THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

DEPARTMENT OF CIVIL AND ENVIRONMENTAL ENGINEERING
土木及環境工程學系
CEE

Atomistic-Continuum Multiscale Approach based on Higher-Order Cauchy-Born Rule to Predict Nonlinear Mechanical Behaviors of Carbon-Based Nanostructures

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SPEAKER'S BIOGRAPHY

Dr Jianwei Yan is currently an Associate Professor in Jinan University, China. He was conferred with a Bachelor Degree in Urban Planning from Hefei University of Technology in 2008 and a joint PhD degree in Nano-Mechanics from City University of Hong Kong and University of Science and Technology of China in 2013. His main research interests include advanced composite structures, nanocomposites, nano-mechanics and smart material control. He has published one monograph entitled "***Mechanical Behaviors of Carbon Nanotubes: Theoretical and Numerical Approaches***" in 2017 and authored many peer-reviewed articles in high-quality and prestigious journals, e.g., Computer Methods in Applied Mechanics and Engineering, Composite Structures, Journal of Sound and Vibration, Nanotechnology etc. As a Principal Investigator, he is now working on several research projects supported by National Natural Science Foundation of China and Guangdong Natural Science Foundation.

Date: **18 July 2018 (Wednesday)**
Time: **11:00 a.m. - 12:00 noon**
Venue: **Room Z505, 5/F, Block Z**
The Hong Kong Polytechnic University
181 Chatham Road South, Hung Hom
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ABSTRACT

Our recently developed atomistic-continuum multiscale approach based on the higher-order Cauchy-Born rule has demonstrated outstanding performance in terms of computational stability and accuracy. With the help of a mesh-free computational framework on the basis of the moving Kriging interpolation, the commonly encountered essential boundary condition problems and singular matrix problems can be easily solved. By iteratively updating the system stiffness matrix and the residual stress, this approach can provide a good prediction for the real deformation pattern of carbon-based nanostructures as compared with conventional atomistic simulation. This multiscale approach has been successfully applied to predict the buckling behaviors of carbon nanotubes/carbon nanocones and the nonlinear bending deflection of graphene. It is also suitable to control the surface morphology of carbon-based nano devices, such as the wrinkle patterns of graphene can be tuned by imposing a twisting load.

***** All Interested Are Welcome *****
This seminar will be presented in Mandarin.
For further information, please contact Dr S.K. Lai at Tel. 2766 6060.
Certificates of attendance will be provided to participants if they attend the whole lecture.