IITB-Monash Research Academy

Indian Institute of Technology Bombay | MONASH University

An Indian-Australian research partnership

Project Title:	**Microplastics in the aquatic environment: Fate and transport dynamics**	
Project Number	**IMURA0873**	
Monash Main Supervisor (Name, Email, Phone)	**Dr. Tanveer Adyel** Email: tanveer.adyel@monash.edu	*Full name, Email*
Monash Co-supervisor(s) (Name, Email, Phone)		
Monash Head of Dept/Centre (Name, Email)	**Prof Jeff Walker** Email: jeff.walker@monash.edu	*Full name, email*
Monash Department:	**Civil Engineering**	
Monash ADGR (Name, Email)		*Full name, email*
IITB Main Supervisor (Name, Email, Phone)	**Asso/Prof Shobha Shukla** Email: sshukla@iitb.ac.in	*Full name, Email*
IITB Co-supervisor(s) (Name, Email, Phone)	Prof Sumit Saxena Email: Sumit.saxena@iitb.ac.in	*Full name, Email*
IITB Head of Dept (Name, Email, Phone)	Prof K Narasimhan Email: nara@iitb.ac.in	*Full name, email*
IITB Department:	Metallurgical Engineering & Materials Science	

Research Clusters:

Highlight which of the Academy's CLUSTERS this project will address? *(Please nominate JUST **one.** For more information, see www.iitbmonash.org)*	
1	*Material Science/Engineering (including Nano, Metallurgy)*
2	*Energy, Green Chem, Chemistry, Catalysis, Reaction Eng*
3	*Math, CFD, Modelling, Manufacturing*
4	*CSE, IT, Optimisation, Data, Sensors, Systems, Signal Processing, Control*
5	*Earth Sciences and Civil Engineering (Geo, Water, Climate)*
6	*Bio, Stem Cells, Bio Chem, Pharma, Food*
7	*Semi-Conductors, Optics, Photonics, Networks, Telecomm, Power Eng*
8	*HSS, Design, Management*

Research Themes:

Highlight which of the Academy's Theme(s) this project will address? *(Feel free to nominate more than one. For more information, see www.iitbmonash.org)*	
1	*Advanced computational engineering, simulation and manufacture*
2	*Infrastructure Engineering*
3	*Clean Energy*
4	*Water*
5	*Nanotechnology*
6	*Biotechnology and Stem Cell Research*
7	*Humanities and social sciences*
8	Design

The research problem

Microplastics (MP) are usually often defined as plastic particles <5mm that can create problem not only for aquatic system but also human wellbeing. Although MP do not pose acute fatal effects on living organisms, they can cause chronic toxicity, which is considered as a key issue in long-term exposure. All the generated MP can carry other persistent pollutants and be accumulated in the downstream aquatic system. This proposed research will investigate the status of MP and associated other pollutants, including microbes in a sensitive water ecosystem of India. The high-throughput genomic DNA sequencing explores any shifts in microbial community structures and their relative abundances in the aquatic system after MP exposure. Finally, a process based-model to be developed for better understanding of the fate and transport of MP for their better management.

Project aims

This research aims to

- investigate MP in waterway in India.
- look at MP-associated pollutants and microbial community
- model fate and transport of MP

Expected outcomes

By this project, we expect to explore the fate and transport of MP in waterways under different environmental conditions.

How will the project address the Goals of the above Themes?

Project directly falls into the theme of "water" and “nanotechnology” as it deals with detection of MP in water using different nano-instrumental technique.

Capabilities and Degrees Required

BTech, MTech, MSc in EE, Physics, Chemistry, Material Science, Green Energy, Microbiology, Polymer science, Laser, Optics, ME, CE, ESE or any other relevant field. Experience in microbial culture or analytical instruments operation, optics or dispersion science would be preferred.

Potential Collaborators

Please visit the IITB website www.iitb.ac.in OR Monash Website www.monash.edu to highlight some potential collaborators that would be best suited for the area of research you are intending to float.

Select up to **(4)** keywords from the Academy's approved keyword list **(available at http://www.iitbmonash.org/becoming-a-research-supervisor/)** relating to this project to make it easier for the students to apply.

Water, Nanoscience, Smart manufacturing, Material chemistry