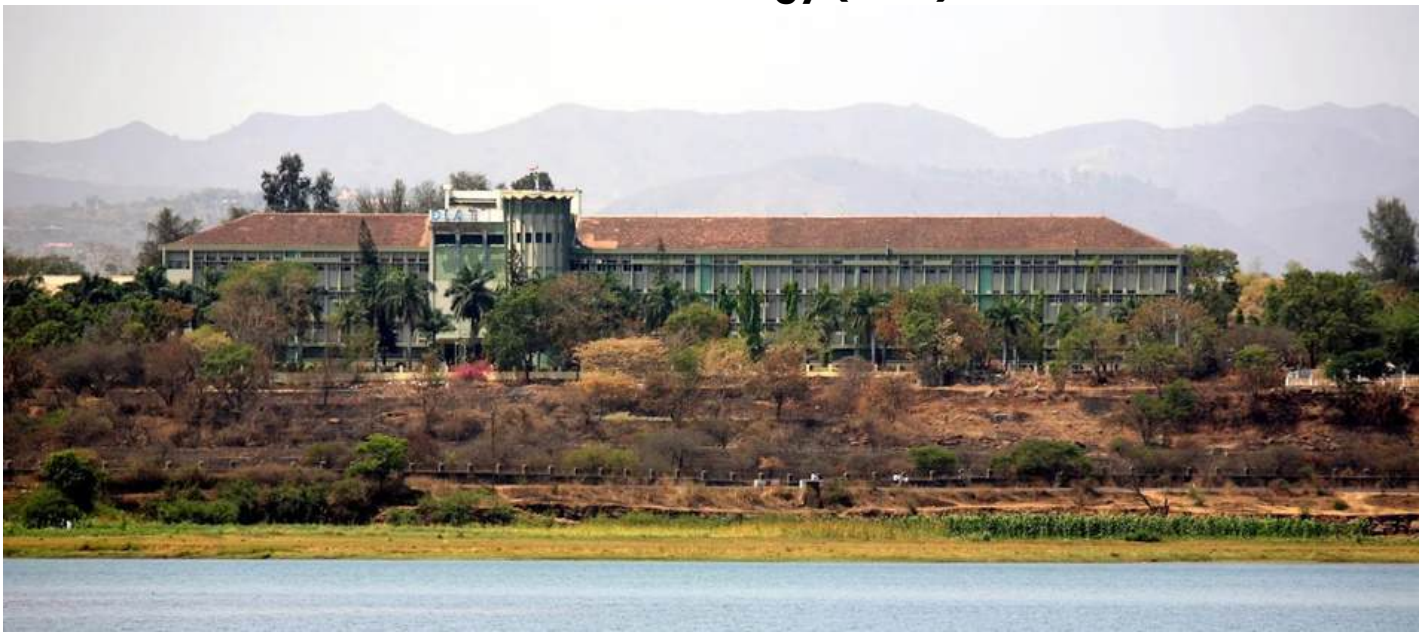
Department of Electronics Engineering

Defence Institute of Advanced Technology, Pune

An Autonomous Organization, Department of Defence, Research & Development,
Ministry of Defence, Government of India

Defence Institute of Advanced Technology (DIAT)



The Defence Institute of Advanced Technology (DIAT), as it is known today, came into being as the Institute of Armament Studies in 1952 in the CME campus. In 1967, the Institute was renamed as "Institute of Armament Technology, (IAT)", which moved to its present location at Girinagar, Pune. From the relatively narrow scope of Armament Studies alone in the Fifties, the role of the Institute was considerably enlarged by the Defence R&D Council in 1964 and further in 1981.

In the year 2000, the Institute acquired the status of a Deemed to be University. IAT has been renamed as DIAT w.e.f. 1st April 2006 and has achieved A grade; Grade university status by NAAC. The remarkable efforts put in at improving the quality of education has lead the institute to achieve 58th Rank, 71st Rank, and 57th Rank in NIRF Ranking in Engineering Category for year 2021, 2022 and 2023 respectively making it one of the best institute for Engineering study in India.

Vision:

To be a center of Excellence of International repute for Education, Training and Research in advanced technologies with a view to strengthen national security and self reliance.

Mission:

To evolve as an Innovative Unique Research University to develop indigenous contemporary Defence related technologies in Navigation Systems, Wireless Sensors, Efficient Propulsion Systems, Weapon Systems for DRDO and Defence Services, provide technological solutions to the Services to optimise combat battlefield effectiveness and above all produce qualified quality manpower which can truly become an instrument for building a strong indigenous technology base in the context of creating a performing Defence Industrial Base in India.

Department of Electronics Engineering:

About the Department: The Department of Electronics Engineering, established in 1972, has steadily evolved from offering short-term training programs to advanced academic degrees, including M.Tech, MS (By Research), and Ph.D. programs. As part of a premier Defence University, the department plays a pivotal role in research and training, catering to DRDO Scientists, Defence Officers from Tri-services, personnel from Defence Public Sector Undertakings, industry professionals, and civilian students.

The department offers a Master of Technology (M.Tech) program in Electronics and Communication Engineering, with six specialized tracks:

- Signal Processing & AI
- Radar & Communication (R&C)
- Defence & Space Electronics (DSE)
- VLSI & Embedded Systems (VLSI)
- Semiconductor Chip Design (SCD)
- Hardware Security and Cryptology(HSC)

Each year, the program admits students, comprising GATE-qualified candidates and Self-sponsored/Industry-sponsored/Ministry of Defence (MoD)-sponsored candidates. Accredited by the National Board of Accreditation (NBA), New Delhi, this program provides cutting-edge knowledge and hands-on experience in critical areas of electronics and communication.

The department is equipped with state-of-the-art facilities, including Communication Lab, Antenna Lab, System-on-Chip (SoC) Lab, and Embedded Systems Lab, ensuring students gain practical exposure to emerging technologies. Additionally, the department conducts specialized short-term courses for DRDO and Defence Officers, reinforcing its commitment to advanced research and defense-oriented technological advancements.

Vision:

To be a center of excellence of international repute to provide high quality education, research and training in the area of Rasar and Communications, Signal Processing & Communications, Defence Electronics Systems, VLSI & Embedded Systems. To promote innovation and entrepreneurship skills amongst students with a view to strengthen national security and self reliance.

Mission:

To establish state-of-art research facilities to train the personnel as per the Defence needs especially in Electronics & Communication fields and to produce qualified quality manpower for the Defence requirements.

Faculty Members:

Prof. BHVS N. Murthy
Ph.D. IIIT Hyderabad,
Professor & VC, DIAT
vc@diat.ac.in

Prof. A A Bazil Raj
Ph.D. Anna University,
Professor & Head, EE
brazilraj.a@diat.ac.in

Dr. Kailas Sawant
Ph.D. DIAT Pune,
Asst. Professor, EE
kailassawant@diat.ac.in

Dr. Rishi R. Sharma
Ph.D. IIT Indore
Asst. Professor, EE
rsharma@diat.ac.in

Shri. M. T. Abhilash
M.Tech. (SRMEC)
Asst. Professor, EE
abhilash@diat.ac.in

Dr. Rajesh K. Singh
Ph.D. IIT Delhi
Asst. Professor, EE
rajesh_singh@diat.ac.in

Dr. Bhubon C. Mech
Ph.D. IIT Dhanbad
Asst. Professor, EE
bhubon_chandra@diat.ac.in

Administrative, Technical & Supporting Staff

Ms. Monika Chavan
Sr. Stenographer

Mr. Dileep Yadav
Lab Superintendent

Mr. Sanket Kalamkar
Sr. Lab Assistant

Mr. Mahesh Lonkar
Tradesman

Mr. Ashish Hedau
Tradesman

Chair Professor /Adjunct/Visiting Faculty Members:

Shri. V. G. Gujarthi
Padmashree Dr Arun Firodia Chair Professor
Research area: Business Management, Strategy advisor, Electronics product developer.

