Center for Wireless Networks & Applications

AMRITA

THE CENTER

A leading multi-disciplinary research center at Amrita Vishwa Vidyapeetham, our scientists, academicians and students innovate leading edge technologies in the field of wireless, sensors, computing, and networking to solve grand challenges facing humanity today in the areas of disaster monitoring & preparedness, climate change, energy, water, and health.

1 Million Lives Impacted

100+ Million Research Funding

6 Products Commercialized

450+ International Publications

14 Patents Granted

World Center of Excellence in Landslide Risk Reduction

In recognition of the pioneering work, The Global Promotion Committee of the International Programme on Landslides (IPL) has awarded the center with the title of "World Center of Excellence on Landslide Disaster Reduction" consecutively for two terms, in 2017 and 2020.


The International Programme on Landslides (IPL)
Global Promotion Committee
THIS IS TO CERTIFY THAT
Amrita Vishwa Vidyapeetham,
Amritapuri campus, India
HAS BEEN APPROVED AND ENTITLED TO USE THE TITLE
WORLD CENTRE OF EXCELLENCE ON LANDSLIDE DISASTER REDUCTION
2020 - 2023
AT THE FIFTH WORLD LANDSLIDE FORUM IN KYOTO, JAPAN
THIS SECOND DAY OF NOVEMBER 2021

Prestigious NABARD Rural Innovation Award

Govt. of India's NABARD Award for Rural Innovations under the academic and research innovations category was bestowed upon the center for the Real-time Landslide Monitoring System via Wireless Sensor Network, at Munnar, India.

Top 2% Scientists

Dr. Maneesha V Ramesh, Provost and the Director of AmritaWNA, has been ranked among the list of world's top 2% scientists published by Stanford University.

Landslide Early Warning Systems in Himalayas

Starting in 2009, we have developed and deployed the world's first IoT system for early detection of rainfall induced landslides in India. WIth first deployment in the western ghats, we have expanded to monitoring landslides in the Himalayas as well. The system has provided eight valuable warnings over the last decade that helped save many lives.

Equipped with India's first landslide laboratory with state-of-art real-world test bed, our researchers developed deep earth probes, site specific sensors, and three level AI based warning systems.

Offshore communication systems for fishermen

Many avoidable accidents at sea due to collisions as well as lack of communication of impending natural hazards to offshore fishermen has caused a huge loss of lives and livelihood. Researchers have developed a scalable, high bandwidth multi-hop at-sea communication network called OceanNet, which enhances LoRa WiFi and provides a secure platform for fishermen to access the internet up to 80 km into the sea

FloodEvac - As part of this Indo-German consortium project, we developed a crowd sourced flood monitoring system to estimate the level of flood depth using Computer Vision and AI based on crowd-sourced flood scenes containing humans, vehicles and bridges.

Landslip - In collaboration with the British Geological Society and other partners, a Landslide Multi-Hazard Risk Assessment system has been developed through social media feeds and news aggregation for real-time situational understanding of emerging disasters.

The centre has set up India's first landslide laboratory for live test bed experimentation and analysis, which can simulate slips, landslides, rain and water runoffs.

AmritaKripa - Crowd-sourced mobile app to connect victims of natural disasters with volunteers/NGOs/ agencies. Deployed during the Kerala Floods in 2018, 2019, AmritaKripa app helped in the rescue and relief of more than 100,000 flood victims.

Union Minister Shri. Prakash Javadekar presenting the OceanNet transceiver to a fisherman.

Smart city infrastructure

Stabiliz-E: smart grid distribution network that is implemented in the university campus

Micro hydro & Solar PV microgrids in Wayanad & Idukki in Kerala for rural electrification

Smart Grid Lab - A live test bed for innovating in microgrids, IoT and AI-ML for energy efficiency

Water wise communities aided by IoT-based monitoring (4WARD) to monitor and

efficiently utilize water resources and filtration

Blockchain-based peer-to-peer renewable energy trading in microgrids, reward and penalty algorithms for consumers and prosumers, bidirectional energy exchange between EVs and Microgrids.

