AMRITA WNA

OCTOBER - DECEMBER 2025 VOLUME - 2 ISSUE - 4

THARANG

Events & Activities Research Spotlight Peoples Spotlight Workshop & Conference

"Our educational system needs to give equal importance to the intellect and the heart " Amma

Advancing Geo-Hydrological Research through Indo-Italian Collaboration

In the divine presence of Amma, Chancellor of Amrita Vishwa Vidyapeetham, the university strengthened its global academic footprint by signing two new Memorandums of Understanding (MoUs) with leading institutions in Italy. The collaborations aim to advance research in climate resilience and disaster management. A key MoU was signed with the National Research Council (CNR) of Italy, the country's premier scientific body. Amrita will partner specifically with CNR's Institute for Geo-Hydrological Protection (IRPI). he agreement was formalized by Dr. Maneesha V. Ramesh, Pro Vice-Chancellor of Amrita University, and Dr. Tommaso Moramarco, Director of IRPI.

Dr. Moramarco shared his heartfelt reflections on meeting Amma, describing it as an unexpectedly profound experience. "Thank you for giving me a completely new experience. I am a researcher, and I didn't know Amma, but she surprised me. I live in the land of St. Francis of Assisi, and I found Amma's mission to be very much in line with St. Francis," he said.This partnership marks a significant step toward enhancing international collaboration in environmental resilience and sustainable development.

Amrita WNA Conducts Workshop on Sustainable Energy Futures




Amrita WNA successfully conducted a three-day workshop titled “Sustainable Energy Futures: Bridging IoT, Digital Twins & Blockchain,” aimed at empowering participants to build ethical, practical, and future-ready solutions for a greener tomorrow. Hosted by Dr. Aryadevi R. D. and Dr. Anjana M. S., the workshop highlighted the outcomes of the E-CAISS project, focusing on context-aware IoT frameworks, energy behavioral insights, and sustainable software architectures for energy-efficient communities. The workshop conducted in Amrita Vishwa Vidyapeetham for “Empowering Participants to Build Ethical, Practical, and Future-Ready Solutions for a Greener Tomorrow.”

The sessions explored IoT-driven smart energy applications, digital twins and AI-based control strategies for renewable energy systems, and blockchain-enabled secure and transparent transactions. Participants gained hands-on exposure to tools such as Python, Grafana, and context-aware IoT workflows, bridging theory with practice. The workshop also featured talks by international experts Dr. Patricia Lago and Dr. Emitza Guzman, emphasizing software sustainability and ethical engineering. With active participation and collaborative discussions, the workshop fostered innovation and interdisciplinary thinking, reinforcing Amrita WNA’s commitment to advancing sustainable and intelligent energy systems.

Amrita WNA Showcases Innovations at ESTIC 2025

Amrita Center for Wireless Networks & Applications (Amrita WNA) showcased its cutting-edge research and innovative products at the Emerging Science, Technology, and Innovation Conclave (ESTIC 2025), held from November 3 to 5, 2025, in New Delhi.

The Amrita exhibition stall attracted significant national and international attention, featuring innovations across artificial intelligence, healthcare, sustainable agriculture, renewable energy, and climate resilience. From Amrita WNA, key highlights included the Amrita Spandanam device, landslide modeling solutions, and research projects focused on water and energy sustainability. Nitin Kumar represented our center on ESITC.

The conclave was inaugurated by the Hon'ble Prime Minister of India, Narendra Modi, and brought together Nobel Laureates, policymakers, researchers, and innovators from India and across the globe. Amrita Vishwa Vidyapeetham proudly stood at the forefront of discussions and collaborations shaping the future of science, technology, and innovation in the country.The event provided an excellent platform to foster new collaborations and strengthen national and international partnerships.

Published Q1 Journals

1. 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.
2. Velayudhan, Nibi Kulangara, Dina Zaman, Aryadevi Remanidevi Devidas, Manoj Kumar Tiwari, Johanna Sophie von Lieres, and Maneesha Vinodini Ramesh. "Blockchain-IoT and Optioneering Driven Framework for Smart Water Management in Emerging Urban Areas." iScience (2025).
3. Meenu, L., S. Aiswarya, Unnikrishna Menon KA, and K. Menon Sreedevi. "Experimental investigation to analyze the electromagnetic radiation exposure from wireless communication devices." Journal of Hazardous Materials Advances 17 (2025): 100548.
4. Valsan, Vipina, AM Abhishek Sai, Anu G. Kumar, Aryadevi Remanidevi Devidas, and Maneesha Vinodini Ramesh. "Deep Learning-enabled Spatiotemporal Sustainable Energy Strategy for Rural Multiple Microgrids." Results in Engineering (2025): 107569.

