

Name of CoE/Centre: RF and Microwave Research Lab

About the Centre: This research laboratory provides a complete platform for the simulation and experimental validation of a variety of antennas, RF systems, metamaterials, and microwave devices. The lab was established in the year 2018 with the support of CHRIST University Major Research Project funding.

Vision: To lead globally in microwave and communication technology innovation, fostering cutting-edge research, education, and impactful industry collaboration.

Mission: To lead globally in microwave and communication technology innovation by:

- Advancing the field through pioneering research, interdisciplinary collaboration, and transformative education.
- Providing high-quality education and training that fosters creativity, nurtures talent, and inspires innovation to solve global challenges.
- Building a vibrant ecosystem that accelerates technological breakthroughs, enhances industry collaboration, and drives socio-economic development through partnerships with academia, government, and industry stakeholders.

Objectives:

- To advance research and development in microwave and advanced communication systems.
- To provide state-of-the-art education and training to students and professionals.
- To foster interdisciplinary collaboration and partnerships with industry, academia, and government.
- To drive technological innovation that addresses global communication challenges and enhances societal connectivity.
- Conduct research that addresses sustainability challenges and contributes to a more sustainable future for all.

Departments Associated: Electronics and Communication Engineering (ECE), Electrical and Electronics Engineering (EEE).

Facilities Available:

- ANSYS HFSS 18.2 software
- Vector Network Analyzer (up to 40 GHz),
- Spectrum Analyzer (up to 43 GHz),
- PCB prototyping machine,
- WR90 waveguide material characterization kit (X-Band)
- Anechoic Chamber of size 7m x 4m x 3m supporting measurement from 700 MHz to 40 GHz.

Research Areas:

- Microwave Devices using Sustainable materials
- MIMO antennas for 5G and beyond
- Antenna arrays
- mmWave antenna
- Antennas for biomedical applications
- RF Energy Harvesting
- Bio Sensors
- Synthetic Aperture Radar

Collaborations: Research collaborations with

- ESEO School of Engineering, Angers, France
- University of Mauritius (UoM), Mauritius
- Binghamton University, USA
- Thapar Institute of Engineering and Technology (Deemed to be University), Punjab, India
- Gustave Eiffel University, France
- Loughborough University, United Kingdom

Consultancy and Research Projects Undertaken:

- Funding by **CEFIPRA** (DST, Government of India and Government of France) for organizing Indo-French Workshop on “Electromagnetic Solutions for Smart Cities.” **[Funding of 1.37 Million INR] PI (India):** Dr. Naveen Kumar, CHRIST; **PI (France):** Dr. Mohsen Koohestani, ESEO]
- Research project titled “**Satellite image analysis to monitor UN Sustainable Development Goals (SDGs) in Mauritius**” funded by the University of Mauritius. [Funding of 770K Mauritian Rupees i.e. 1.36 Million INR] **PI and Co-PIs (India):** Dr. Chidambaram S, Col. P Jai Govind, Dr. Naveen Kumar, CHRIST; **PI (Mauritius):** Dr. T P Fowdur, University of Mauritius.
- An internally funded seed grant from **CHRIST University** for a project on “Sustainable and organic microwave absorbers and substrates.” **[Funding of 300K INR] PI:** Dr. Naveen Kumar; **Co-PI:** Dr. Hari Murthy, Dr. Sourav Roy, Dr. Chidambaram S.
- Consultancy provided to GalaxEye Space, Bengaluru
- Consultancy provided to AvGarde Systems, Bengaluru
- Consultancy provided to DewDas Tech, Bengaluru
- Consultancy provided BRALCO, Singapore

Programmes and Certification Courses Offered:

- An online 30-hour short course offered through the University of Mauritius on “Fundamentals of Satellite-based Earth Observations in Monitoring the UN Sustainable Development Goals.”

Student Internships: Students secured internships at Tata Advanced Systems Limited (TASL), GalaxEye Space, Elena Geo Systems, and many more.

Major Achievements:

- Number of Journal Publications: 12 (IEEE Communication Magazine, Wireless Personal Communication, Advanced Electromagnetics, International Journal of Microwave and Optical Technology...)
- Number of Conference Publications: 30+ ((IEEE EUCAP, IEEE APS/URSI, IEEE RADIO, IEEE MAPCON, IEEE InCAP...)
- Number of webinars/invited talks delivered by faculties: 16
- Organized a national level workshop in collaboration with Tata Advanced Systems Limited, Bengaluru on 18th and 19th April titled “**Recent Advancements and Developments in Antennas and Electromagnetics (RADIATE) 2024**”.





