

An Indian-Australian research partnership

Project Title:	Fluid dynamic investigation of gas hydrate bearing sediments.	
Project Number	IMURA0815	
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Research Clusters:

Research Themes:

Highlight which of the Academy's CLUSTERS this project will address? <i>(Please nominate JUST <u>one</u>. 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	Earth Sciences and Civil Engineering (Geo, Water, Climate)	1	Advanced computational engineering, simulation and manufacture
		2	Clean Energy

The research problem

Natural gas hydrate is a potentially vast energy resource for the future. However, the fundamental behavior of hydrate dissociation during energy recovery is not fully understood due to the complex interplay of phase change and multiphase flow within porous media. In particular, this study aims to understand these processes in the context of sediments from select Indian basin. In India alone, methane hydrate reserves such as those found in the Krishna-Godavari and Andaman basins, are present in such a quantity that production from even 10% of these reserves is sufficient to meet the

country's demand for a century. As of yet, no commercial production of gas from methane hydrates worldwide has been possible as research is still ongoing to find an efficient and economically feasible way of extraction.

During the production process of thermal stimulation, fluid flow patterns govern both the mass transport and heat transfer phenomena and hence in order to obtain a better understanding of such production processes, it is imperative to study the dynamics of fluid flow behaviour under in situ reservoir conditions.

Project aims

1. Detailed geomechanical and petrophysical investigation of the hydrate bearing samples from Indian reservoir basins
2. Establishing effective correlation between absolute/relative permeability and hydrate gas saturation using novel laboratory experiments
3. Interpret stress evolution, pore pressure variation and permeability with gas hydrate formation and dissociation.

Expected outcomes

This project will help understand the Indian reservoirs better – more so in terms of their responses in in-situ conditions and therefore it directly meets the objectives of the Oil and Natural Gas mission to address key challenges in these unconventional reservoirs to ensure accelerated exploration and production of hydrocarbons.

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

This project addresses the themes like clean energy, and advanced computational engineering, simulation and manufacture.

Capabilities and Degrees Required

A BTech/M.Sc./M.Tech degree in Geology, Geophysics, Mechanical, Petroleum Engineering. Background in experiments will be preferred.

Select up to **(4)** keywords from the Academy's approved keyword list (**available at <http://www.iitbmonash.org/becoming-a-research-supervisor/>**) relating to this project to make it easier for the students to apply.

Geo Science, geotechnical, geomechanics (7)