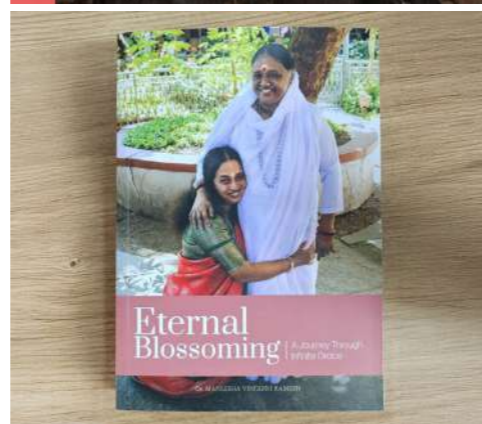
The staff and students of the Amrita Center for Wireless Networks and Applications (AmritaWNA) came together to organize a heartfelt farewell ceremony for the outgoing M.Tech batch. The event was marked by the distribution of awards and certificates, recognizing students for their academic excellence and contributions through publications. Winners of the earlier M.Tech project presentation competition from all three programs were also honored during the ceremony. During the ceremony, the graduating M.Tech students shared their experiences at Amrita, expressing how their journey at the institution helped them transform into well-rounded individuals. They thanked Amrita for providing them with exceptional learning, academic excellence, and numerous opportunities that shaped their careers. In addition to the formalities, the first-year M.Tech students, along with the staff, showcased their talents through various cultural performances, adding a lively and entertaining aspect to the program. The farewell event concluded with a fun-filled gaming session, followed by a celebratory cake-cutting, creating a memorable send-off for the graduates as they embark on the next chapter of their careers.



Amma’s 72nd Birthday: AmritaWNA Engages in Seva Activities

The 72nd birthday of Satguru Sri Mata Amritanandamayi Devi (Amma) was celebrated with profound devotion and unity at Amritapuri, drawing lakhs of devotees and well-wishers from across India and around the world. The atmosphere was marked by prayer, service, and spiritual harmony as thousands gathered at the Ashram to offer their reverence and devotion. Staff and students of Amrita WNA actively participated in various seva activities during the celebrations, contributing wholeheartedly to the smooth conduct of the event and embodying the spirit of selfless service inspired by Amma.

The official programme was inaugurated by Union Health Minister and BJP National President Shri J. P. Nadda, who lauded Amma’s tireless commitment to compassion, humanitarian service, and social transformation. As part of the celebrations, Amma released new publications authored by Ashram writers and spiritual scholars. Among them was the book “*One Health, One Heart: Amalabharatham Campaign*”, authored by Dr. Maneesha V. Ramesh, which documents the Amalabharatham cleanup drives conducted by Amrita across various locations, highlighting the collective effort toward environmental cleanliness and public health. Amma also released the book “*Eternal Blossoming: A Journey Through Infinite Grace*”, which beautifully describes Dr. Maneesha Amma’s personal spiritual experiences and journey with Amma, offering deep reflections on grace, compassion, and inner transformation.



One World, One Heart : Exhibition on Amritavarsham 72

As part of the 72nd Birthday Celebrations of Sadguru Sri Mata Amritanandamayi Devi (Amma), the “One World, One Heart” Exhibition was inaugurated at Amrita Vishwa Vidyapeetham, Amritapuri Campus. The exhibition highlighted global humanitarian, environmental, and technological initiatives inspired by Amma’s vision of compassion and sustainable living.

At the exhibition, the Amrita Center for Wireless Networks and Applications (Amrita WNA) showcased its multidisciplinary research spanning disaster management, healthcare, and AR & VR technologies. A major highlight was the Landslide Model, demonstrating Amrita WNA’s real-time monitoring system for disaster risk mitigation in vulnerable regions. Visitors, including students and faculty from Amrita and nearby institutions, were particularly drawn to the Mixed Reality (MR) experience, where they interacted with immersive historical architecture and medical anatomy models, offering a unique fusion of technology and learning.

