Indian Institute of Technology Delhi

School of Interdisciplinary Research (SIRe)

SIRe Project Number

2023-01-22

(will be assigned by SIRe)

Project Proposal for Ph.D.

Project Details	
Project Title	Developing DNA Field-Effect Transistor (FET) as a Sensing platform for Agricultural Applications
Project Summary (Minimum 500 and maximum 2000 characters)	Field-effect transistors (FETs) are widely used in electronics and play an instrumental role in revolutionizing several applications, including healthcare, semiconductors and biosensors. DNA field-effect transistors (DNA FETs) are a type of biosensor that have gained attention in recent years due to their high sensitivity, selectivity, and ability to detect biomolecules at low concentrations. Developing DNA FETs for agricultural sensing applications could provide a vital resource for advancing crop production, crop productivity, preventing crop loss and enabling real-time monitoring of plant health and growth. DNA FETs can detect specific DNA sequences in plants, which can provide valuable information on their health status, microbial invasion and growth rate. To revolutionize the crop production and protection, the DNA from different sources will be used for developing DNA FET and subsequent investigation of gate material and surface modification will be tested on precision monitoring of different crop groups for most effective solutions and crop forecasting. The development of DNA FETs for agricultural applications has the potential to revolutionize the field of precision agriculture and improve crop yields. This research proposal outlines a systematic approach to developing DNA FETs with improved sensitivity and selectivity and exploring their potential applications in precision agriculture. The results of this research will have significant implications for the development of new diagnostic tools and techniques for agriculture and improving food security.

Ph.D. Supervisors

Role	Faculty	Academic Unit in IITD/Institute/University	Email ID (Official)
Supervisor 1	Prof. Kavya Dashora	CRDT, IIT Delhi	kdashora@rdat.iitd.ac.in
Supervisor 2	Prof V Ramgopal Rao	EE, IIT Delhi	rrao@iitd.ac.in

Project requirements (Student qualifications, experience required, etc)

- MTech in Biotechnology
- Prior experience in working on biosensors, DNA is desirable

Source of fellowship/funding (CSIR/UGC/DBT/ICMR/ICAR/NEET-PG/DST-INSPIRE/IRD/FITT Project details, if any)
Institute Assistantship (IA) from Prof. Kavya Dashora

Role of Faculty Members involved:
Prof Kavya Dashora- Supervisor : will provide supervision on all aspects related to DNA and it's modification. Prof V Ramgopal Rao: Biosensors, characterization, Sensing, electronics etc.