

DR. RACHANA S. AKKI

Mobile: 91-9611100994

Email: rachana.akki@rvce.edu.in

PROFESSIONAL SUMMARY

- 20 years of Teaching experience in academia (2005-till date)
- Programming languages: MATLAB
- Simulation/Analysis packages: Ansys HFSS, COMSOL Multiphysics, ALTAIR (IR thermography)
- Equipment handled: Universal Compression Testing Machine, Vector Network Analyzer, FLIR IR camera, Ipitek Fiberoptic thermometry
- Experimental skills:
 - o Sensor Modelling using COMSOL Multiphysics Software
 - o Tissue mimicking phantom fabrication
 - o Electronic signal conditioning, data acquisition
 - o IR image capture and processing using ALTAIR and MATLAB
 - o Antenna fabrication and characterization on tissue mimicking phantoms



EDUCATIONAL QUALIFICATION

1. **Indian Institute of Technology, Madras, India(2012-2016)**
Ph.D in Engineering and Design with CGPA specializing in Early detection of Breast Malignancy using Microwave Radiometer, with CGPA of 7.71
2. **Poojya Appa Doddappa College of Engineering , India(2003– 2005)**
Master of Technology in Power Electronics with 79.00% .
3. **Prouda Devaraya Institute of Technology, Hospet, Karnataka, India(1997 – 2001)**
Bachelor of engineering in Electronics and Instrumentation Technology with 77%.
(Secured 7th Rank to the university)

COURSES HANDLED

1. Power Electronics
2. Network Analysis
3. Linear Integrated Circuits
4. Control Systems
5. PLC and SCADA Systems
6. Basic Electronics
7. Communication Systems
8. Antenna Wave Propagation
9. Signal Conditioning Circuits
10. Transmission Lines
11. Analog Circuits
12. Digital Logic Design
13. Bio-MEMS and NEMS
14. MEMS and Devices
15. Sensors and Actuators

16. Aircraft Instrumentation
17. MPI- Measurements And Process Instrumentation
18. Sensors and Transducers
19. Bio Medical Instrumentation
20. Automation And Process Technology
21. Industrial Automation and Technology
22. Control System Components
23. Engineering Management And Technology

LABORATORIES HANDLED

1. Power Electronics Lab
2. Control Systems Lab
3. Analog Electronics Lab
4. Digital Electronics Lab
5. BOSCH- REXROTH Lab
6. Linear Integrated circuits Lab
7. Instrument Transducers Lab
8. Process Control and Instrumentation Lab
9. Industrial Automation and Technology Lab
10. PLC and SCADA Lab

UG AND PG PROJECTS

Guided UG and PG projects in the area of :

1. Sensor Modelling and Characterization- Micro Cantilever Sensors
2. IoT for Smart Dams - flood control
3. Bio Medical Imaging
4. 2 Axis CNC Foam Cutting machine by controlling the temperature of Hot wire
5. Design of Planar Microstrip antenna array for 5G

Guided Doctoral degree in the area of:

1. Study of factors for early detection of Renal Cell Carcinoma

PORTFOLIOS HELD at Department and Central Level

1. Dept BoS Co-Ordinator
2. Dept BOE member
3. Dept. Skill Lab Co-ordinator for II Year
4. Dept. NAAC Co-Ordinator and Central Co-ordinator for Criteria 6.3.2
5. Involved in activities related to first year induction program at central level
6. Dept. NBA Co-Ordinator
7. Dept. Syllabus Co-Ordinator
8. Dept. Minor and Major Project Co-Ordinator

9. Dept. VTU/LIC Co-Ordinator
10. Dept. Time table co-ordinator
11. Dept. Test Co-Ordinator
12. Dept. Website Co-ordinator
13. Dept. Newsletter Co-ordinator
14. Dept. Counsellor
15. Dept. Lab In charge
16. Dept. Placement Co-Ordinator
17. Dept. library in charge

RESEARCH AREAS

1. Sensor Modelling, fabrication and characterization
2. Tissue mimicking Phantom fabrication and testing
3. Antenna design and miniaturization
4. Biomedical Instrumentation
5. Medical device development in the area of wearable sensors

RESEARCH PROJECTS

PhD Research: Study of Factors Influencing Early Detection of Breast Tumour Using Passive Medical Microwave Radiometry

Initial stages of tumour growth, exhibit an increase in localized temperature due to higher metabolic rates, this raise in temperature can be easily detected using medical microwave radiometer. A 3D numerical model was designed and developed using comsol multiphysics simulation software, to analyze and identify the influential controllable and uncontrollable factors. The involvement of tissue compression (controlling the tumour movement towards the antenna) and transient cold stress as major controllable factors, significantly improved the tumour visibility. Experimental measurements indicated that tumour of 10 mm diameter, at a depth of 30 mm, was able to record 5nW power by varying controllable parameters in comparison with nil recorded power at room temperature, using medical microwave radiometer...

Post Graduate Project: Design Development and Analysis of a PC based Leakage Current, Voltage measuring System in High Voltage Laboratory.