In the healthcare segment, AMRITA SPANDANAM, a low-cost, low-power ECG wearable for remote cardiac care, attracted wide interest. The 5-in-1 health monitoring device for diabetes and cardiac health tracking also drew attention for its compact and efficient design for underserved communities. The exhibition further featured OceanNet, providing low-cost internet connectivity for fishermen at sea, along with demonstrations of green hydrogen production from seawater, underscoring Amrita’s commitment to sustainability. Antenna prototypes developed at the Amrita Tharang Lab were also exhibited, highlighting advancements in wireless and communication technologies.



PUBLISHED Q1 JOURNALS

Velayudhan, Nibi Kulangara, Aryadevi Remanidevi Devidas, and Dragan Savić. “Generative AI for Spatio-temporal Multivariate Imputation and Demand Prediction in Water Distribution Systems.” *Results in Engineering* (2025): 106178.

Jayaprakash, Divya Saraswathy, Aryadevi Remanidevi Devidas, and Maneesha Vinodini Ramesh. “Leveraging digital twin for COVID-19 risk assessment in IoT-enhanced hospital pharmacies.” *Journal of Safety Science and Resilience* (2025): 100246.

Vinodini Ramesh, Maneesha, Hari Chandana Ekkirala, Balmukund Singh, Nitin Kumar M, Sabari Ramesh, Aadityan Sridharan, Nirmala Vasudevan, and Sudesh Kumar Wadhawan. “Mundakkai-Chooralmala landslide: assessment of initiation, progression, and impact.” *Scientific Reports* 15, no. 1 (2025): 26961.

Krishna, Sruthi, Shruthy S. Stancilas, Suganthi Salem Srinivasan, and Dehannathparambil Kottarathil Vijayakumar. “Enhancing Breast Cancer Diagnosis With Attention Branch Network and Thermographic Imaging.” *International Journal of Imaging Systems and Technology* 35, no. 5 (2025): e70195.(Q2)

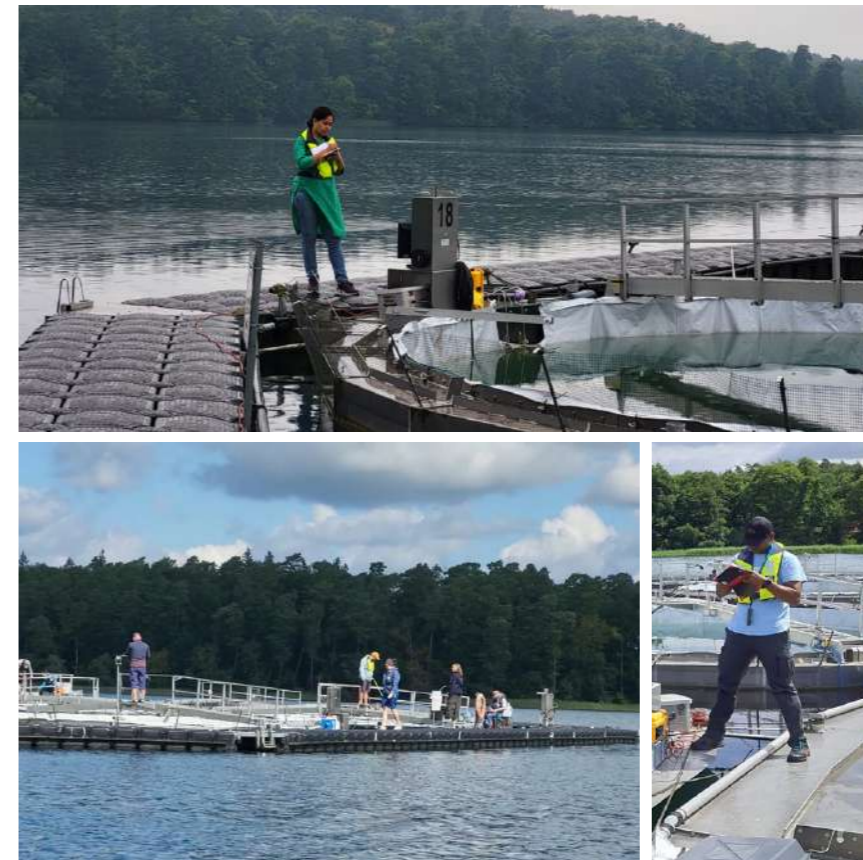
New Beginnings: AmritaWNA Welcomes the M.Tech Batch

