



Project Proposal for Ph.D.

Project Details

Project Title	Fabrication of intelligent materials for regulating biofilm formation in bioreactors
Project Summary (Minimum 500 and maximum 2000 characters)	Wastewater treatment and other technologies must adapt to be sustainable into the future. Lower cost and energy systems are critically needed. However, they must still be capable of treating conventional as well as emerging pollutants. Among the most sustainable technologies are biofilm-based reactors. Different engineered materials are being used to maintain the treatment capability of such reactors but advances in the support materials for the biofilms has not happened. This project will co-develop new intelligent materials which will be designed to regulate the formation of biofilms composed of different desired microorganisms. Use of such materials in wastewater treatment plants will help reduce the size of reactors and treatment times. Developed materials will also be used any other allied research areas to take advantage of the properties of the material.

Ph.D. Supervisors

Role	Faculty	Academic Unit in IITD/Institute/University	Email ID (Official)
Supervisor 1	Prof. Wazed Ali	Dept. of Textile and Fibre Engineering	wazed@iitd.ac.in
Supervisor 2	Prof. David Graham	School of Engineering, Newcastle University	David.Graham@newcastle.ac.uk

Project requirements (Student qualifications, experience required, etc)

- M.Tech in Textile Technology / Chemical Engineering / Polymer Science / Biochemical Engineering OR B.Tech in Textile Technology / Chemical Engineering / Polymer Science / Biochemical Engineering (with valid GATE score)
- Applicant with sufficient knowledge in nanomaterials synthesis and processing of fibrous and polymeric materials

Source of fellowship/funding

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

Project matching slot/ Institute. Institute fellowship.

Role of Faculty Members involved:

The proposed work is truly an interdisciplinary task where the expertise of the collaborators can be complementary. There are clearly two segments of the entire research work. Firstly, development of nanocomposite based flexible advanced materials where Textile Dept. would play major role. On the other hand, devising the developed material in the biochemical reactor and the study the biodegradation of the effluents would be the key role from the expert in Newcastle University. The expert from NU will also help to assess the risk of the materials and its impact on the environment.

Dr. Wazed Ali: Development of intelligent nanocomposite-based materials.

Prof. David Graham: Development of advanced low cost and efficient high rate reactors to treat conventional and emerging pollutants. Also to understand the ecotoxicology, and the environmental fate and impacts of trace and contaminants in the environment and risk of the material.