



## ANNOUNCEMENT

### AGS (HK) & The Hong Kong Polytechnic University Joint Technical Seminar

## “Computational multiphysics approaches to geotechnical engineering problems”

by

**Dr Jinhyun Choo**

- Date** : Tuesday, 10<sup>th</sup> July 2018
- Time** : 6:30 pm – 8:00 pm
- Venue** : Lecture Theatre Y301, 3/F Lee Shau Kee Building, The Hong Kong Polytechnic University, Kowloon (see enclosed map)
- Enquiry** : For enquiries, please contact  
Raymond Sin (email: [raymond.sin@aecom.com](mailto:raymond.sin@aecom.com) or tel: 3922 8804)
- Seminar Fee** : Free of charge
- Registration** : No prior registration is required. Seating capacity is provided for approximately 120 people. CPD certificates will be provided after the seminar.
- Book Prize** : Book prize is open to all young attendants under 35 years old for the submission of a good quality report (max. 500 words) on this event. Book Prize reward comprises a book "Geology of Site Investigation Boreholes in Hong Kong" by Chris Fletcher and book coupon HK\$300 from BookaZine.

### **Synopsis:**

Many geotechnical problems are triggered by coupled multiphysical processes—tight interactions among solid deformation, fluid flow/transport, chemical reactions, and other phenomena in geological materials. Examples range from rainfall-induced landslides to long-term settlement to weathering damage. Accurate prediction and management of these problems are beyond the capabilities of most traditional approaches because they rely on empirical methods that oversimplify the intricate coupling of various physical phenomena.

This talk will introduce some recent approaches to geo-engineering problems that rely on high-fidelity modeling and simulation of the relevant multiphysics processes. The talk will consist of two parts. The first part will focus on coupled fluid flow and solid deformation in structured soils having multiple pore systems. Theoretical,



constitutive, and computational modeling frameworks that honor the multi-porous structure of these soils will be presented. It will be shown that the new framework can capture phenomena that are not reproduced by classical hydromechanical models. In the second part, the focus will be shifted to the failure behavior of geomaterials under a variety of loading conditions. A coupled phase-field fracture-plasticity framework will be described as a way to capture a wide array of failure modes of geological materials from brittle fracture to ductile compaction. This framework will then be combined with multiphysics modeling to simulate cracking and damage in rocks from environmental loads.

### **About the Speaker**

Jinhyun Choo is an Assistant Professor of Civil Engineering at The University of Hong Kong (HKU). He obtained his Ph.D. from Stanford University, in Civil and Environmental Engineering (Geomechanics) with a minor in Mechanical Engineering. He then completed his postdoctoral training at Columbia University before joining the HKU faculty. In earlier days, he received his B.S. and M.S. degrees from Seoul National University in South Korea, and worked for three years at the Korea Institute of Civil Engineering and Building Technology. Dr. Choo works in geomechanics and its intersections with computational solid mechanics and flow in porous media, with applications to geotechnical problems in the areas of civil infrastructure, energy resources, and environmental sustainability. He is the recipient of several prestigious awards, including a Fulbright Scholarship for his doctoral studies at Stanford University. For more information, visit <https://www.choogroup.org>.