Our center welcomed new students for the three M.Tech programs—Geoinformatics and Earth Observation, Biomedical Instrumentation and AI for Health, and Wireless Networks and Applications on August with an induction program. The event aimed to introduce the curriculum and research opportunities at the center and provide a warm welcome to the incoming batch. Faculty members, staff, and current students joined to greet the newcomers. Prof. Sethuraman Rao, Prof. Balaji Hariharan, Dr. Alka Singh, Dr. Dhanya M., and Dr. Aiswarya S. introduced the M.Tech programs, emphasizing the scope and interdisciplinary nature of the curriculum. Dr. Meenu L led an insightful session on dissertation work, outlining key expectations

and timelines for students research. As part of the induction, the students were taken on a lab tour to familiarize themselves with the cutting-edge research facilities at AmritaWNA. Anjana M. S. and Divya S. J. presented the Intelligent Infrastructure Lab, explaining its projects and real-world deployments. Dr. Sabari Ramesh guided the students through the Landslide Laboratory, discussing the Landslide Early Warning System and its significance in disaster management. Former M.Tech students of the center and Ph.D. scholars also shared their experiences, highlighting the strong faculty support and the vibrant research ecosystem that offers ample opportunities for growth and collaboration.



Research Visit to Leibniz Institute of Freshwater Ecology, Germany



Dr. Alka Singh Assistant Professor and PhD Scholar Rajarajan V visited the Leibniz Institute of Freshwater Ecology and Inland Fisheries (IGB) in Stechlin, Germany, from July to August 2025. The visit was part of the joint project between AmritaWNA and IGB's Department of Plankton and Microbial Ecology, led by Prof. Mark Gessner, titled "Merging Approaches to Improve Estimates of Methane Emissions from Wetlands." The international mobility was supported by the DST-DAAD Project-based Personnel Exchange Program. A highlight of the visit was their participation in the "CyanoIBM" experiment at IGB's world-class LakeLab, located on Lake Stechlin—the largest experimental setup of its kind. Dr. Alka Singh

shared, "We conducted key measurements of methane flux and vertical concentration profiles, and set up incubation chambers to study methane production and transport. The IGB team was exceptional, training and empowering us to work independently and collaboratively." For Rajarajan, the 50-day visit was a transformative experience. "As a researcher focused on models and data, gaining hands-on field and lab skills was invaluable," he said. He also participated in field campaigns at Lake Dagow and Lake Neemitz, guided by German collaborators. Dr. Alka Singh concluded, "We thank Prof. Mark for being such a wonderful and generous host."

CO-AUTHORED Q1 JOURNALS

von Lieres, J. Sophie, A. M. Sretha, M. Nitin Kumar, Nibi Kulangara Velayudhan, Aryadevi Remanidevi Devidas, and Maneesha Vinodini Ramesh. "Promoting water-sustainability: A participatory co-design approach for addressing water-supply challenges in urban Kerala, India." *Journal of Urban Management* (2025).

Nandan, Krishna, Hari Chandana Ekkirala, A. S. Reshma, Vineeth Ajith, Ramesh Guntha, Amrita Jayakumar, and Maneesha Vinodini Ramesh. "Multi-Stakeholder-Centric Micro-Level Sustainability Assessments and Policy Recommendations." *Environmental and Sustainability Indicators* (2025): 100710.

IEEE GRSS Kerala Chapter Launched at Amrita



The IEEE Geoscience and Remote Sensing Society (GRSS) Kerala Chapter hosted its inaugural event on August 28, 2025, at Amrita Vishwa Vidyapeetham, Amritapuri. The program commenced with inaugural addresses by Prof. Vinod Kumar Sharma and Dr. Manoj B. S., followed by guest addresses from Dr. Gnanapazham L., Dr. Maneesha V. Ramesh, Dr. Jyothi S. N., and Dr. Rajesh Kannan Megalingam.