Hospital Exposure Program for Biomedical Engineering & AI Students

As part of the M.Tech curriculum in Biomedical Engineering & Artificial Intelligence, a one-week hospital visit was organized from November 10 to 15, 2025 for 18 M.Tech students enrolled in the course Biomedical Instrumentation: Measurement & Analysis. The visit, conducted at the Amrita Institute of Medical Sciences (AIMS), Kochi, provided valuable exposure to real-world clinical environments and was supervised by Dr. Aiswarya, Assistant Professor at Amrita WNA, and Dr. Meenu L., Senior Researcher. Students explored major departments and biomedical instruments across specialties.

Laboratory visits covered Biochemistry, Pathology, Microbiology, Hepatology, and Pharmacology, followed by exposure to critical care equipment in Cardiology, Neurology, Sleep Studies and Epilepsy Center, Radiology, Radiotherapy, Nuclear Medicine, and Operation Theaters. The program also included visits to ENT, Ophthalmology, and Dialysis units, strengthening practical understanding of biomedical technologies in healthcare.

The immersive experience enabled students to bridge theoretical concepts with clinical applications, enhancing their analytical and problem-solving skills in real healthcare settings. The visit also fostered interdisciplinary interaction with medical professionals, offering deeper insights into the evolving role of biomedical engineers in modern hospitals.

Amrita WNA Hosts Guest Lecture on RF & Microwave Device Technologies

A guest lecture was successfully conducted on 16 December 2025 at the WNA Conference Room by Dr. Vikram Kumar, Assistant Professor, Department of Electronic Science, University of Delhi (South Campus). The session was organized by the Multimedia and Embedded Systems Tag under the Amrita Center for Wireless Networks and Applications (WNA) and witnessed enthusiastic participation from faculty members, research scholars, and postgraduate students. Dr. Vikram Kumar delivered an insightful talk on Modern Antennas and Future of Electronics, highlighting the role of Maxwell's equations in antenna design and discussing recent advancements in 5G and emerging 6G communication systems. He elaborated on key concepts such as massive MIMO, phased-array antennas, metamaterials, and metasurfaces, along with their applications in wireless communication, biomedical systems, and defense technologies.

The session was interactive and informative, motivating participants to explore advanced research areas and indigenous computational approaches in RF and microwave technologies

First Batch Completes Internship at Amritatarang

The first batch of students has successfully completed their internship at Amritatarang – Advanced RF and Microwave Lab, marking an important milestone for the facility. The inaugural batch included Integrated MSc Physics students from the Amrita School of Physical Sciences and B.Tech ECE students from the Amrita School of Engineering, Amritapuri Campus. Students contributed to ongoing research in areas such as hepatic steatosis detection, electromagnetic absorption in Tectona grandis, underground life detection, surveillance and monitoring, and vehicular communication.

Several students achieved notable outcomes, with research papers accepted at ICCES 2025, MAPCON 2025, and ICCCES 2026. Additionally, a team comprising Sheela Devi Aswathy Chandran (PhD Scholar, WNA) and interns Kalyani Shibu and Manasa Murali has been shortlisted for the Student Design Contest at MAPCON 2025, highlighting the strong research impact of the internship program.

Published Q1 Journals

5. Rahman, Saifur, Radhagayathri Udhayakumar, David Kaplan, Brendan McCarthy, Tye Dawood, Nicholas Mellor, Alexander Senior, Vaughan G. Macefield, Dilpreet Buxi, and Chandan Karmakar. "Photoplethysmography as a noninvasive surrogate for microneurography in measuring stress-induced sympathetic nervous activation—A machine learning approach." Computers in Biology and Medicine 185 (2025): 109522.

6. Noble, Sneha, Uma Gopalakrishnan, D. K. Vijaykumar, and Rahul Krishnan Pathinarupothi. "Rapid Early Screening for Lymphedema Using Kinect." International Journal of Imaging Systems and Technology 35, no. 1 (2025): e70020.

Wins Student Design Contest : MAPCON 2025

Amrita WNA student team secured First Prize in the Student Design Contest for their innovative project titled “Design a Wideband Tunable Bandstop Filter for Wi-Fi and Radar Co-existence.” The winning team members Aswathy Chandran, Kalyani Shibu, and Manasa Murali were recognized for their outstanding technical design and research excellence.