Dr. (Cdr) Shishir B. Sahay
(Ex-India Navy)
Visiting Faculty
Research area: Detection and Estimation theory, Digital Signal Processing.

Dr. Seshagiri
Director, NPOL, Kochi
Adjunct Faculty
Research area: Radar signal Processing and servo systems

Shri. S.S. Patil
Former Scientist LRDE Bengaluru
Adjunct Faculty
Research area: Radar System Engineer, Radar Signal Processing and Array Signal Processing, EW System and HPMW

Shri. T.S. Rashad
Scientist G, RCI, DRDO, Hyderabad
Adjunct Faculty
Research area: SoC, FPGA

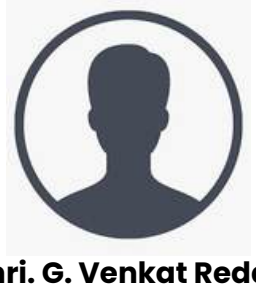
Dr. Arijit Ukil
Principal Scientist, TCS
Adjunct Faculty
Research area: Artificial Intelligence through Deep learning algorithms. Digital signal processing for Radar systems, developed software and hardware for naval and land radar systems.

Shri. Dinesh Kumar
Technical Director, Aritrak Technologies
Adjunct Faculty
Research area: Analog Communication

Dr. Sankalp Kumar
Synopsys India
Adjunct Faculty
Research area: VLSI and Semiconductor

Dr. N. Suresh Kumar
Scientist(RETD), NPOL
Adjunct Faculty
Research area: Signal Processing, Radar Processing and Array Signal Processing

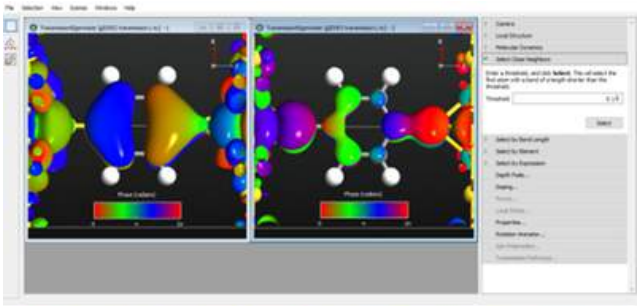
Dr. Shubhi Parolia
Post-Doctoral fellow, TIFR
Guest Faculty
Research area:High Energy Particle Physics, Astronomy & Astrophysics, Research Methodology



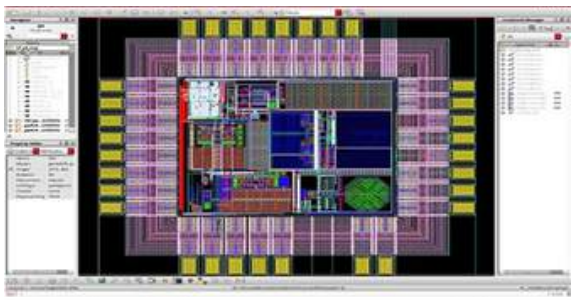
Shri. G. Venkat Reddy
Technical Advisor -Azista Aerospace Pvt. Ltd
Sc, H(Retd.) RCI, DRDO
Adjunct Faculty
Research area: Embedded Systems, Signal Processing

ADVANCED ATOMISTIC TO CHIP COMPUTATION LAB (A2C2) WITH HPC

HPC Specification	
CPU Cores	224
RAM	2048 GB
GPU	NVIDIA A100 80 GB
Memory	56 TB

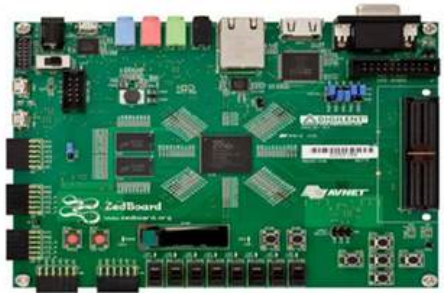


SYNOPSYS® | QuantumATK



cadence®

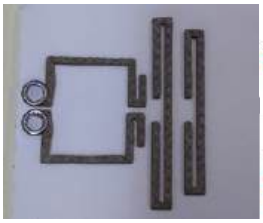
SOC & EMBEDDED SYSTEMS LAB

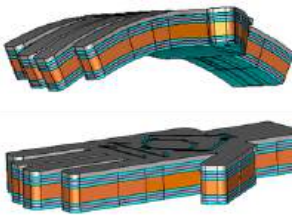


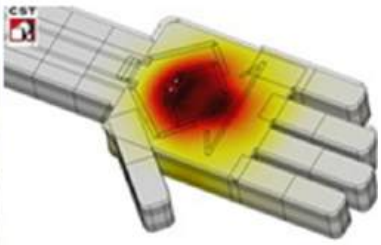
Major Facilities

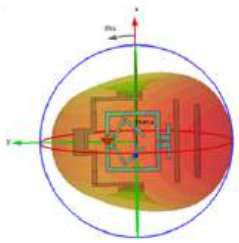
- Kintex 7, KC705
- Virtex 7, VC707
- Spartan 6 FPGA Development Board - Nexys 4
- Spartan 6 FPGA Development Board - Atlys
- ZED Board
- PSoC 5 First TouchTM Starter Kit
- PSoC MiniProg3 Program and Debug Kit
- CUDA Platform
- PSoC 3 Development Kit
- Altera FPGA cyclone EP2C5T144 s

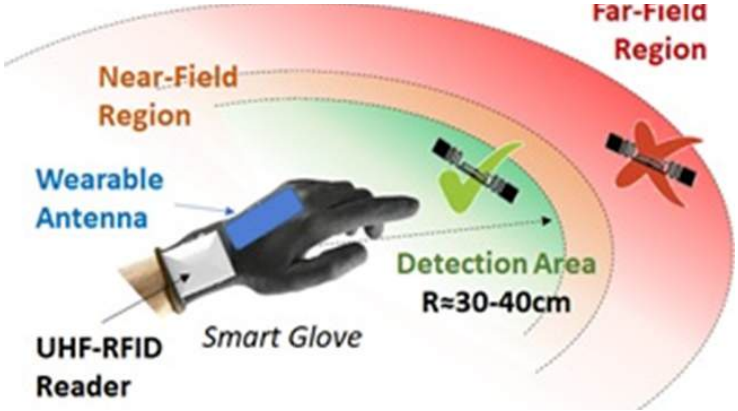
RFID LAB





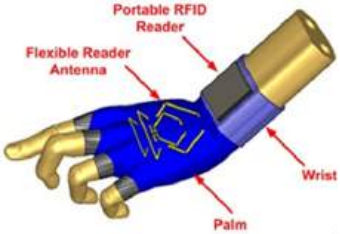






Major Work

- Smart Gloves
- Flexible Antennas
- Body Worn Antennas
- 2D & 3D Wearable Antennas



FABRICATION LAB

Major Facilities

- Copper-Clad Boards: FR4, ROGERS
- UV Exposure Unit, Baking Machine
- Etching Tank with bubblers
- Etching, Cleaning & Developer Solutions
- Film Development Facility, Drills etc.

