Faculty of Construction and Land Use
建設及地政學院

THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

FCLU Public Seminar

SIMULATION AND EXPERIMENTS IN NANO AND MULTI-SCALE MECHANICS

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Abstract

According to National Science Foundation [NSF] Director A. Bement, "Transformative research is driven by ideas that stand a reasonable chance of radically changing our understanding of an important existing scientific concept or leading to the creation of a new paradigm or field of science. It is also characterized by its challenge to current understanding or its pathway to new frontiers."

Bio sensing, drug delivery systems, efficient molecular dynamics, modeling and simulation are some of the challenging areas. Efficient civil and mechanical infrastructure systems as well as high performance materials are essential for these technologies. By promoting research and development at critical points where these technological areas intersect, we can foster major developments in engineering. The solid mechanics and materials engineering (M&M) communities will be well served if some specific linkages or alignments are made toward these technologies. Some thoughtful examples for the M&M and other engineering communities are:

Bio-mechanics/materials	Multi-scale Simulations/modeling
Thin-film mechanics/materials	Micro-electro-mechanical systems
Wave Propagation/NDT	Smart materials/structures
Nano-mechanics/materials	Designer materials
Nano-electro-mech'cal (NEMS/MEMS)	Fire Retardant Materials and Structures

Nanotechnology is one of the frontiers in transformative research. It is the creation of new materials, devices and systems at the molecular level - phenomena associated with atomic and molecular interactions strongly influence macroscopic material properties [according to I. Aksay, Princeton]; with significantly improved mechanical, optical, chemical, electrical properties. Nobelist Richard Feynman back in 1959 had the foresight to indicate, "there is plenty of room at the bottom". National Science Foundation Director Rita Colwell in 2002 declared, "nanoscale technology will have an impact equal to the Industrial Revolution". The transcendent technologies include nanotechnology, microelectronics, information technology and biotechnology as well as the enabling and supporting mechanical and civil infrastructure systems and materials. These technologies are the primary drivers of the twenty first century and the new economy. Mechanics and materials are essential elements in all of the transcendent technologies. Research opportunities, education and challenges in mechanics and materials, including experimental, numerical and analytical methods in multi-scale modeling, nanomechanics, carbon nano-tubes, bio-inspired materials, coatings, as well as improved engineering and design of materials will be presented and discussed.

* Opinions expressed are those of the author's only not necessary that of the National Science Foundation.

All Interested Are Welcome

Please reserve your seat with Miss Joyce Wong at

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Fee : Free of charge

- An attendance certificate will be issued to each registered participant.
- Applicants with confirmed registration who fail to turn up will be put on lower priority in the registration for the next Faculty distinguished lecture or seminar.

About the Speaker

KEN P. CHONG, P.E., is the Engineering Advisor and Director of Mechanics and Materials of Engineering at the National Science Foundation [NSF]. He earned his Ph.D. in Mechanics from Princeton University. He specializes in solid-mechanics/materials, nano-mechanics, and structural mechanics.

In addition to managing 130 university research projects in mechanics/materials, he has been involved in the development of model-based simulation, durability and accelerated tests, life-cycle engineering, nano science and engineering, and other initiatives; and established the NSF Summer Institute on Nano Mechanics/Materials at Northwestern University. He founded the Engineering Distinguished Lecture Series and was instrumental in creating the Nano, Bio Mechanics program at NSF. He was the Interim Division Director in 2005.

As a professor, he pioneered the R&D of architectural sandwich-panels; developed new semi-circular fracture specimens for brittle materials. His experimental research on sweet spots in the 70's changed the design of tennis rackets. He has published 200 technical papers and authored 2 textbooks on mechanics. He has given 50 keynote lectures, received awards including the fellow of AAM, ASME, SEM and ASCE, Edmund Friedman Professional Recognition Award; Honorary Doctorate, Shanghai University; Distinguished Member, ASCE; NSF Distinguished Service Award.

With Attendance Certificate

Date:
15 January 2009
(Thursday)

Time:
6:30p.m. to 7:30p.m.
(Refreshments will be served at 6:00p.m.)

Venue:
Chiang Chen Studio Theatre,
The Hong Kong Polytechnic University