Amrita WNA Researchers Participate in APN-Funded Fall School 2025, Nepal

Researchers from Amrita Center for Wireless Networks and Applications (Amrita WNA), Dr. Harichandana and. Drisya S, participated in the Fall School 2025 on “Advanced Climate Data Analytics and Strategies”, held in Nepal from 14–18 October 2025. The program was conducted under an Asia-Pacific Network for Global Change Research (APN) funded project focusing on enhancing climate resilience in South Asia and China.

Organized by Small Earth Nepal (SEN), the five-day program brought together Early Career Researchers from across South Asia for hands-on training in climate data analysis, climate modelling, and precipitation trend studies. The school featured expert-led technical sessions, collaborative learning, and a field visit to the flood-impacted Roshi Khola region. The knowledge gained will support future climate data analysis and development of interactive data platforms for disaster risk reduction.

Participation : 3rd Indian Near Surface Geophysics Conference & Dam Safety Technical

Bichu B.K. Raman, field person of Amrita WNA participated in 3rd Indian Near Surface Geophysics Conference & Dam Safety Technical workshop conducted by Aqua Foundation (AFA) in collaboration with Geophysical Experts, Dam Safety Review Panel, and Industry Partners. The workshop aimed to deepen technical understanding of modern geophysical, instrumentation, and material-based solutions for dam safety assessment, dam rehabilitation, breach verification, and geotechnical monitoring. Experts from India and abroad shared real case studies, technological advancements, and practical guidelines relevant to dam engineers, researchers, and authorities.

Amrita WNA Showcases Research and Outreach at IEEE FNWF 2025

The three-day IEEE Future Networks World Forum 2025, held from November 10–12 under the theme “Beyond Connectivity: 6G for a Sustainable and Intelligent Future,” successfully brought together participants from academia, industry, and R&D organizations for forward-looking discussions on next-generation network technologies and their societal impact. The forum served as a vibrant platform to explore innovations shaping the evolution toward sustainable and intelligent 6G ecosystems.

Dr. Sangeeth Kumar delivered a keynote address titled “Sustainable and Intelligent Networks for Weather Resilience,” where he highlighted the importance of weather-aware wireless communication systems and the integration of environmental intelligence into network design to enhance resilience and energy efficiency. In a thematic session, he further presented “5G Network Sustainability,” outlining practical strategies for improving sustainability within existing 5G infrastructures and addressing key operational challenges faced by telecom operators.

Researchers from the Amrita Center for Wireless Networks and Applications (Amrita WNA) showcased innovations in Wearable IoMT and AI for healthcare at FNWF and the co-located IEEE Connecting the Unconnected Summit. Demonstrations included Amritaspandanam wearable devices, fail-safe remote cardiac rehabilitation platforms, swallowing disorder assessment tools, and AR/VR-based surgical pre-planning systems, highlighting the impact of reliable connectivity on advanced healthcare delivery and reinforcing the Center’s commitment to sustainable and intelligent network advancements.

Additionally, Dhivya J. P. presented her work on QoE-aware digital twin-enabled community networks, Dhanesh Raj served as Demo Co-Chair, and the team participated in outreach activities on November 13, 2025, at Hulimangala Gram Panchayat, Karnataka, promoting inclusive connectivity.

IEEE Mapcon : Researchers Present Papers and Win Student Design Contest

Faculty members and researchers actively participated in the Microwaves, Antennas, and Propagation Conference (MAPCON) 2025, the flagship event of IEEE MTT-S and IEEE AP-S, held from December 14–18, 2025, at the Lulu International Convention Centre, Kochi. The conference served as a global platform for sharing advancements in electromagnetics, microwave engineering, and antenna and propagation, with strong participation from academia, industry, and government organizations. Dr. Aiswarya, Dr. Meenu L, and Ms. Sheeladevi Aswathy Chandran presented a total of six research papers at the conference. MAPCON 2025 featured keynote and plenary talks by eminent experts, technical sessions, workshops, tutorials, and a large-scale industry exhibition showcasing innovations in RF and microwave technologies.

In a notable achievement, a student team won First Prize in the Student Design Contest for their work titled “Design of a Wideband Tunable Bandstop Filter for Wi-Fi and Radar Co-existence.” The winning team comprised Ms. Sheeladevi Aswathy Chandran, Ms. Kalyani Shibu, and Ms. Manasa Murali.

