IITB-Monash Research Academy

Indian Institute of Technology Bombay | MONASH University

An Indian-Australian research partnership

Project Title:	**Graphene & ultrasound based combinatorial approach for water purification**	
Project Number	**IMURA0775**	
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Monash Co-supervisor(s) (Name, Email Id, Phone)		
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IITB Department:	MEMS	

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*

The research problem

Extraordinary properties of graphene makes it a potential candidate for nano-sieving. In this project we plan to develop combinatorial approach of ultrasound and graphene based material systems that can be used for water purification. Chemical modification of the graphene membranes will be used attaching various nanoparticles or functionalization. Extensive

characterization using LCMS, FTIR, SEM, TEM, uv-vis spectroscopy and raman spectroscopy will be performed for characterizing the water quality before and after purification. The synergistic effects of ultrasound and graphene oxide on the purification of water will be investigated.

Project aims

To develop a graphene based membrane for water sensing and purification

Expected outcomes

Understanding the role of graphene as support material and active material with respect to water purification
Effect of ultrasound on water impurities
Membrane capable of removing chemical impurities

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.

Project directly falls into the theme of "water" as it deals with detection and purification of impurities in water

Capabilities and Degrees Required

BTech, MSc or MTech in Physics, Chemistry, Material Science, MEMS, Chem Engg, Elec Engg, Mech Engg, Envionment Science, Nanotech or any other relevant branch

Potential Collaborators

Rico Tabor

Select up to **(4)** keywords from the Academy's approved keyword list **(available at www.iitbmonash.org)** relating to this project to make it easier for the students to apply.