

An Indian-Australian research partnership

Project Title: **Design, Synthesis and Application of Fluorescent Polymers via Continuous Flow**

Project Number **IMURA0755**

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Research Clusters:

Research Themes:

Highlight which of the Academy's CLUSTERS this project will address? <i>(Please nominate JUST one. For more information, see www.iitbmonash.org)</i>		Highlight which of the Academy's Theme(s) this project will address? <i>(Feel free to nominate more than one. For more information, see www.iitbmonash.org)</i>	
1	Material Science/Engineering (including Nano, Metallurgy)	1	Advanced computational engineering, simulation and manufacture
2	Energy, Green Chem, Chemistry, Catalysis, Reaction Eng	2	Infrastructure Engineering
3	Math, CFD, Modelling, Manufacturing	3	Clean Energy
4	CSE, IT, Optimisation, Data, Sensors, Systems, Signal Processing, Control	4	Water
5	Earth Sciences and Civil Engineering (Geo, Water, Climate)	5	Nanotechnology
6	Bio, Stem Cells, Bio Chem, Pharma, Food	6	Biotechnology and Stem Cell Research
7	Semi-Conductors, Optics, Photonics, Networks, Telecomm, Power Eng	7	Humanities and social sciences
8	HSS, Design, Management	8	Design

The research problem

Define the problem

Fluorescent probes play vital role in both bio-sensing (or diagnosis) as well as bio-imaging applications. Therefore, design syntheses and characterization of these probes become interestingly important and challenging. If the syntheses can be developed using continuous flow processes, it allows the scalability, reproducibility along with the control of critical molecular design parameters and hence the origin of this proposal. The main focus of this proposal is to design and synthesize new fluorescent probes based on non-toxic, non-bleaching fluorescent polymers using continuous flow approaches to create a reliable and GMP-robust procedure..

Project aims

Define the aims of the project

The aims of the project are

- Translation of batch synthesis protocols to continuous flow
- Integration of flow processes into single production line
- Testing of materials for biocompatibility and theranostic application

Expected outcomes

Highlight the expected outcomes of the project

The expected outcomes of the project are

- New methods via continuous flow processes
- Non-toxic, non-bleaching bioimaging agents for advanced theranostic applications

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

Describe how the project will address the goals of one or more of the 6 Themes listed above.

Advanced manufacturing is one of the 6 themes and continuous flow synthesis fits well within this theme as it has been projected as the process for the chemical factories of tomorrow.

The targeted structures are classical examples for bottom-up nanotechnology

Capabilities and Degrees Required

List the ideal set of capabilities that a student should have for this project. Feel free to be as specific or as general as you like.

These capabilities will be input into the online application form and students who opt for this project will be required to show that they can demonstrate these capabilities.

The candidate should have the right bend of mind to work in this interdisciplinary area where-in synthetic, materials aspect as well as engineering of continuous flow processes skills are required. An ideal candidate will be one with a strong background in materials chemistry with additional some exposure to biochemistry.

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.

N/A

Please provide a few key words relating to this project to make it easier for the students to apply.

Polymer Chemistry, Continuous Flow Synthesis, bio-sensing, bio-imaging