The technical sessions featured two distinguished talks. Prof. Vinod Kumar Sharma, Senior Professor and Consultant at the Indian Institute of Public Administration and Vice Chairman, Sikkim State Disaster Management Authority, delivered a lecture on “Model State in Climate Change Adaptation, Disaster Risk Reduction and

Sustainability.” Prof. Stefano Gabriele, Associate Professor at University Roma Tre, presented “Experimental Validation of a GNSS System for Monitoring of Civil Infrastructures.” The program concluded with an interactive student session led by Prof. Sharma on “Learning from Experience: Lessons on Recovery, Resilience, and Sustainability,” offering insights into disaster management, climate adaptation, and infrastructure monitoring.

The event was organized by the Amrita Center for Wireless Networks and Applications (Amrita WNA), with Nitin Kumar M as Chair, Harichandana E. S. as Vice-Chair, Balamukund Singh Lakshmi M. S. and Dhanesh Raj as committee members.

Invited Guest Lecture at ZARM, University of Bremen

Dr. Alka Singh, Assistant Professor at AmritaWNA, delivered an invited guest lecture at the Centre of Applied Space Technology and Microgravity (ZARM), University of Bremen, Germany. During her visit, she engaged with Prof. Katharina Brinkert and her research team, exploring opportunities for future collaborations in space science and related research areas. ZARM is renowned for its pioneering research facilities, particularly the

Bremen Drop Tower, a unique installation capable of generating a microgravity environment for up to 9.3 seconds. Highlighting the potential of such infrastructure for advancing interdisciplinary studies, Dr. Singh emphasized the value of international partnerships in pushing scientific frontiers. Her lecture and interactions marked a promising step toward collaborative ventures between AmritaWNA and ZARM.

Amrita Secures Another US Patent on Smart Grid Innovation

Amrita Vishwa Vidyapeetham has been granted another prestigious US patent (US12380519B2) in the field of Smart Grids, marking a significant milestone in cutting-edge energy research. The new patent, titled “Optimal Communication Architecture for Smart Distribution Power Grid,” has been awarded to Dr. Maneesha V. Ramesh, Dr. Aryadevi R.D., and Dr. P. Venkat Rangan. This achievement represents the fourth patent in the series, following two Indian patents and one US



patent already granted in the same domain. This recognition highlights Amrita’s continued excellence in developing innovative solutions for sustainable power distribution, further enhancing its impact within the global smart grid ecosystem.

IEEE ICCCNT 2025: AmritaWNA PhD Scholars Present Papers

Two PhD scholars presented papers at the 16th International IEEE Conference on Computing, Communication and Networking Technologies (ICCCNT 2025), held at IIT Indore from July 6–11, 2025. The prestigious conference brought together global researchers to discuss advancements in computing, communication, and network technologies. Anjana Viswanath presented her paper titled “CompacBin: IoT-Enabled Garbage Monitoring System”, co-authored with Dr. Aryadevi R.D., Dr. Sabari Ramesh, and Dr. Sruthy S. Her work introduces an intelligent waste management system capable of automatic waste compaction and real-time fill-level alerts, contributing to smarter urban waste handling. Hrudya S. Nair presented “IoT-enabled Monitoring of Tea Waste Biochar’s Effect on Soil Moisture Retention”, co-authored by Dr. Aryadevi R. D. and Dr. Sabari Ramesh.