A Measuring Instrument designed to measure very high voltage and leakage current in string insulators and ZnO arresters with utmost Accuracy. Design includes, Design of voltage Divider for voltage Measurement, Design of shunt for Current measurement with protection, Design of power supply for the whole project.

Undergraduate Project: Power Cards

Aim of the power card is to reduce the pilferage of power and to curb the unauthorized utilization of power and to get correct revenue to the electricity board so that they can invest the same to the development works of generation power. The consumer can purchase units in advance depending up on his/her requirement by paying money in advance. Necessity of disconnection and reconnection does not arise here as the consumer can reconnect the installation by insertion of card in the meter setup, after the

completion of the units purchased the power automatically gets disconnected. In this case the board gets money in advance for the power sold and no necessity of maintaining the records.

PUBLICATIONS

Publication in refereed international journal

1. R. S. Akki, S. P. Sugumar, K. C. Venkata, and K. Arunachalam, "Multi-physics modeling to study the influence of tissue compression and cold stress on enhancing breast tumor detection using microwave radiometry," *Bioelectromagnetics*, 2019. (Impact factor of 3.91)
2. R. S. Akki and K. Arunachalam, "Cold stress Aids Detection of Deep Seated Thermal Anomaly in Compressed Tissue using Passive Microwave Radiometry " to be submitted to IEEE Letters (SENSORS)

Publications in referred National Journals

1. Nihal Hegde, Dhanya HU, Uthank Nandin NN, Rachana S Akki, "Real-Time Monitoring System for Agricultural Fields Using IOT" 10th Issue of RV Journal of Science Technology Engineering Arts and Management, ISSN : 2582-8819, Nov 2024.
2. Yashaswini B. M, Dr. Rachana. S. Akki, Design of Micro-Cantilever Biosensors for Detection of Latent Tuberculosis, International Research Journal of Engineering and Technology (IRJET) Volume: 07 Issue: 07 | July 2020

Publication in international conference proceedings

1. R. S. Akki and K. Arunachalam, "A study of factors influencing detectability of breast tumour in microwave radiometry," in *IEEE MTT-S International Microwave and RF Conference*, 2013, pp. 1-4.
2. Akki, R. S. and K. Arunachalam, "Breast tissue phantoms to assist compression study for cancer detection using microwave radiometry 2014 , 36th Annual International Conference of the IEEE Engineering in Medicine and Biology Society, IEEE.
3. V. M. Ravi, R. S. Akki, S. P. Sugumar, C.V. Krishnamurthy, K. Arunachalam, "Design and evaluation of medical microwave radiometer for measuring tissue temperature," *URSI Asia-Pacific Radio Science Conference India*, 2019. (to appear on IEEE Xplore).

HONORS /AWARDS

- Has been awarded **Certificate of Appreciation for being Panelist** in the **Panel Discussion Event for 6th Annual Convention on International Society of Gene & Cell Therapy & AIML-BIO 2024 on 11th and 12th of September**
- Has been awarded **Certificate of Distinction**, from **Indo Universal Collaboration for Engineering Education (IUCEE)** and **International Society for Engineering Education, Austria** upon successful completion of **IUCEE INTERNATIONAL ENGINEERING EDUCATOR CERTIFICATION PROGRAM Spring 2023**, for a duration of 6 months.
- Infrastructure upgradation was done by installing **PICK AND PLACE MACHINE** from **Electronic Automation Pvt Ltd.**, worth 15 Lakhs.
- Certified **YOGA VOLUNTEER** by **YOGA CERTIFICATION BOARD**, under the voluntary certification of yoga professionals, **Ministry of Ayush, Government of India**.
- Represented Department Road map **towards Outcome based Education, Human Resource,**

Environmental Ecosystem and Impact on NEP at Mini Millenium held at Grand Sheraton, Bangalore 12-04-2022.

- **As a placement co-ordinator was successful in calling Philips India Pvt Ltd., for hiring our students.**
- **NPTEL Appreciation Certificate for Programming in Java, Cloud Computing and Distributed Systems.**
- **IoT Based Milk Adulteration project was shortlisted for the SELCO FUNDING.**
- **Mentor Award for 5th Mitsubishi-Electric Cup 2020, National Level Competition for Factory Automation, conducted by Mitsubishi Electric India Pvt. Ltd, Japan, The project titled "SMART FLOOD CONTROL AND INTELLIGENT DAM COORDINATION SYSTEM by TECHNO-TUNERS", won 9th appreciation prize at the National level competition from October 2019 to February 2020.**
- **Was Honoured by ISTE-RVCE Chapter for obtaining Doctoral Degree from , IIT, Madras, 27th September 2019.**
- **Was Honoured by RSST Trust and RVCE, for receiving Ph.D, at IIT Madras on 26th January 2020.**
- **PhD fellowship** from IIT Madras
- **Travel fellowship**, Government of India , Awarded by Indian Institute of Technology Madras (IITM), 2014 (USA – 10 days).
- **7th Rank** to University in UG
- **Topper in School**