Landslide Team Conducts Field Investigation in Pathanamthitta

The AWNA landslide research team conducted a field survey at Chittar Grama Panchayath, Pathanamthitta, a landslide-affected area, and interacted with local representatives and eyewitnesses to understand past incidents. The discussions helped identify a landslide-susceptible zone that experienced a major debris flow in 2018 and a minor flow event in 2023.
To investigate subsurface conditions, the team conducted DGPS, Electrical Resistivity Tomography (ERT), and Seismic Refraction Tomography (SRT) surveys along a 120 m profile aligned with the flow direction. ERT measurements were collected using 24 electrodes at 5 m spacing with Wenner and Schlumberger configurations, while SRT was carried out using 24 geophones and controlled hammer sources. Additionally, core cutter soil samples were collected for laboratory analysis to support subsurface characterization and landslide risk assessment.

PEOPLE SPOTLIGHT

Dr. Maneesha Appointed as the Editor of Natural Hazards and Earth System Sciences (NHESS)

Amrita Vishwa Vidyapeetham proudly announces the appointment of Dr. Maneesha Vinodini Ramesh, Pro Vice-Chancellor and Director of Center as an Editor of Natural Hazards and Earth System Sciences (NHESS*)*, a leading Q1 international journal of the European Geosciences Union (EGU). The three-year appointment reflects global recognition of her contributions to disaster resilience, early warning systems, geospatial technologies, and multi-hazard risk research.

NHESS, published by Copernicus Publications, is among the EGU's 19 open-access journals and is widely known for its transparent and interactive peer-review model, where manuscripts are first published as preprints on EGUsphere for open scientific discussion.

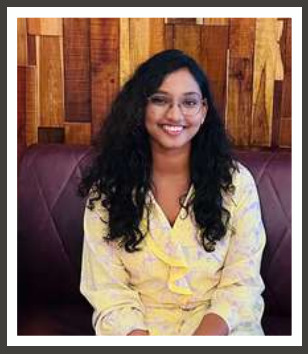
This approach has significantly strengthened the journal's impact in natural hazards, risk assessment, and early warning research. As Editor, Dr. Maneesha will contribute to key focus areas including landslides and debris-flow hazards; GIS, remote sensing, monitoring and early warning systems; risk assessment and adaptation strategies; and education and outreach. This appointment further enhances Amrita's international standing in hazard science and resilience research.

INTERNSHIP

Niranjan

M.Tech – Biomedical Engineering & Artificial Intelligence

SENSIVISION Health Technologies



Shivani Suresh

M.Tech – Biomedical Engineering & Artificial Intelligence

AMRITA HOSPITAL KOCHI

Sneha Biju

M.Tech – Biomedical Engineering & Artificial Intelligence

AMRITA HOSPITAL KOCHI

Dr. Anjana Completed Dual Doctorate Program

Dr. Anjana has successfully completed her dual doctorate through the joint PhD program of Vrije Universiteit Amsterdam, The Netherlands, and Amrita Center for Wireless Networks & Applications Amrita Vishwa Vidyapeetham.

Her doctoral thesis, titled "Occupant-Centric Energy Management: Balancing Privacy, Well-being, and Sustainability in Smart Buildings," was carried out under the guidance of Prof. Dr. Maneesha Vinodini Ramesh and Prof. Dr. Patricia Lago. The research addresses critical challenges in smart building systems by integrating occupant comfort, privacy preservation, and sustainable energy management, setting a new benchmark in occupant-centric and privacy-aware energy-efficient smart buildings.

As part of her doctoral work, Dr. Anjana has published in leading Q1 international journals. Her notable publications include "Empowering Sustainability: The Crucial Role of IoT-enabled Distributed Learning Systems in Reducing Carbon Footprints" and "Energize Sustainability: EnSAF for Sustainability-Aware, Software-Intensive Energy Management Systems," co-authored with her guides Dr. Maneesha V. Ramesh, Dr. Patricia Lago, and co-guide Dr. Aryadevi R. D. Dr. Anjana's research significantly contributes to advancing sustainable, intelligent, and human-centric energy management solutions and reflects the strong international research collaboration between Amrita Vishwa Vidyapeetham and Vrije Universiteit Amsterdam.