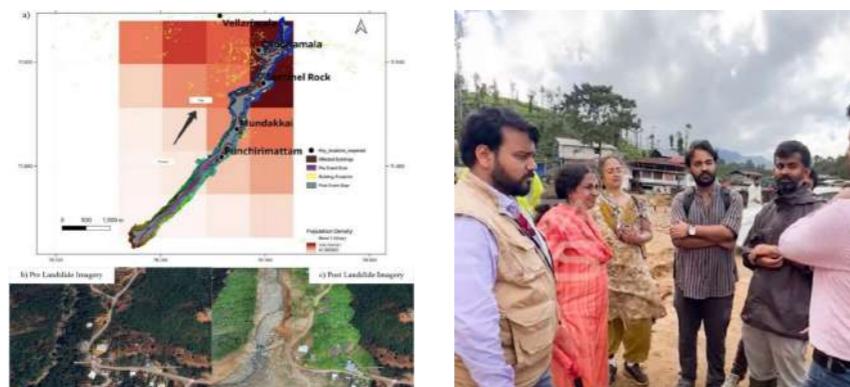
Her research focuses on sustainable agriculture, showcasing new IoT technology can be leveraged to monitoring soil health by adding eco-friendly biochar materials.



Research Spotlight

Investigating the Chooralmala Landslide

A team of faculties & researchers from Amrita WNA— Dr. Maneesha V. Ramesh, Dr. Hari Chandana Ekkirala, Balmukund Singh, Nitin Kumar M., Dr. Sabari Ramesh, Dr. Aadityan Sridharan, Dr. Nirmala Vasudevan, and Dr. Sudesh Kumar Wadhawan, conducted a detailed study on the Mundakkai–Chooralmala landslide in Wayanad. The disaster triggered a long-runout debris flow, flash floods, and large-scale sediment deposition, severely impacting Mundakkai, Punchirimattam, and Chooralmala. While previous studies highlighted isolated aspects, a comprehensive analysis of the landslide’s initiation, progression, and impact was missing. This study addressed that gap by combining rainfall threshold modeling, geomorphometric analysis, and geotechnical evaluation. The team used global rainfall threshold models along with satellite (GPM IMERG) and ground-based data to establish

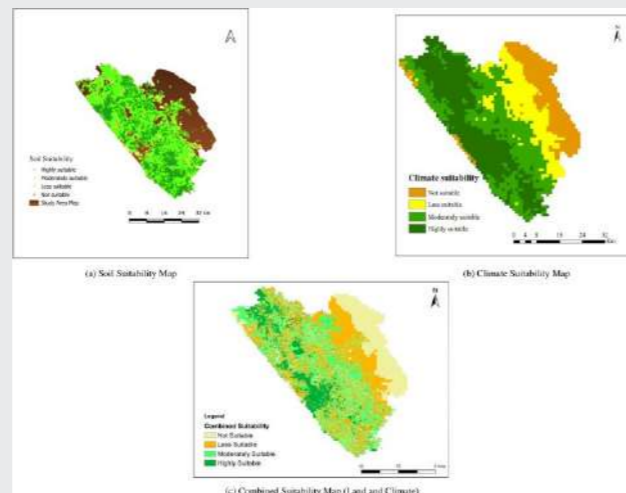


the role of extreme rainfall as the primary trigger. Results showed that cumulative rainfall exceeded thresholds consistently in the days leading to the event, peaking dramatically on July 29–30. Geomorphological weaknesses, tectonic influences, and soil properties further accelerated slope failure and debris flow mobility. The research provides ground-validated insights and proposes actionable strategies for a Landslide Early Warning System, crucial for disaster preparedness in Kerala’s vulnerable Western Ghats and other high-risk regions.

Climate-Smart Land Suitability for Coconut Cultivation



Ms. Lekshmi G.S. from Amrita School of Wireless Networks & Applications, in collaboration with Dr. Aryadevi R.D., Raji Pushpalatha, Hariprasada, and Byju G., conducted a pioneering study on enhancing coconut yield

