## PhD Project

### Project Details

<table>
<thead>
<tr>
<th>Project Title</th>
<th>Control of Processes used for Production of Biotech Therapeutic Products</th>
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| Project Summary | Biotech unit operations are by nature complex. Most of the underlying physicochemical processes are non-linear in nature, making their control non-trivial. This project will entail development of advanced process controls for production of biotech therapeutic products. Specifically, the student will be responsible for performing the following activities:  
1. Modeling of the various unit operations  
2. Identification of the appropriate analytical method for process monitoring  
3. Creation of advanced process controls for the various unit operations  
4. Integration of the process models and the monitoring schemes to create process wide control  
As the scope of this project is inter-disciplinary in nature, spanning skills from bioprocessing to control, the admittance of the student would be best suited under the SIRe scheme. The resources required to successfully carry out research in the host lab would be made available to the admitted student along with appropriate training. |

### PhD Supervisors

<table>
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<tr>
<th>Role</th>
<th>Faculty</th>
<th>Academic Unit in IITD</th>
<th>Email ID</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supervisor 1</td>
<td>Anurag S. Rathore</td>
<td>Chemical Engineering</td>
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<td>Supervisor 2</td>
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### Project requirements (Student publications, experience required, etc)

**Qualification:**  
B Tech/ MS/M Tech in biotechnology or biomedical (1st division)

**Experience required** (Mandatory skills)  
1. Familiarity with bioprocess unit operations  
2. Hands on experience with bioprocess unit operations  
3. Familiarity with commonly used analytical methods for protein analysis like HPLC, MS, CD, FTIR etc  
4. Well versed in programming languages Python and C

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

| FT/03/1964/2018 | Process Automation and Continuous Process Monitoring Analysis & a model based predictive Control with a view to digitize the Continuous Biopharma Processing |
### Role of Faculty Members involved:

**Supervisors:** Prof. Anurag. S. Rathore - Bioprocessing  
**Co-Supervisor:** Prof. I N Kar – Process control