SIGNAL PROCESSING, COMMUNICATION & NAVIGATION SYSTEMS LAB

Major Softwares

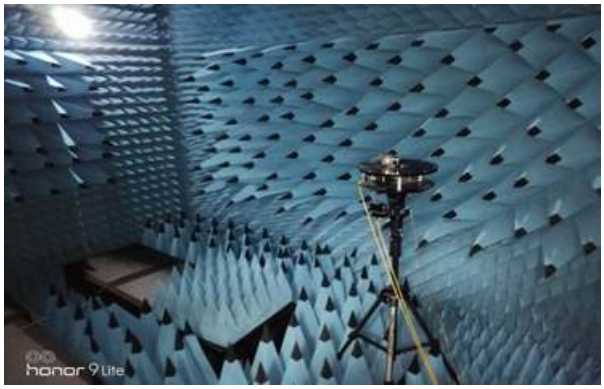
- Keysight Advanced Design Systems (ADS)
- Keysight Vector Signal Analysis (VSA)
- Keysight Electronic System-Level (ESL)
- Lab VIEW 2016
- GMSS Simulator
- GPS, IRNSS and GAGAN Rx

RADAR SYSTEMS LAB

Major Softwares

- System Vue – RF S/m and Radar S/m Simulator
- ADS – RF IC Design
- SAR Simulator
- Xilinx ISE 14
- MatLab

ANTENNA SYSTEMS AND SIMULATIONS LAB



Facilities & Equipments

- Anechoic Chamber
- Vector Network Analyser
- Antenna Trainer Kit
- Spectrum Analyser
- Vector Volt Meter
- Keysight Field fox (14GHz) – 4 in 1 Handheld device

MICROWAVE & RF LAB

Facilities & Equipments

- Wave Guide Trainer Kit
- MIC Kit
- Field fox (14GHz) – 4 in 1
- Network analyzer
- Spectrum Analyzer

EMI / EMC / EMP LAB

Facilities & Equipments

- EMI-EMC Chamber
- EMI EMC Trainer Kit
- Analog Signal Generator
- Vector Signal Analyzer
- Digital Storage Oscilloscope
- Antennas for EMI EMC Test
- Tune Rejection Filter
- RFI Transient Generator
- Transient Pulse Generator
- Spike Generator
- Line Impedance Stabilization Network
- RF Capacitor
- EMI Test Receiver
- TWTA

RF PHOTONICS LAB

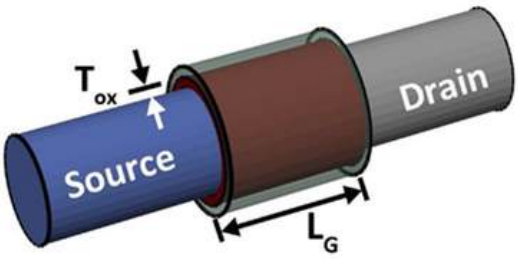
Major Softwares

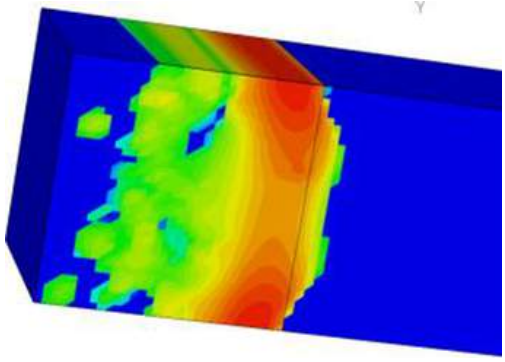
- Optisystem
- Matlab
- Vivado
- System View

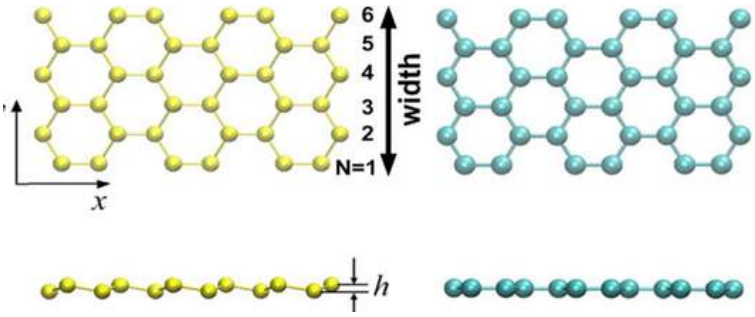
Major Equipments:

- Real Time Oscilloscope
- Vector Network Analyzer
- Spectral Analyzer
- Field Fox
- Signal Generator
- Optical Laser
- Mach-Zehnder modulator
- Photo Detector
- Optical Coupler
- Wavelength Division Multiplexing
- Erbium-Doped Fiber Amplifier
- Semiconductor Optical Amplifier

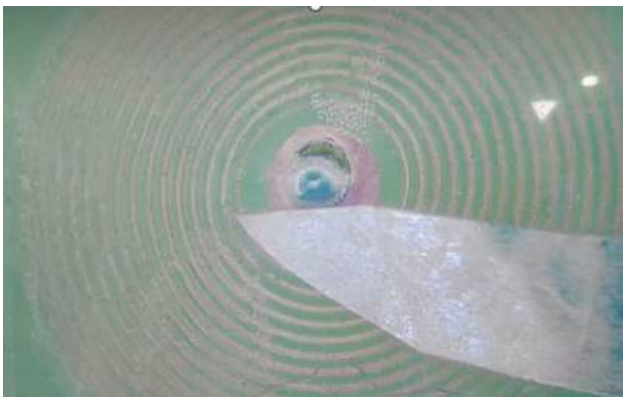
Research Areas:

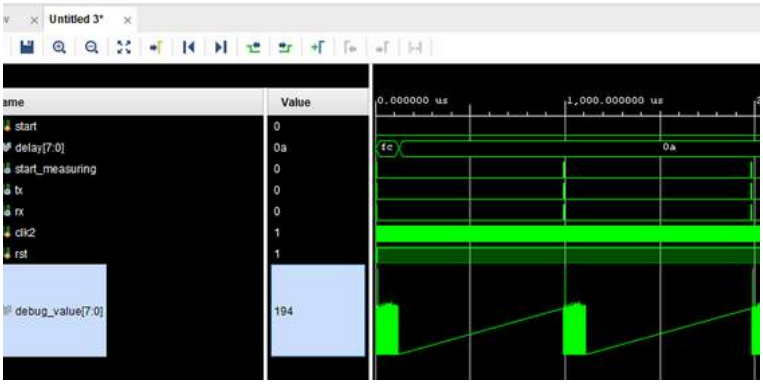


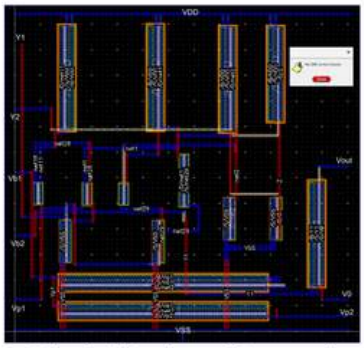




1. **Nanoscale FETs modeling & simulations.**
2. **Emerging two dimensional materials, heterojunction structures.**
3. **Millimeter-wave frequency circuits for 5G application.**
4. **AI and ML for VLSI circuit design.**
5. **FPGA and SoC.**
6. **Microsystems.**



