You are cordially invited to a Seminar organized by Centre for Offshore Research and Engineering (CORE) and Department of Civil and Environmental Engineering

**An Experimental Method To Determine Fracture Toughness of Brittle and Heterogeneous Material Through Hydraulic Fracturing**

By

**Too Jun Lin**
Ph.D. Student, Department of Civil and Environmental Engineering

---

**Abstract**

In this presentation, an experimental method is proposed to determine the fracture toughness of brittle and heterogeneous material through hydraulic fracturing using linear elastic fracture mechanics (LEFM) approach. The intention of the proposed method is to be used or employed on materials which are not easily tested through standard tests. Example of such material is the hydrate-bearing sand which is only stable at high pressure and low temperature. Hydrate-bearing sand is one form of gas hydrates which is ice-like substance within sand layers. The abundance of methane hydrate in sediment is huge and can be yet another unconventional gas resource in petroleum framework if a stable production method is developed. Various production schemes from research to field tests have been explored. Here in NUS, single and dual wellbore schemes had been experimented to produce gas from hydrate-bearing sand. However, little has been done in exploring the possibility of creating artificial fracture in these layers.

This presentation will focus on the verification of this method using frozen sand as a substitute material. Frozen sand has similar composition to hydrate-bearing sand except for the absence of methane gas and stable under atmospheric pressure condition. Experimental results show that pressure-time records, flow rate and total volume injection provided the necessary information to determine the fracture toughness of brittle & heterogeneous material in hydraulic fracturing.
About the speaker
Too Jun Lin started his graduate studies in 2013 and focused on exploring methods to produce gas from hydrate-bearing sand. He had obtained his B.Eng (Hons) in Civil Engineering from NUS in 2011. Between 2011 and 2013, he had worked for INTECSEA WorleyParsons Pte Ltd on subsea and pipeline system projects in this region.

Contact Person: Prof Andrew Palmer: 6516 4601, Email: ceepalme@nus.edu.sg
General Enquiry/Registration: Ms Norela Tel: 6516 4314, Email: nor@nus.edu.sg

***Seats are limited. Please register early. All are welcome and admission is free***

Location Map