CEE691 Seminars in Civil and Environmental Engineering

Mesoscale Modeling of Calcium Silicate Hydrates (C-S-H)

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Location: Bilger Hall 335, Date: Wednesday, March 16, 2016, Time: 1:30 – 2:20 pm

Speaker: Denvid obtained his Bachelor degree with first class honors and Master degree in Civil Engineering from the University of Hong Kong (HKU) in 2004 and 2006 respectively, and got his second Master degree from the Department of Civil and Environmental Engineering (CEE) at Massachusetts Institute of Technology (MIT) in 2009. He then received his Ph.D. in the field of structures and materials from MIT in 2012. Prior to joining the City University of Hong Kong as an assistant professor in August 2012, he worked as a postdoctoral associate at MIT. Denvid got various awards and scholarships during his undergraduate and graduate studies including the Croucher Foundation Scholarship (2006-2009) and the Marvin E. Goody Award (2007). He was named as one of the Harvey Fellows in 2011. His research focuses on the multiscale modeling of organic-inorganic system, moisture-induced debonding, durability of concrete-epoxy system and fiber-reinforced polymer (FRP) composites in structural rehabilitation. To date, Denvid has attracted over HK$3 million fund in total for research and teaching development. He has published more than 40 referred journal and conference articles and has delivered more than 10 invited talks around the world.

Abstract

Atomistic simulations of cementitious material can enrich our understanding of structural and mechanical properties, whereas current computational capacities restrict the investigation length scale within 10 nm. This limitation prevents the consideration of many features of hydrated cements that originate at the mesoscale and are critical to macroscopic mechanical properties and failure modes. In this context, coarse-grained simulations can translate the information from nanoscale to mesoscale, thus bridge the multi-scale investigations. In this seminar, the development a coarse-grained model of cement matrix using the concept of disk-like building block is presented. The objective is to introduce a new method to construct coarse-grained model of cement, which could contribute to the scale-bridging issue from nanoscale to mesoscale.