Biomedical & AI for Health

Amrita Spandanam IoT ECG monitoring device for cardiovascular patients helps continuously monitor 3-lead ECG of patients while they are engaged in their daily activities

Multi-parameter vitals monitoring device uses a single sensor for the evaluation of diabetes, blood pressure, blood oxygen, heart rate and respiratory rate

Breast cancer detection using thermograms and AI for point of care early screen in rural regions

Tongue controlled assistive device for paralyzed for navigation and smart home controls

Deployable AI models for early

detection of acute hypotensive episodes, sleep apnea, atrial fibrillation, sepsis, long COVID, RWMA, and neutropenia as well as environmental causatives of cancers

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Immersive Learning

India's First Remote triggered Wireless Sensor Networks lab that helps students in tier II and III colleges to remotely conduct experiments.

A gateway to global classroom: E-learning with gaze alignment techniques providing immersive interaction & experience for students

AR based heritage site reconstruction in Moovar Kovil, Tamil Nadu for tourism and historical studies

Research Focus

The center develops and deploys interdisciplinary scientific and technological applications for practicalhumanitarian benefit by integrating areas such asComputer Science, Electronics and Communication, Electrical Engineering, Geology, Hydrology, Mechanical Engineering, Information Technology, Environmental Engineering, Machine Learning & Artificial Intelligence..

IoT SYSTEMS FOR EXTREME ENVIRONMENTS

We have built and deployed state-of-the-art landslide early warning systems using intelligent IoT sensors in the Himalayas and the Western Ghats, real-time flood monitoring applications, offshore communication systems, and landslide multi-hazard risk assessment framework.

WEARABLE MEDICAL SYSTEMS

At the intersection of engineering, medicine and biology we develops and delivers personalized, precision and preventive healthcare through wearable wireless sensors for multi-parameter vitals monitoring, assistive and therapeutic devices, and ML models for early diagnosis of diseases.

GLOBAL KNOWLEDGE NETWORK

From preserving multi-user gaze alignments in virtual classrooms to re-building temples and historical sites, our researchers have developed immersive learning techniques and using AR/VR/ Metaverse to build provide the next generation of learning experience.

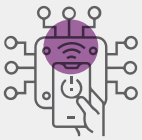
INTELLIGENT INFRASTRUCTURE

We have deployed smart energy, water monitoring and management systems at the campus as well as renewable energy solutions for tribal villages. We have partnered with India's Smart City Mission to develop solutions based on IoT, Blockchain and AI.

IoT & BIG DATA

Our research in managing and making sense of big data through data summarization, smart insight extraction and building domain aware tiny ML models for edge deployment has reduced power and bandwidth requirements in resource constrained environments.

TOWARDS 6G



Working on technologies associated with 5G and 6G to design and deliver secure, sustainable, and affordable connectivity solutions, we develop reference design, system architecture, and effective smart contracts for communication infrastructure.

Today, universities are ranked mainly based on the amount of funding they receive, the number of papers they publish and their intellectual caliber. Along with this, we should take into consideration how much we have used our research to serve the lowest and most vulnerable strata of society. In our approach to sustainable development, we should not forget that it is by strengthening the people at the base of the pyramid that the entire edifice of society becomes healthy and strong.

Sri Mata Amritanandamayi Devi
Chancellor, Amrita Vishwa Vidyapeetham

Academic Programs

The center offers highly interdisciplinary and career enriching M.Tech and PhD programs that help the students to identify their career paths and upskill themselves to be future-ready.

The 2 Year Masters programs are M.Tech in:

- **Wireless Networks and Applications**
  (IoT, 5G/6G, Blockchain and AI)
- **Geo Informatics and Earth Observation**
  (Remote Sensing, Hyperspectral Image Analysis, Geospatial Analytics)
- **Biomedical Instrumentation and Signal Processing**
  (Devices, Sensors, Signals, Predictive Analytics and AI for Health)

AMRITA VISHWA VIDYAPEETHAM
DEEMED TO BE UNIVERSITY

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