Indian Institute of Technology Delhi

School of Interdisciplinary Research (SIRe)

SIRe Project Number
2022-01-21

(will be assigned by SIRe)

PhD Project

Project Details	
Project Title	Indigenous Low-Cost Smart Semiconductor Sensors for Dosimetry in Radiation Therapy for Cancer Treatment
Project Summary	India is seeing a constant growth in cancer cases with over 1.4 Million cases in 2020. Radiotherapy such as IMRT (Intensity Modulated Radiation Therapy), Image Guided Radiotherapy, Brachytherapy etc. are some of the major treatments offered by most cancer hospitals treating carcinomas. Monitoring and calibrating the radiation dosage is essential for safe use and efficacy of these therapies. However, almost all dosimeters used by hospitals have to be imported and are very expensive, thereby increasing the overall cost of cancer treatment. This project aims at developing Indigenous Low-Cost Semiconductor Based Radiation Sensors that can replace expensive imported dosimeters by targeting specific applications in Cancer Treatment through Radiation Therapies. The project involves use of organic semiconducting devices with very high sensitivity to ionizing radiation to be developed as smart dosimeters through novel instrumentation interfaces controlling and sensing the electro-physical characteristics and response of the sensors in real-time to ionizing radiation. Further, the developed low-cost sensor platforms would be benchmarked against existing dosimeters for several usage characteristics such as dosage, dosage rate, physiological factors, spatial orientation etc. Thereafter the developed instrumentation platform will be miniaturized and the integrated sensing platform packaged into a clinically usable system for various applications in Cancer treatment.

PhD Supervisors

Role	**Faculty**	**Academic Unit in IITD**	**Email ID**
Supervisor 1	Prof. V. Ramgopal Rao	Dept of Electrical Engineering	rrao@iitd.ac.in
Supervisor 2	Prof. Leena Nebhani	Dept of Materials & Science Engineering	leena.nebhani@mse.iitd.ac.in

Project requirements (Student qualications, experience required, etc)

- BE./B.Tech./M.E./M.Tech. in Electrical / Electronics/Materials Engineering or M.Sc. in Physics
- Expertise in MEMS, NEMS, Materials Characterization, instrumentation design, medical electronics, product design.

Source of funding (IRD/FITT Project details, if any)

JC Bose Fellowship Project in IRD, if no institute fellowships are available.

Role of Faculty Members involved:
Prof. V. Ramgopal Rao, EE MEMS, NEMS Design Device Fabrication Instrumentation Design Medical Electronics Design
Prof. Leena Nebhani, DMSE Materials Selection & Characterization