Department of Electrical Communication Engineering

Indian Institute of Science, Bangalore

List of Open Positions for PhD Admission, January 2023

The following are the open positions with different faculty members of the department

Chandra R. Murthy

Experimental work on the 5G Testbed

A. Chockalingam

Research in wireless communications with focus on physical layer waveform designs and transceiver techniques/algorithms. Current focus areas include:

* OTFS modulation for high-Doppler channels (in 6G and beyond)

* Intelligent reflecting surfaces (IRS) aided wireless communication

* Deep learning techniques/algorithms for efficient wireless transceivers design"

B.Sundar Rajan

1) Energy-efficient and High-rate modulation and coding for 6G and beyond.

(2) Cache-aided Communication for next generation wireless systems."

Vaibhav Katewa

1. Security and Privacy in Cyber-Physical Systems

2. Learning-based Control of Networked Systems

These are interdisciplinary projects that use mathematical tools from linear algebra, probability, optimization, control, signal processing etc. Students will also get an opportunity to do experimental work on drones and ground robots as per their interests. For more details, please visit my webpage - https://cps.iisc.ac.in/faculty/vaibhav/

Navin Kashyap

Design and implementation of security protocols within the [IEC 62351](#) standard for security of communications within a smart power grid. (position supported by PGCIL)

Rajesh Sundaresan

Image data banks. The project will involve creation of gold standard image data banks for some common cancers to enable AI pipelines for early cancer detection. This will be part of an ICMR sponsored project.

Sudhan Majhi

Project 1: Mobile Edge learning and computing for 6G Communication

Project 2: Integrated sensing and communications (ISAC) with UAVs for 6G

Project 3: Cell-free massive MIMO, mobile edge learning and computing"

Debdeep Sarkar

Tentative Title: Design and Analysis of Conformal Frequency Selective Surface (FSS) Based Radomes for Near-field Integration with Antenna Systems

Objectives and Scope: The research will focus on co-design of FSS Radomes and antennas which will ensure low RCS (radar cross section) of the integrated system. The FSS Radomes will be placed in the antenna near-field, and will possess conformal shape, hence the computational analysis will not be like plane wave excited flat FSS panels. The work will require exploration of new Computational Electromagnetic techniques customized for the application scenario.

Furthermore, there will be emphasis on FSS Radome fabrication and its testing in collaboration with concerned government agencies. More details will be provided in our research group website soon: https://ece.iisc.ac.in/~debdeeps/"

KJ Vinoy

Stochastic Computational electromagnetics for time or frequency domain analysis for high frequency RF-sub Terahertz circuits.

Rajiv Soundararajan

View Synthesis for Virtual Reality: Several virtual reality applications require the synthesis of novel views using very few other views of a given scene. The goal of this project is to explore real time novel view synthesis using different techniques such as multi-plane images or neural radiance fields when very few views of the scene are available. We wish to explore this problem in the context of generic scenes as well as human avatars. See https://nagabhushansn95.github.io/publications/2022/DeCOMPnet.html for related work.

Varun Raghunathan

To work on integrated quantum photonics. This project will involve the design, fabrication, packaging and experimental characterisation of a quantum communication transmitter chip. The student will learn guided wave photonics, device fabrication, optoelectronic integration and experimental optics techniques.

T Srinivas

Quantum computing using photonics.

Kausik Majumdar

The student is expected to work on one or more of the following projects. All these projects will require a combination of both theory and experiment. The candidate should have a strong foundation of basic physics, mathematics, and electronics. During the PhD tenure, the student will be trained in the state-of-the-art experimental facility the lab hosts. The nature of the projects will make the student ready to take up both academic and industrial positions at the end of the PhD. To get a feel about the nature of the work, I strongly encourage the candidate to have a quick look at our research publications here: https://ece.iisc.ac.in/~kausikm/publications.html

1. Design and experimental demonstration of single photon emitter [Application area: quantum communication, quantum processing, enhanced imaging, space]

2. Design and experimental demonstration of high efficiency single photon detector at room temperature in visible and infrared region [Application area: quantum communication, quantum processing, sensing, imaging, space, military]

3. Building hardware for ""true"" random number generation [Application: Security, cryptography]

4. Design and demonstration for light-induced artificial magnetism and spin devices [Application: Spin manipulation for low power computing, sensing, artificial magnetism, topological physics]

5. Light-matter interaction in 2D materials and their heterojunction [Application: Exciton physics, exotic phenomena, spectroscopy]

6. Transistor scaling down to sub-5 nm [Application: electronics, high speed computation]