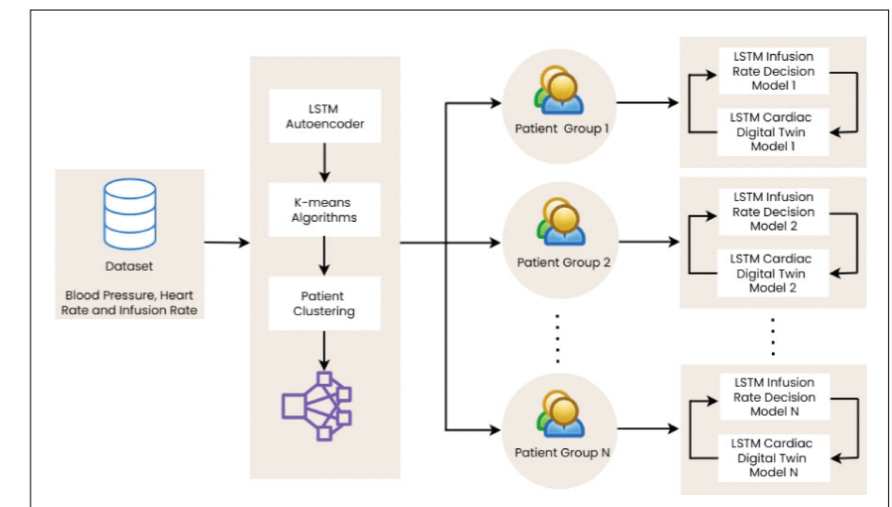


AI-Driven Closed-Loop Inotrope Infusion Control



Maintaining optimal blood pressure in critically ill patients is a persistent challenge due to highly dynamic and patient-specific hemodynamic variations. Addressing this complexity, Vidya S. Nair, PhD Scholar, under the guidance of Dr. Rahul Krishnan, conducted pioneering research on AI-driven automation of inotrope infusion. The study proposes an AI-enhanced closed-loop noradrenaline infusion control framework that surpasses the limitations of conventional control methods. Using Long Short-Term Memory (LSTM) networks, patient blood pressure responses are clustered through time-series autoencoders and K-means algorithms, enabling personalized and adaptive infusion rate decisions. A digital twin cardiac model is developed to simulate patient-specific hemodynamics and validate inotropic effects within a closed-

loop environment. Performance evaluation shows that the proposed approach significantly outperforms conventional fuzzy logic and PK–PD models, ensuring safer blood pressure control, optimized drug delivery, and reduced clinician workload, highlighting its strong potential for next-generation critical care infusion systems. Clinicians from Amrita Hospital, Kochi—Dr. Aryalekshmi C.S., Dr. Dipu T., and Dr. Thushara Madathil—actively contributed to this interdisciplinary study.



potential through climate-smart land suitability analysis. The research focused on Kerala, where coconuts play a crucial role in the economy but face yield gaps due to soil and climatic variability. Using datasets from the Soil Survey Department, the team compared multiple machine learning (ML) and deep learning (DL) models for soil suitability prediction, identifying XGBoost as the most effective with nearly 100% accuracy. For climate suitability, the MaxEnt model was applied, achieving 67.7% accuracy. The integrated results were combined using GIS tools to create a

comprehensive suitability map, classifying regions into highly suitable, moderately suitable, less suitable, and unsuitable zones. This climate-smart framework provides a valuable decision-support system for farmers, helping optimize productivity and sustainability in coconut farming.

Lab Visits

Amrita Center for Wireless Networks & Applications (WNA) conducts research across various fields, supported by specialized labs that facilitate innovation and experimentation. The Landslide Lab focuses on studying soil behavior, landslides, and early warning systems to mitigate natural disasters. The Intelligent Infrastructure Lab explores smart and sustainable infrastructure solutions, while the Healthcare Lab integrates wireless technology with medical advancements for improved patient care. The Tharang: Advanced RF & Microwave Lab specializes in RF and microwave engineering, supporting research in wireless communication and sensing technologies. Over the past three months, the labs have hosted visits from students, researchers, and external guests, fostering collaboration and knowledge exchange.





Amrita University is a unique place of learning where science, technology, innovation and humanitarian principles are taught to benefit society and character building of students. The spiritual environment, dedicated and highly qualified faculty members make the university different from other institutions. Amma's love and compassion make the students and teachers better citizens of India. I wish that university should get its recognition all over the globe. I was fortunate to visit such a temple of learning recently.

Dr. Vinod Kumar Sharma,

Senior Professor,
Disaster Management /Consultant at Indian
Institute of Public Administration, Vice Chairman,
Sikkim State Disaster Management Authority,
Govt. of Sikkim



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