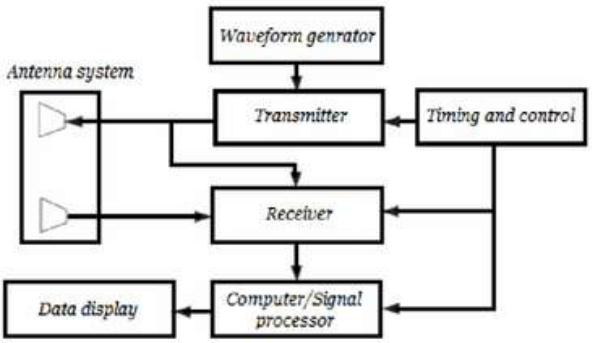




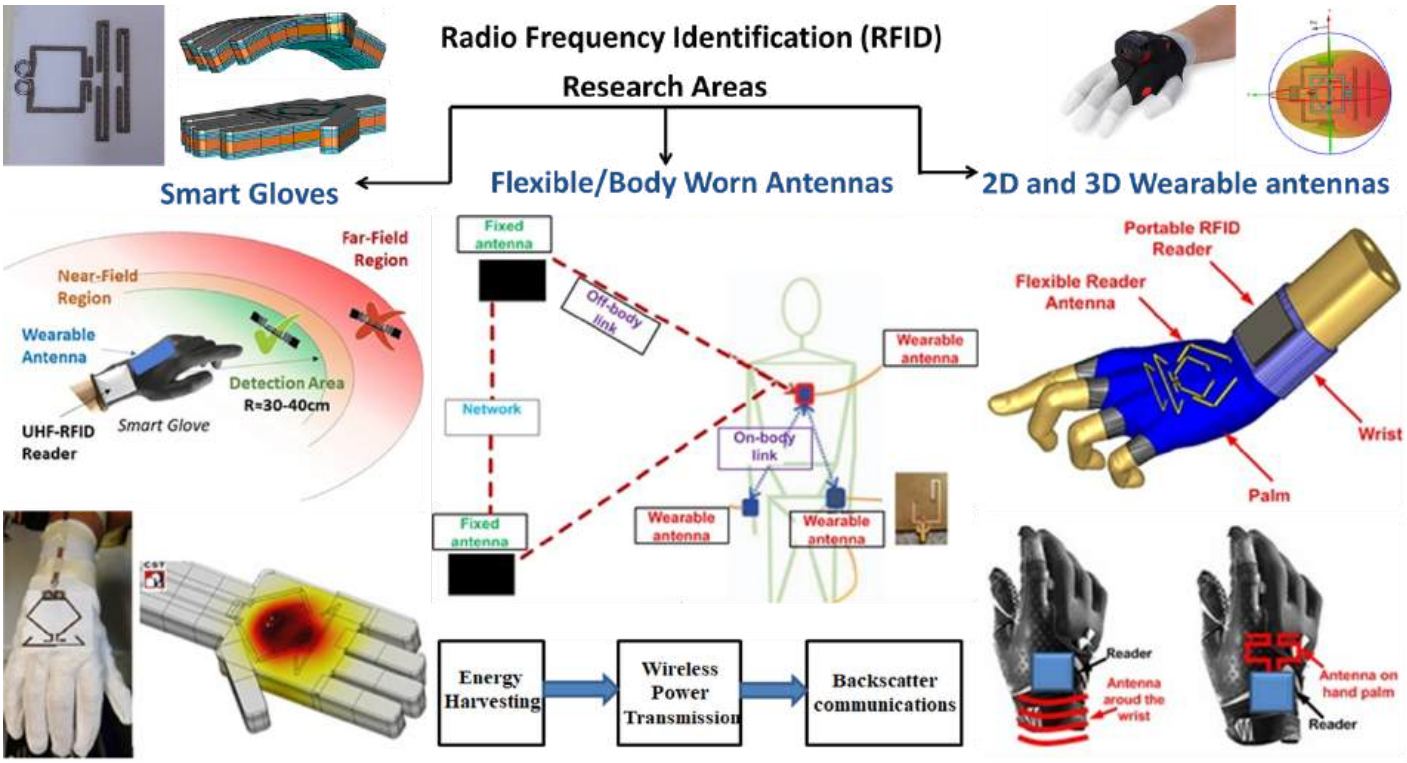
Physical Design of Proposed Memristor

DRC and Quantus Debug Window

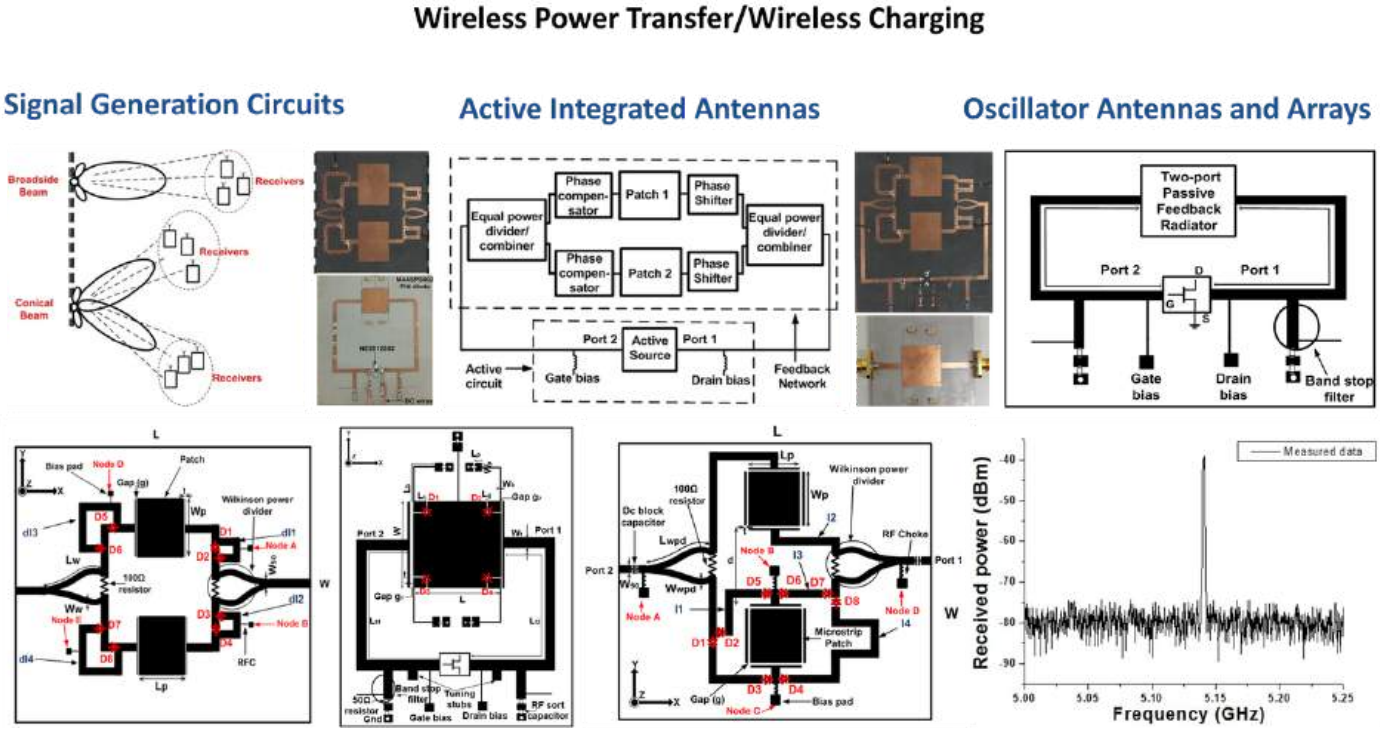
LVS Debug Window



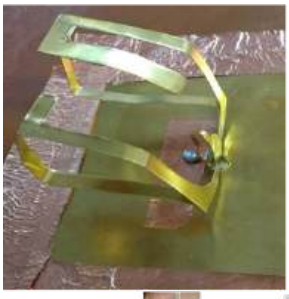
Research Areas:

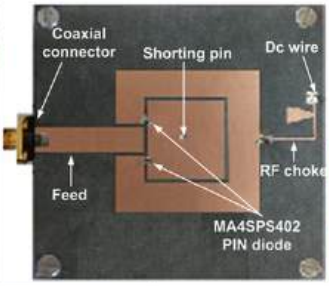


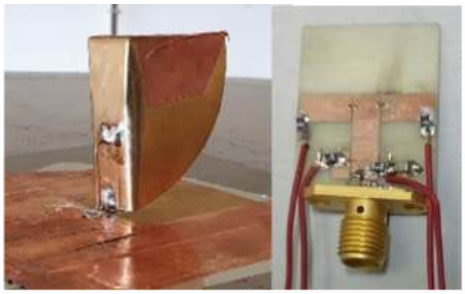
Wireless Power Transfer/Wireless Charging

