





## An Indian-Australian research partnership

Project Title:	Development of plasmonic metamaterials substrates for SERS application		
Project Number	IMURA0748		
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IITB Department:	MEMS		

## **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)

- 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

Surface enhanced Raman spectroscopy is very useful and sensitive tool for detection at molecular level. Various material combinations and device architecture have been conceived, in the past, for improving the efficiencies of SERS processes. Gold based structures have been used in the past for manipulating the electromagnetic wave. Most of these studies utilize gold nanoparticles scattered throughout surface. Recently strategically patterned metamaterials including gold gratings have attracted attention as possible SERS substrate. In this project, we plan to use two-photon lithography for patterning plasmonic

Patterning of plasmonic materials Strategic patterning of plasmonic metamaterials Simulations of plasmonic metamaterials SERS on patterned substrate Optimize process iteratively for SERS substrate development  **CPECTED OPTIMIZE PROCESS**  Plasmonic metamaterials based structures simulations Patterned SERS substrate Process development for SERS substrate;  **DOWN will the project address the Goals of the above Themes?**    Itities and Degrees Required	oject a	ims
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