

An Indian-Australian research partnership

**Project Title:** **Low-cost affinity Biosensor for Cardiac application**

**Project Number** IMURA0294

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## 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**
5. **Nanotechnology**
6. **Biotechnology and Stem Cell Research**

## The research problem

*Define the problem*

To develop a low-cost cantilever based lab on chip that integrates the sensor, micro-fluidics and the blood filtration in a miniaturised low-cost disposable package.

To optimise and validate a new platform of low-cost sensors for biomedical applications based on quantifying the cantilever-biofluid interaction raising from the specific interaction between the biomolecule of interest (antibody, protein) and the modified surface of the cantilever (with antigen or specific captor).

## Project aims

*Define the aims of the project*

Develop a low cost, robust, sensitive and instantaneous cardiac marker sensor based on affinity measurement with the piezo-resistive polymer cantilever platform. The cantilever is surface modified with a antibody/antigen specific to the antigen/antibody of interest to detect in the blood stream. Interaction of the antigen tip from the sensor with the antibody in blood deforms the cantilever which is measured by the piezo and the force is translated to a concentration.

## Expected outcomes

*Highlight the expected outcomes of the project*

Development and validation of a new platform of low-cost instantaneous sensors for medical/cardiac applications based on affinity measurement. These diagnostics will be developed and optimized in lab and tested in hospital. Novel strategies of data analysis and concept of remote medical diagnostic strategies will be developed.

## 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.*

New platform of low cost instantaneous biodiagnostic sensors for medical application. This combines nanotechnology, biotechnology, in the medical application field. It also involves a new paradigm of advance manufacture and requires intelligent signal analysis and remote data interpretation and diagnostic concepts.

## 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.*

Undergraduate and preferably masters in Chemical, material, biomedical or electrical engineering. Demonstrated capability in multidisciplinary projects. Strong problem solving ability and demonstrated laboratory experience.