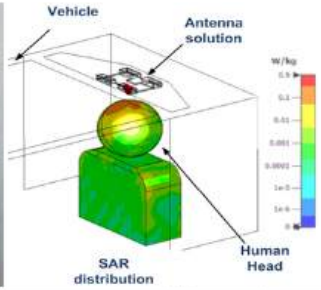


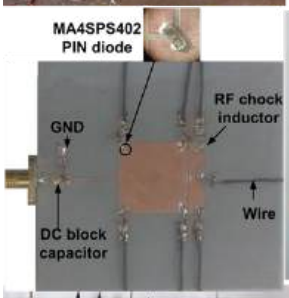
Research Areas:









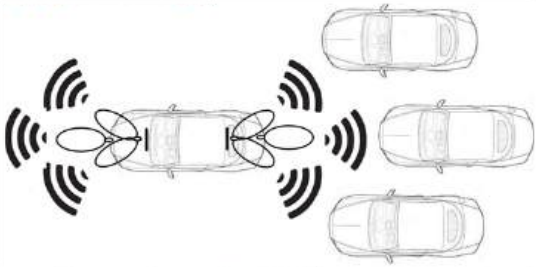


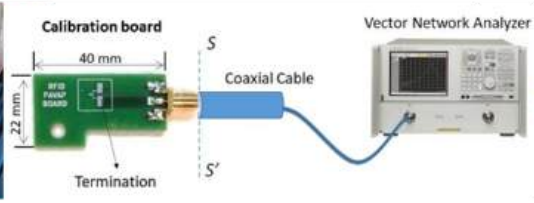
Reconfigurable Antennas

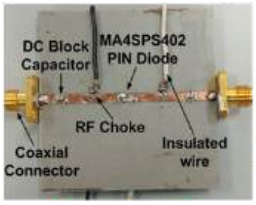
Planar Antennas

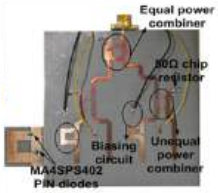
3D Antennas

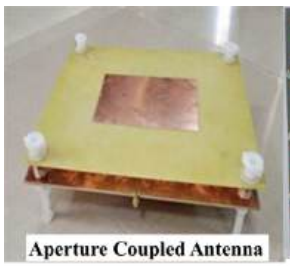
Automotive Antennas

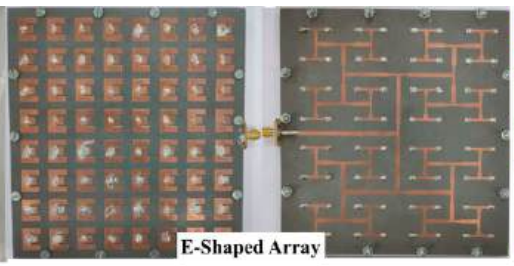


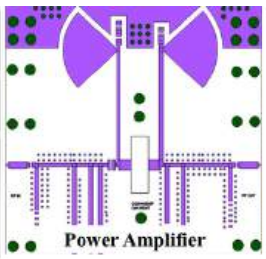


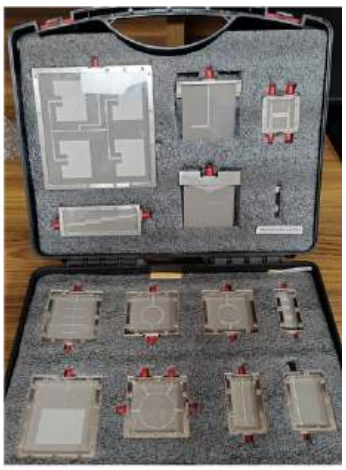












Low-Noise Amplifier

Mixer Circuits

Amplifier Circuits

Oscillator Circuits

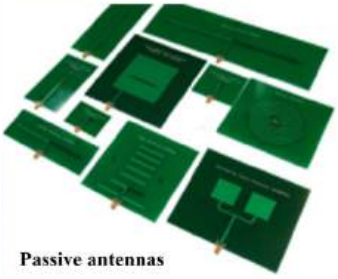
Energy Harvesting Circuits

Microwave Passive Circuits

VCO

Energy Harvesting Circuit

Antennas for Ground Penetrating Radar



Research Areas:

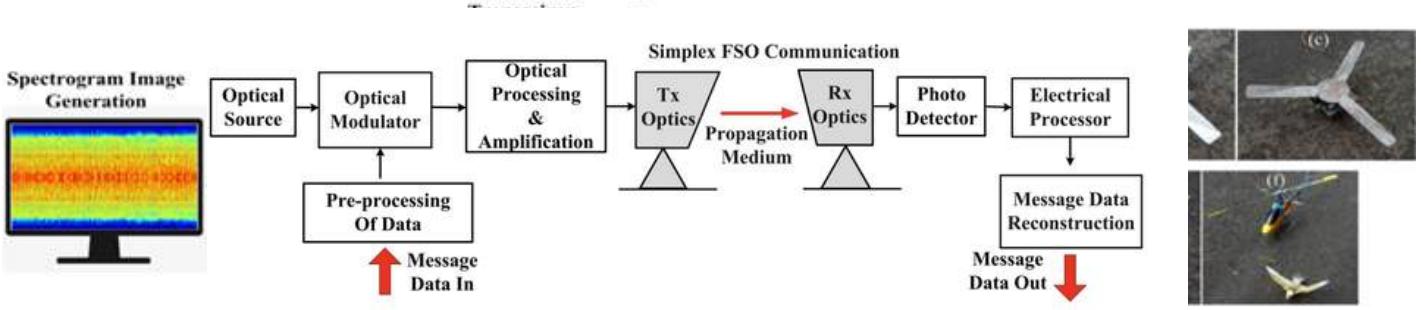


Figure 2: Top-level schematic of simplex FSO communication system.

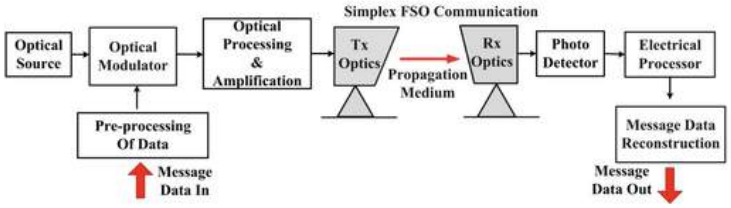
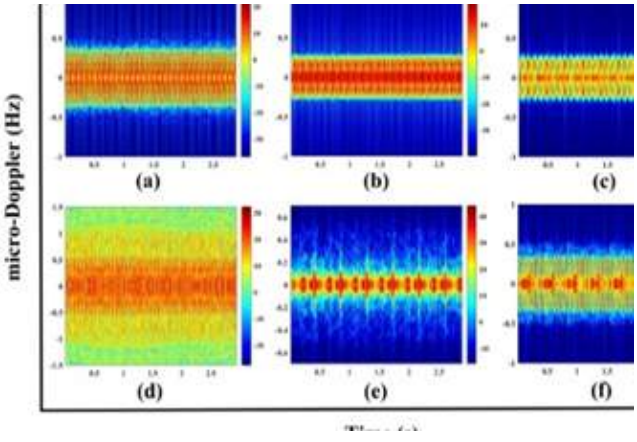


Figure 2: Top-level schematic of simplex FSO communication system.