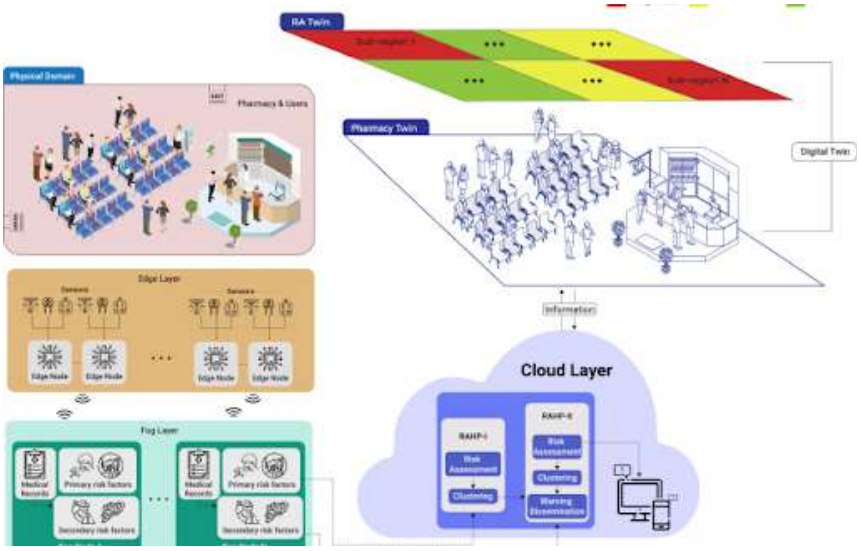
RESEARCH SPOTLIGHT

Leveraging Digital Twin for COVID-19 Risk Assessment in IoT-Enhanced Hospital Pharmacies

Researcher Divya S.J., under the guidance of Dr. Aryadevi R.D. and Dr. Maneesha V. Ramesh, conducted an innovative study addressing COVID-19 risk assessment in IoT enabled hospital pharmacies using a Digital Twin (DT) based framework.

By leveraging existing IoT infrastructure, the framework supports real-time decision intelligence, alert dissemination, and proactive mitigation. Although focused on COVID-19, the proposed architecture is adaptable to other airborne infectious diseases and densely populated environments, demonstrating strong potential for smart city applications.

Recognizing hospital pharmacies as high risk common areas with unrestricted public access, the research proposes a DT enabled, IoT driven dynamic risk assessment architecture (DT-RAHP) that integrates real-time sensor data to monitor, analyze, and assess infection risks.
The study introduces a two-phase risk assessment model that evaluates both primary and secondary risk factors, enabling accurate classification of pharmacy sub regions based on risk levels.



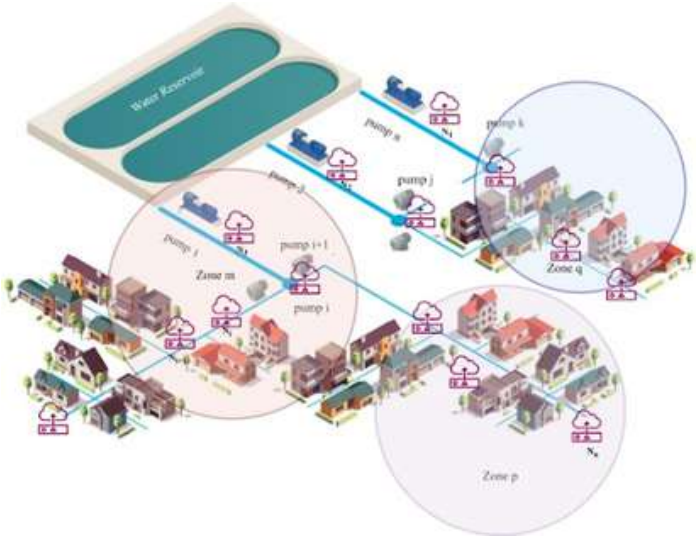
Social Media for Managing Disasters Triggered by Natural Hazards: A Critical Review

Researcher Lakshmi S. Gopal, under the guidance of Dr. Rekha P., Dr. Hemalatha T., Dr. Maneesha V. Ramesh, and international collaborator Dr. Bruce Malamud, conducted a comprehensive critical review exploring the role of social media in managing disasters triggered by natural hazards. The study examines how social media data (SMD) has transformed disaster response by enabling rapid information dissemination, enhanced situational awareness, and community engagement during crises. The paper got published in Natural Hazarads & Earth system Sceiences. The paper got futured on Prevention Web, the knowledge platform of the United Nations Office for Disaster Risk Reduction (UNDRR).