CONSULTANCY/INTERNSHIP TRAINING

1. Funding of **15 Lakhs** has been sanctioned by **Vision Group of Science and Technology (VGST), Govt. of Karnataka under the category KFIST L1**, for the project titled "**Fabrication of Breast Tissue Mimmicking Phantoms, Characterization of Elastic and Acoustic Properties with Numerical Model Validation**" in the year April 2023.
2. Funding of **50,000/-** for consultancy work for the project work titled, "Design of Automated Injection Machine for Panchakarma treatment for Kalash Medtech Pvt Ltd.," in the year 2023.
3. 20 Students under CoE, Bosch Rexroth, RVCE for the internship training program
4. 09 Students under CoE- E- Mobility, RVCE for the internship training program
5. 01 Student from CoE-IDRC, RVCE for the internship training program.

INVITED TALKS

- **Delivered technical talk and Hands on Sessions to Professors of various Engineering colleges on Applications of COMSOL Multiphysics, under AICTE SPONSORED "Share and Mentor Institutions (Margadarshan) scheme" on 06th and 09th February 2018.**
- **Delivered a technical talk to Professors/ Students of various Engineering colleges on "Simulation and Modelling of thin films using COMSOL Multiphysics" for a five day online FDP on "THIN FILM TECHNOLOGIES: Fabrication, Characterization and Simulation", Jointly organized by IDRC, Dept of Physics, Chemistry, ECE, ME, Chemical Engineering and COE-Macroelectronics, RV College of Engineering, Bengaluru during August 3-7, 2020.**
- **Delivered a technical talk to students of engineering colleges on "Introduction and Application of COMSOL Multiphysics for E Vehicles ", for an Internship training program under Centre Of Excellence- E- Mobility, on 15th October 2020.**

- Delivered a webinar on “COMSOL MULTIPHYSICS SOFTWARE FOR RESEARCH AND PROJECT APPLICATIONS”, for Indo-Universal Collaboration for Engineering Education (IUCEE) Foundation on August 25th 2021.
- Delivered Talk on Effective Assessment techniques & Activities on 28/07/2023 for faculties at RVCE

INTERACTION WITH OUTSIDE WORLD

- Associate editor for RV Journal of Science of Technology Engineering Arts and Management
- Doctoral Committee member for Ph. D candidate at Parul University in the area of “DESIGN AND ANALYSIS OF MEMS BASED PRESSURE SENSORS”

TEACHING, LEARNING AND EVALUATION RELATED ACTIVITIES

1. Actively participated as placement co-ordinator and organizing committee member for VTU Conclave held at RVCE Campus on 30th January 2023.
2. Initiated ISO 13485 and NABL accreditation of LABS”, by Mrs. Aradhana Mishra, from MTIC INTERCERT INDIA PVT LTD (FORMERLY KNOWN AS TUV), on 28th APRIL 2022.
3. Initiated several rounds of interaction with Philips India Pvt. Ltd., Bangalore in setting a platform for establishment of CoE, Collaboration of Scientists and Internship for both UG and PG.
4. Actively involved in **Curriculum revisions** for UG [Aircraft Instrumentation, Automatic Process control and Instrumentation, Industrial Automation Technology, Process Instrumentation, Measurement and Instrumentation]/ PG [MEMS course where the COMSOL software was introduced to the course for the first time, Bio Medical Instrumentation.) affiliated to VTU.
5. **Proactively engaging Extra Lectures/ Lab sessions** for students to ensure portion coverage, delivery of Course materials and extra contents in time.
6. Consistently receiving an average **Faculty Appraisal of >85%** from students and **Pass percentage of >90%** in all the courses handled.
7. Introduced out of the box thinking in the course “**Product Design technology**” for 6th semester students during (2016-2017), they were taught to do their own **Printed circuit boards** useful for their minor and major projects. From the process of drawing the circuit to the etching of the board was taught in the class room. **This was well appreciated by the visited NBA peer committee.**
8. Introduced a new topic on “**Calibration**” in the course “**Measurement and Instrumentation**”, for 3rd semester students for better understanding about the topic by our students.
9. Introduced the **COMSOL, Multiphysics software**, to **PG BMSPI** students as a part of their COURSE,

"Bio-Mems and Nems lab" where they were guided to develop a simulation model for micro level capacitive sensor, piezoelectric sensor etc., Designed and developed lab experiments where examples on real problems of tissue compression (faced in mammography) and thermal analysis on tissue and many sensors were simulated to understand their behavioural characteristics.

10. I have offered a new set of advanced automation experiments through a new software **"AUTOMATION STUDIO"** in Industrial Automation and Technology course for the first time in E and IE Dept. The software was learnt and taught for VIIth semester batch of E & IE students. This new software was implemented and interfaced for operating the existing hardware units like bottle filling, elevator, and material sorting. The students had new learning experience with this software which is very much needed for their curriculum development.

DR. RACHANA S. AKKI
Assistant Professor
Dept of E &IE
RV College of Engineering
Bangalore