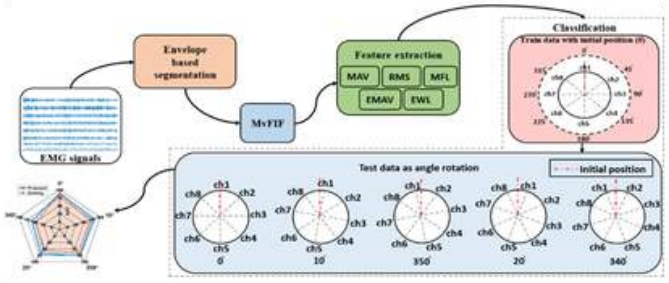
1. **Free space optical communication**
2. **FPGA**
3. **Radar signal processing (RSP)**
4. **Photonics radar**
5. **AI integration with RSP**



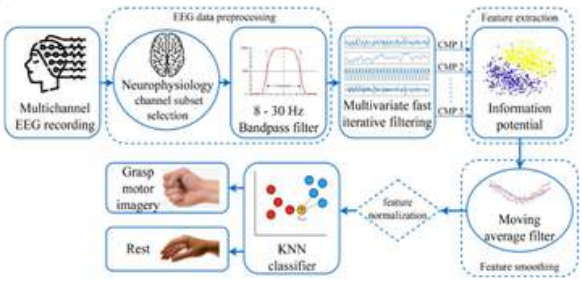
Long Range FSOC Research Facility:

Human Computer Interaction Research Facility:

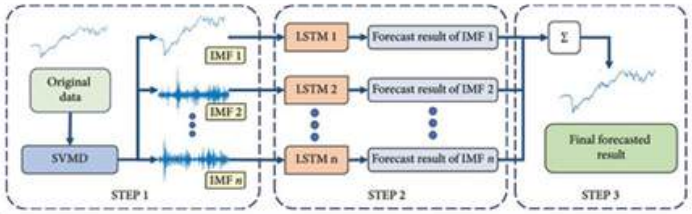
Electromyography (EMG)



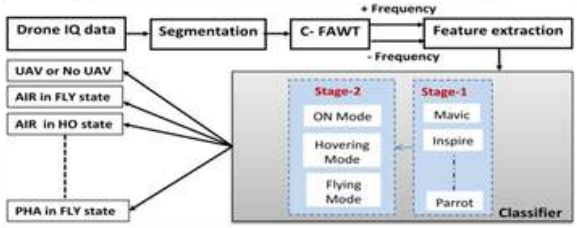
Electroencephalography (EEG)



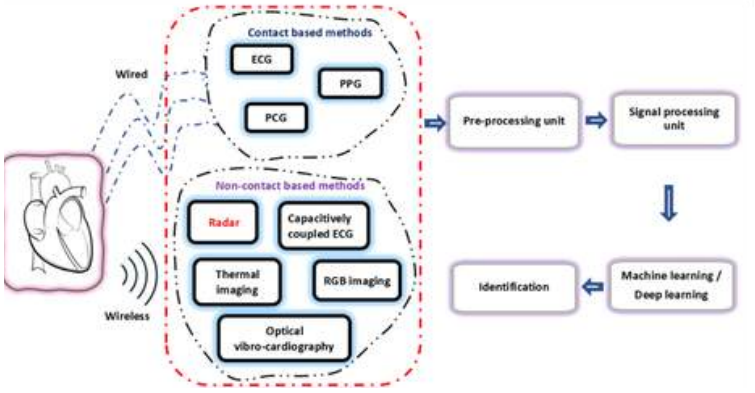
Time Series Forecasting



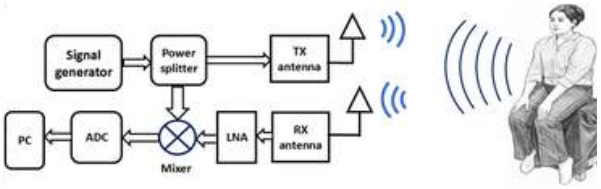
Unmanned Aerial Vehicle (UAV)



Heart Rate Monitoring



Radar



Sensors and Signal Intelligence Research Facility:

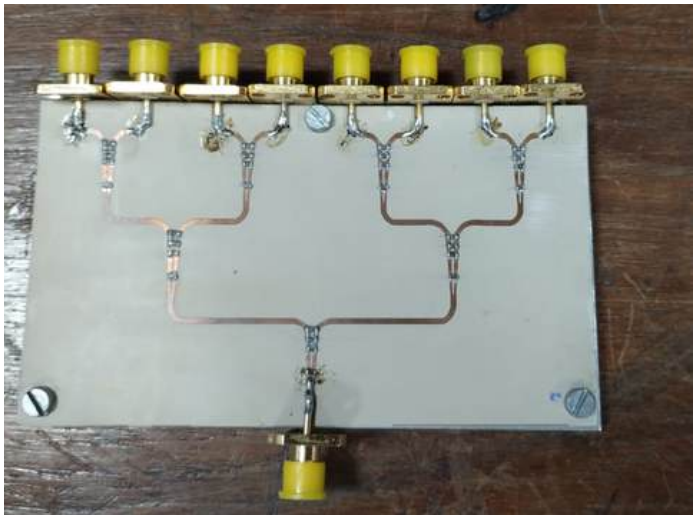
Projects:

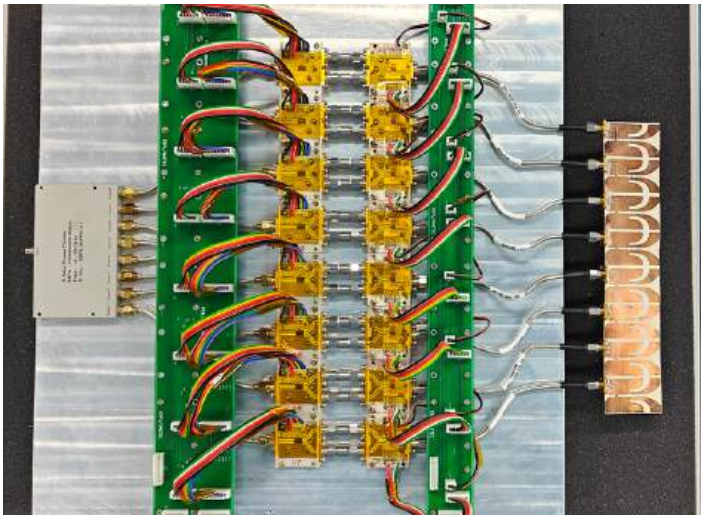
1. Design of Wideband HF Antennas, Prof. K. P. Ray & Prof. A. A. Bazil Raj, funded by LRDE, DRDO.
2. Electrically tuneable 3-3.45 micrometre quantum cascade laser for LiDAR Applications, Dr. Devnath Dhirhe & Prof. A. A. Bazil Raj, funded by LASTEC, DRDO.
3. Photonics radar design, Dr. A. A. Bazil Raj, funded by SERB New Delhi.
4. Algorithms for fast computation of Principal components for self noise cancellation in underwater acoustics, Mr. Abhilash M. T., funded by Naval Research Board.
5. WLAN integrated GNSS System for Indoor Navigation, Dr. K. Krishan Naik, funded by SERB, New Delhi.
6. Development of physical layer technologies and prototypes of acoustic modem and performance evaluation by channel characterization and modelling, Mr. M. T. Abhilash, funded by Naval Research Board.
7. Design and Fabrication of wide band rejection shields using multilayer of periodic resonator arrays and carbon based nanocomposites, Prof. Sangeeta Kale, Prof. A. A. Bazil Raj, funded by DST, New Delhi.
8. Design of FMCW RADAR, Prof. A. A. Bazil Raj, funded by DIAT Pune.
9. Wearable / Body worn antennas for medical and defence applications, Dr. Rajesh K. Singh, funded by DIAT Pune.
10. Design and Reconfigurable FETs using 2D materials for High Frequency applications, Dr. Bhubon C. Mech, funded by DIAT Pune.
11. EEG based sleep stages detection using advanced wavelength techniques, Dr. Rishi Raj Sharma, funded by TEQIP Collaborative research scheme.
12. Modelling of the ionospheric perturbation due to earthquake using long period VLF & TEC data and atmospheric gravity waves as lithospheric coupling agent, Dr. Rishi Raj Sharma, funded by Ministry of Earth Sciences, New Delhi.
13. Development of Wideband Antenna Array & Wideband RF Power Combiner/Splitter Network for Wideband RF System, Dr. Rajesh K. Singh, funded by SSPL, DRDO, Delhi.
14. Design of an X-band FMCW RADAR, Prof. A. A. Bazil Raj, funded by DIAT.
15. Development of a medium range (5-10 km) secured free space optical (FSO) voice simplex communication system for the mission critical wireless optical link, Prof.. A. A. Bazil Raj.
16. Photonics RADAR Design, Prof. A. A. Bazil Raj.
17. Long term training and report generation for feasibility study on OTH RADAR, Prof. A. A. Bazil Raj.
18. Antenna design for OTH RADAR, Prof. A. A. Bazil Raj.
19. Design and fabrication of wide-band rejection shields using multilayer of periodic resonator arrays and carbon based nanocomposites, Prof. A. A. Bazil Raj.

