Department of Civil & Environmental Engineering
Faculty of Engineering

You are cordially invited to a Seminar organized by Centre for Advanced Materials and Structures (CAMS) and Department of Civil and Environmental Engineering

Multiphase Flow in Granular Media: Considering Wettability and Disordered Microstructure

By

Dr Yixiang Gan

School of Civil Engineering, The University of Sydney, Australia

Date: Thursday, 27 June 2019
Time: 11:00 am to 12.00 noon
Venue: EA #06-04
Block EA, 9 Engineering Drive 1,
Singapore 117575
Faculty of Engineering,
National University of Singapore

https://mysurvey.nus.edu.sg/EFM/se/543BE5C258D2FA08
SCAN CODE WITH YOUR SMARTPHONE TO REGISTER

Abstract

Granular materials include everything from sand on the beach to flour and salt on our dining table, and can display some characteristics of gases, liquids and solids. Granular media are commonly used in energy systems to store, convert, capture and produce energy. Examples include lithium-ion batteries, nuclear materials, and thermal storage systems. The function of granular materials in these energy systems involves essentially the transport of electrons, heat and mass. In this talk, we will combine the numerical and experimental approaches to capture the interface dynamics and to model the imbibition processes in such materials with variable secondary pore sizes and wettability. We emphasise the following aspects: (1) how such heterogenous and hierarchical structures influence immiscible fingering during fluid-fluid displacement, and most importantly, (2) to what extent the immiscible fingering can be suppressed due to the existence of secondary porous structures compared with single-pore-size media. To characterise fingering dynamics in hierarchical media, we provide a phase diagram and a scaling law based on a non-dimensional number, which takes multiple length scales and wettability conditions into account. The present study provides an alternative mechanism for controlling the temporal and spatial distribution of interface within porous media for various applications, e.g., increased drainage efficiency, or enhanced chemical reaction.

Organizer:

CENTRE FOR ADVANCED MATERIALS AND STRUCTURES

Speaker Biography

Dr Yixiang Gan is currently a Senior Lecturer at The University of Sydney (USYD). He received the Dr.-Ing degree (with summa cum laude) in Mechanical Engineering from Karlsruhe Institute of Technology (KIT), Germany, in 2008. From 2009 to 2010, he continued worked at KIT as a research scientist on several European projects on nuclear fusion. He joined USYD in 2010, first as a Postdoctoral fellow, then Lecturer and Senior Lecturer. His research areas include mechanics of granular and porous media, multiphase flow, mechanics of interfaces, heat and electrical conduction, and carbon geo-sequestration (More information via http://drgan.org/ and Twitter: @drgan).

Contact Person: Assoc Prof Poh Leong Hien Tel: 6601 4913; Email: leonghien@nus.edu.sg

General Enquiry: Ms Norela Buang Tel: 6516 4314, Email: nor@nus.edu.sg

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

Location

Organizer:

CENTRE FOR ADVANCED MATERIALS AND STRUCTURES

NUS National University of Singapore