



DEPARTMENT OF CIVIL ENGINEERING

SEMINAR

**Geological processes modelling and simulation: phase-transition,
dynamic fracture propagation, and compaction band formation**

Professor Victor Calo
Curtin University
Australia

Date: June 1, 2023 (Thursday)

Time: 4:00 p.m. - 5:00 p.m.

Venue: CPD-LG.39, Central Podium Levels, Centennial Campus, The University of Hong Kong

Abstract

Our modelling and simulation tools seek to describe the deformation of large geological structures. In particular, we describe various complex rock behaviours and simulate their evolution to understanding geological phenomena such as plate tectonics, rock properties, and their stress fields. Our models include the effects on rock deformation of its microstructure, structural discontinuities, fluid interactions and induced pressure, pressure solution, stress corrosion, and different mineral reactions. In this talk, to demonstrate the effectiveness and robustness of our tools, we will focus on a few exemplar applications to showcase the tools we develop. In particular, we will describe metamorphic rocks evolution modelling where chemo-mechanical interactions lead to phase transformation and cracking. We will also describe a new space-and-time adaptive scheme to model complex fracture propagation that circumvents typical mesh dependency issues. Lastly, we will study the compaction band formation in geomaterials, specifically in porous rocks.

About the Speaker

Dr Victor Manuel Calo is a Professor in Applied Mathematics and a John Curtin Distinguished Professor at Curtin University, who has authored 250+ peer-reviewed publications, two patents, and a book. Dr Calo's research interests include modelling and simulating geomechanics, fluid dynamics, flow in porous media, phase separation, fluid-structure interaction, solid mechanics, and high-performance computing.

- ALL ARE WELCOME -