Products Developed:

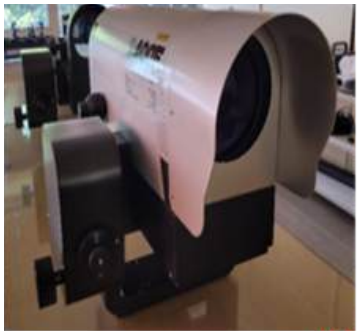
ATULYA: Microwave sterliser to disinfect COVID-19 corona virus

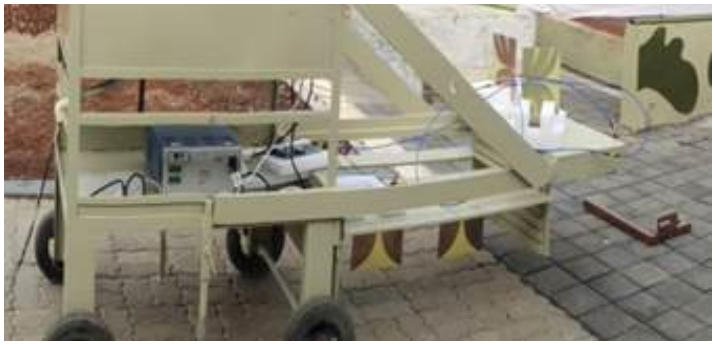
Wideband Antenna Array Network for Wideband RF Systems jointly developed with SSPL Delhi & GAETEC Hyderabad.



