## Project Details

### Project Title
A Plant-Care Monitoring System for Detection of Pathogens

### Project Summary
Food security has become an emergent global issue, especially in the post-COVID era, given the decrease in production of raw material during COVID while human population continued to increase at 8 billion with a trajectory to 10 billion by 2050. To address these concerns, hydroponic greenhouses have evolved into a viable means of farming where water utilization efficiency is greater than 90% and crop productivity is markedly increased. With increasing threats to traditional agriculture production due to the vicissitudes of climate conditions, hydroponic greenhouse solutions are on the rise and will increasingly account for a critical share of global agricultural production.

Despite their advantages, hydroponic greenhouses have a significant vulnerability: pathogens. The objective of this project is to experimentally demonstrate a sensitive, highly accurate and rapid point-of-plant-care pathogen contamination sensing system for early-stage detection of incipient pathogens in greenhouses. In view of this plant virus and bacterial monitoring system using Field effect transistor will be designed, fabricated and tested.

### Ph.D. Supervisors

<table>
<thead>
<tr>
<th>Role</th>
<th>Name of Faculty</th>
<th>Academic Unit in IITD/Institute/University</th>
<th>Email ID (Official)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supervisor 1</td>
<td>Samaresh Das</td>
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<td>Supervisor 2</td>
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</tr>
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### Project requirements (Student qualifications, experience required, etc)
*The candidate will be shortlisted based on common shortlisting criteria decided by ScRC (SIRe)*

- M.Sc. Physics or Electronics with interest in sensor development
- M.Tech in EE/ECE/Electronics/Nano Technology/ Solid State Physics (Devices)

### Source of fellowship/funding
(CSIR/UGC/DBT/ICMR/ICAR/NEET-PG/DST-INSPIRE/IRD/FITT Project details, if any)

Project Funding /Own Fellowship

### Role of Faculty Members involved:

**Supervisor-1**
Prof. Samaresh Das will be involved in fabrication of The field-effect transistor (FET) device.

**Supervisor-2**
Prof. Prashant Mishra will be involved in developing sensing layer using artificial receptors and validation of pathogen detection using various standard techniques.