

An Indian-Australian research partnership

**Project Title:** **Biopolymers: Design, Synthesis and Process intensification via Continuous Flow**

**Project Number** IMURA0755

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**IITB Department:** Chemistry

## Research Academy 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](http://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

## The research problem

*Define the problem*

Biopolymers are becoming increasingly important by the day. These comprise polymers for biomedical applications as well as materials that are either biodegradable or based on bio-feed stocks. An ideal material will meet several of these areas, e.g. a biodegradable material for medical use. Many polymers in this realm are only studied on small-scale. Therefore, design syntheses and characterization of these polymers with a view on scalability become interestingly important and challenging. If the syntheses can be developed using continuous flow processes, it

allows the scalability, improved reproducibility along with the control of critical molecular design parameters to tune properties of the so-derived biomaterials.

## Project aims

*Define the aims of the project*

The aims of the project are

- Design and synthesis of biopolymers
- Application of these materials as biomaterials.

## Expected outcomes

*Highlight the expected outcomes of the project*

The expected outcomes of the project are

- Development of new processes for the synthesis of biomaterials
- Process intensification

## 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 project also addresses the goal 'Biotechnology and stem cell research' since it seeks to create new materials for biological applications

## 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 continuous flow process skills are required. An ideal candidate will be one with a strong background in materials chemistry with some exposure to biochemistry.

## Potential Collaborators

*Please visit the IITB website [www.iitb.ac.in](http://www.iitb.ac.in) OR Monash Website [www.monash.edu](http://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, biomaterials, biopolymers