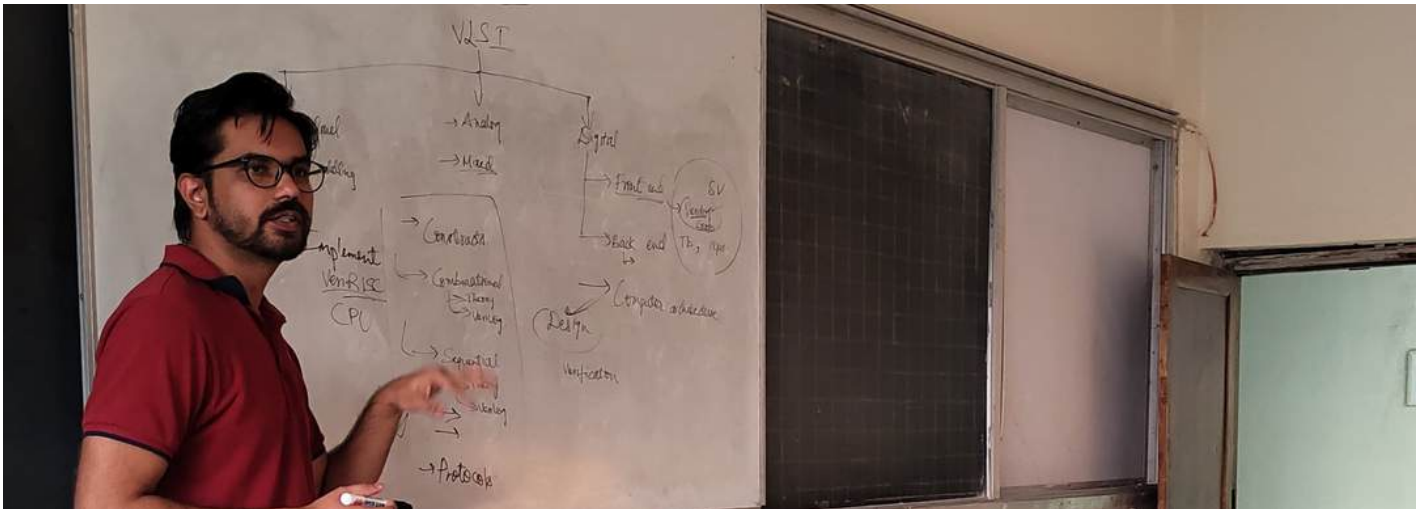


FMCW RADARS & FSOC Systems



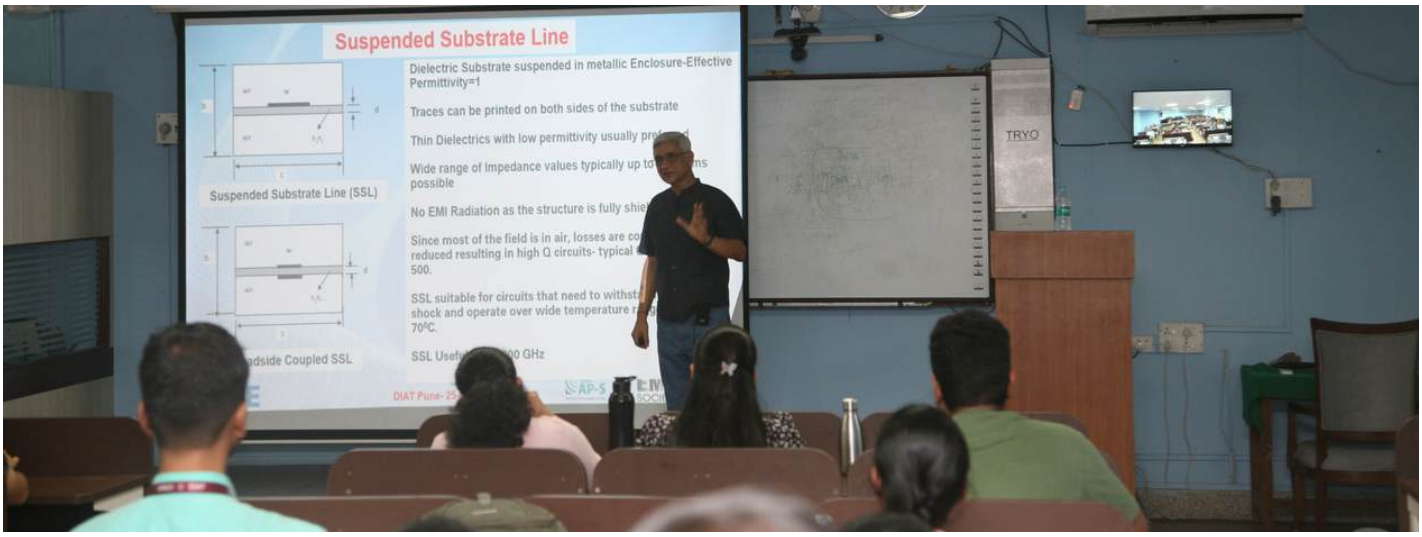


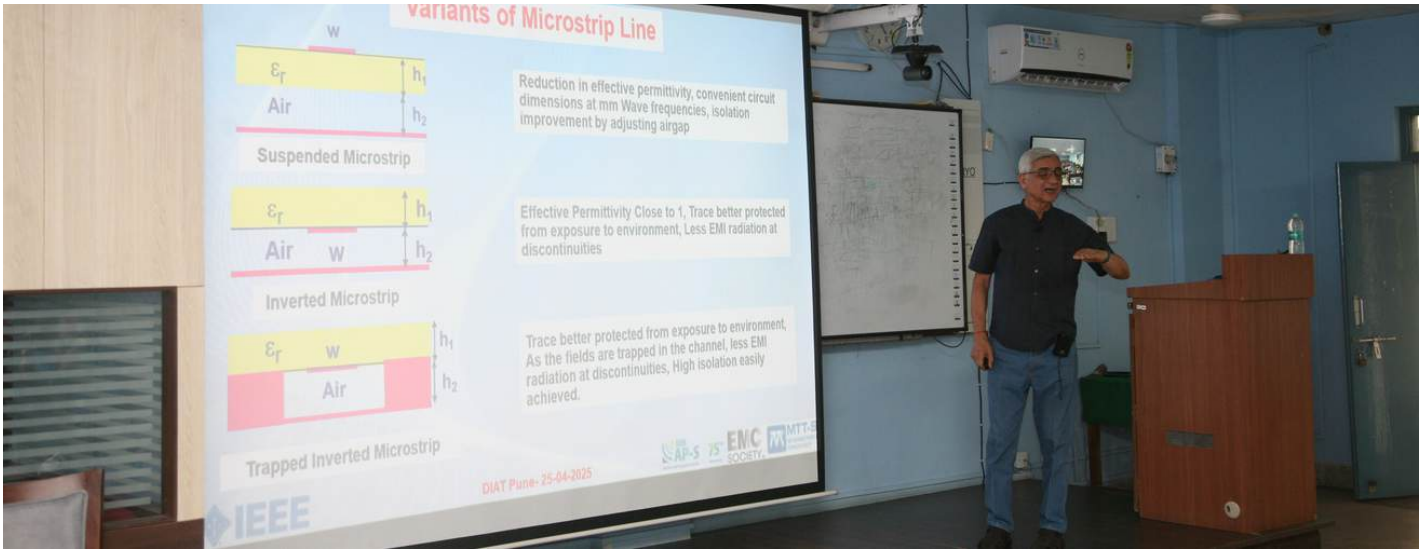
Abhyudaya: Hands on Training on VLSI Front End Design



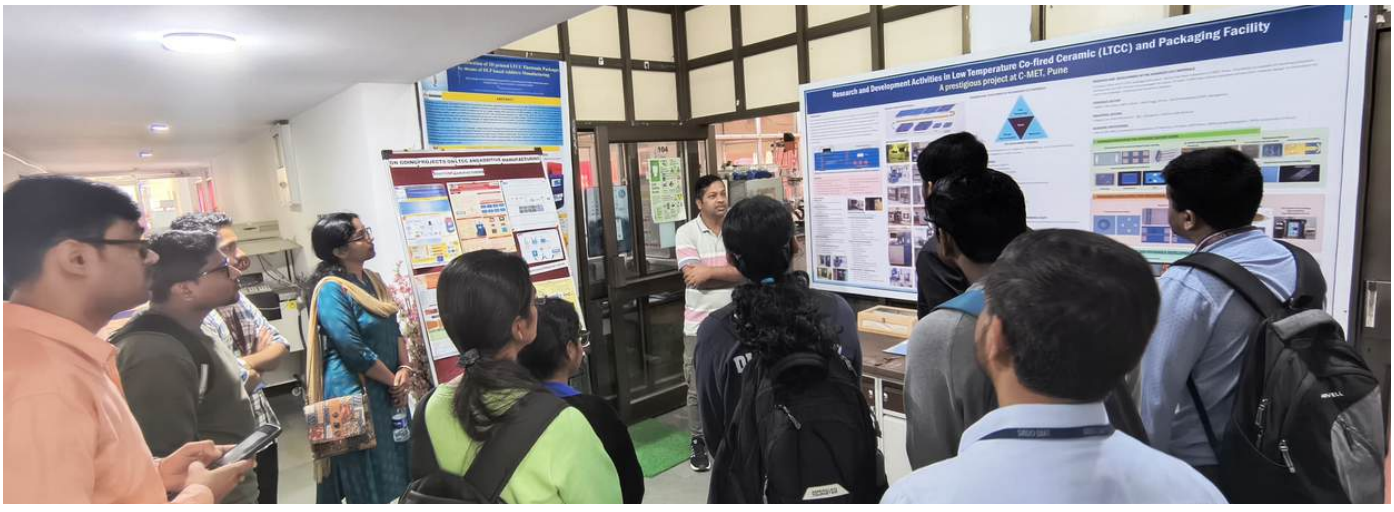
Distinguished Lecture by Prof. Archana Sharma on “Radiation Technology for Food, Water & National Security”

Distinguished Lecture and Welcome Talk for IEEE-DIAT EMC SB Chapter by Prof. Shiban K. Koul





ATAL Advanced FDP on “Innovations & Challenges of Wearable Electronics Especially in Senors / Antenna Domains”



SERB Sponsored High End “Karyashala” Workshop

Institute’s Innovation Council Workshop on “Wearable Sensors & Antennas”

Glimpses of Achievements from EE Faculties

Dr. Rajesh K. Singh receiving Best Teacher Award on DIAT Raising Day 2025

Prof. A. A. Bazil Raj in the Top 2% Scientists published by Stanford University for four times.

Dr. Rishi Raj Sharma to be gracing as the Technical Program Co-Chair

International Research Collaborations

Prof. Mazin Ali A. Ali
Mustansiriyah University, IRAQ

Prof. Arun K. Majumdar,
Stanford University, California

Prof. Alfonso FARINA,
University of Rome

Prof. Alessio Balleri
Cranfield University, UK

Prof. Sunday Ekpo
Manchester Metropolitan University
UK

Julian Cheng
University of British Columbia

International Research Collaboration

Prof. Georges Kaddoum
École de technologie supérieure
Canada

Prof. UcukDarusalam
Universitas Nasional, Indonasia

Prof Zabih Ghassemlooy
Photonics Technology Laboratory, Northumbria University, UK

Prof. Piotr Samczynski,
Radar Systems Group,
Warsaw University of Technology
Poland

Prof. Natan Kopeika
Ben Gurion University,
Israel

Prof. Muhammad Ijaz
Manchester Metropolitan University,
UK

Collaboration is for joint research, teaching, and Projects

Demonstrations and Reorganizations of our Research Works

- IEEE Senior Member Professional Award
- 6 times IEEE Inetr., Conf., Best Paper Award
- Top 2% world Scientists Award 2022 & 2023
- Texas Instruments design innovation 2021
- Best Teacher Award

Awards & Recognitions Received

Syres -2024 : Project Ideathon

Syres -2024 : Project Ideathon

Project Demonstration to RM in Convocation 2023

Inauguration of IEEE Student Branch

Inauguration of HERTZ-2025: Workshop on High End Radar Technologies

Placements

Placement Coordinators

Dr. Bhubon C. Mech

Dr. Rajesh K. Singh

Recent Campus Placements