AI-Driven Model for Reliable Water Demand Forecasting in Smart Cities

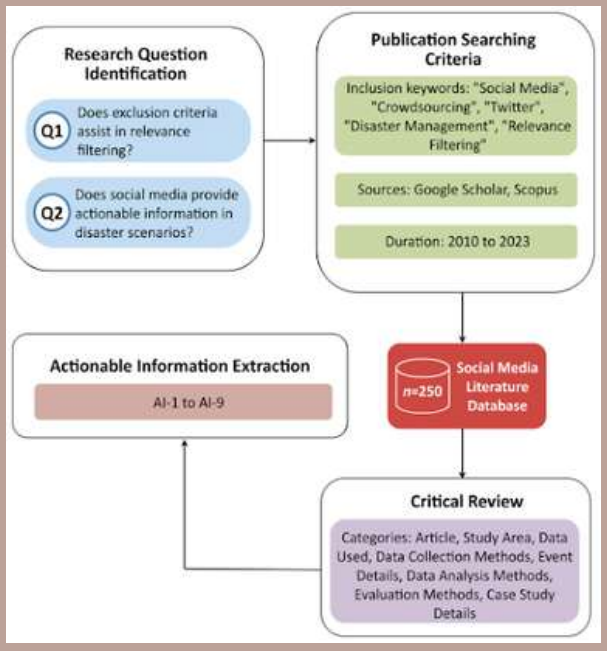
A breakthrough in smart water management has been achieved by researcher Nibi K.V., under the guidance of Dr. Aryadevi R.D. and Dr. Dragan Savić, through the development of a novel Spatio-Temporal Imputation Model (STIM) for Multivariate Water Demand Prediction. Designed to address data loss challenges in IoT-enabled Water Distribution Networks (WDNs), the model tackles missing data caused by sensor failures, communication disruptions, and environmental disturbances.

STIM integrates spatial and temporal correlations using a generative AI-based imputation framework integrated with Hypergraph Neural Network (HGNN) and Bi-directional LSTM (Bi-LSTM) modules. This advanced architecture accurately reconstructs missing data and enhances demand forecasting reliability.



Validated on real-world urban WDN datasets across monsoon and summer seasons, the model achieved up to 0.90 R^2 for imputation and 0.87 for prediction. Remarkably, even with 90% missing data, STIM maintained strong performance, demonstrating exceptional robustness. The framework offers a powerful AI-driven decision-support tool for sustainable and proactive water management.

Covering literature from 2010 to 2023, the review systematically analyses data collection strategies, relevance filtering techniques, and the extraction of actionable information from noisy and large-scale social media datasets. A structured Social Media Literature Database (SMLD) comprising 250 publications was developed to classify methodologies, disaster types, analytical tools, and evaluation approaches. The study highlights key challenges such as misinformation, data overload, and credibility, while proposing best practices and future research directions. The findings offer valuable insights for policymakers, emergency responders, and researchers to improve data-driven decision-making in disaster management.



RESEARCH FACILITY

Green Hydrogen Lab

The Amrita Center for Wireless Networks & Applications proudly inaugurated its Green Hydrogen Lab this year. Our Green Hydrogen Research Laboratory is dedicated to sustainable hydrogen production and storage focuses on innovative material-based approaches. Our lab specializes in hydrogen generation through liquid metal activated (LMA) aluminium–water hydrolysis, where aluminium is activated using low-melting alloys such as Ga-In, Ga-In-Sn, Ga-In-Sn-Bi to disrupt the passive oxide layer. This activation enables rapid and efficient hydrogen production upon contact with water, even under mild conditions.

Research is directed toward optimizing alloy composition, coating techniques, reaction kinetics, activation energy reduction, and performance in different aqueous media, including seawater. The project is led by Dr. O.D. Jayakumar, with the active collaboration of Dr. Sabarinath and Dr. Sajith Kumar from the Amrita School of Sustainable Futures. Together, the team is working to develop scalable and environmentally responsible hydrogen production solutions. This initiative reflects Amrita's strong commitment to advancing renewable energy technologies and contributing meaningfully to the global transition toward a sustainable and green energy future.

Amrita WNA is doing excellent and impactful work in advancing the understanding of landslide processes. Their efforts in guiding stakeholders and translating research into actionable solutions are crucial for preventing future catastrophes. I look forward to collaborating with Amrita WNA and leveraging this expertise to strengthen similar initiatives in Ecuador

Prof. Jorge Celi
Ikiam Amazon Regional University
UNESCO Chair
on Tropical Freshwater
Management, Tena

AMRITA VISHWA VIDYAPEETHAM
DEEMED TO BE UNIVERSITY UNDER SECTION 3 OF UGC ACT, 1956

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