HKSTAM Hong Kong Society of Theoretical and Applied Mechanics 香港力學學會

香港科技大學 THE HONG KONG UNIVERSITY OF SCIENCE AND TECHNOLOGY

Joint HKSTAM / HKUST MAE Distinguished Seminar

Fracture Mechanics of Biological Composites

Prof. Xi-Qiao Feng

Department Head and Chang Jiang Chair Professor
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Tsinghua University, Beijing 100084, China

Date: **4 January 2016 (Monday)**
Time: **10:00 – 11:00 a.m.**
Venue: Mechanical Engineering Conference Room **2571 B** (via Lift 27/28, 2nd Floor), Academic Building Hong Kong University of Science and Technology, Clear Water Bay, Hong Kong.
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ABSTRACT

Most biological materials take the strategy of hierarchical structures to achieve their superior mechanical properties and biological functions. In this talk, the effects of hierarchical structures are discussed on the strength and toughness of biological composites. Firstly, some important toughening and stiffening mechanisms in biological composites are briefly presented, e.g., multiscale energy dissipation, interfacial toughening, and chiral microstructures. Some guidelines for the biomimetic design of novel materials are proposed. Secondly, a microstructure-based fracture mechanics model of nacre is proposed to investigate the toughening effect due to the crack-bridging mechanism of platelets. Our theoretical analysis demonstrates the crucial contribution of this mechanism to the high toughness of nacre. It is found that the sizes of platelets should be in an optimized range to achieve higher fracture toughness.

Biography of Speaker

Professor Xi-Qiao Feng is a Chang Jiang Chair Professor and the head of Department of Engineering Mechanics, Tsinghua University. He earned a Ph.D. degree in Solid Mechanics in 1995 at Tsinghua University. From 1997 to 1999, he worked as an Alexander von Humboldt research fellow in Technical University of Darmstadt and Delft University of Technology. He rejoined Tsinghua University as an associate professor in 1999 and was promoted to a full professor in 2001. Currently, he is the director of Institute of Biomechanics and Medical Engineering (IBME). He also serves as a member of editorial board of more than 10 journals, e.g., Applied Physics Letters, Journal of Applied Physics, Engineering Fracture Mechanics, and Acta Mechanica Sinica. In addition, he was the secretary-general of Chinese Society of Theoretical and Applied Mechanics (CSTAM) during 2010–2014.

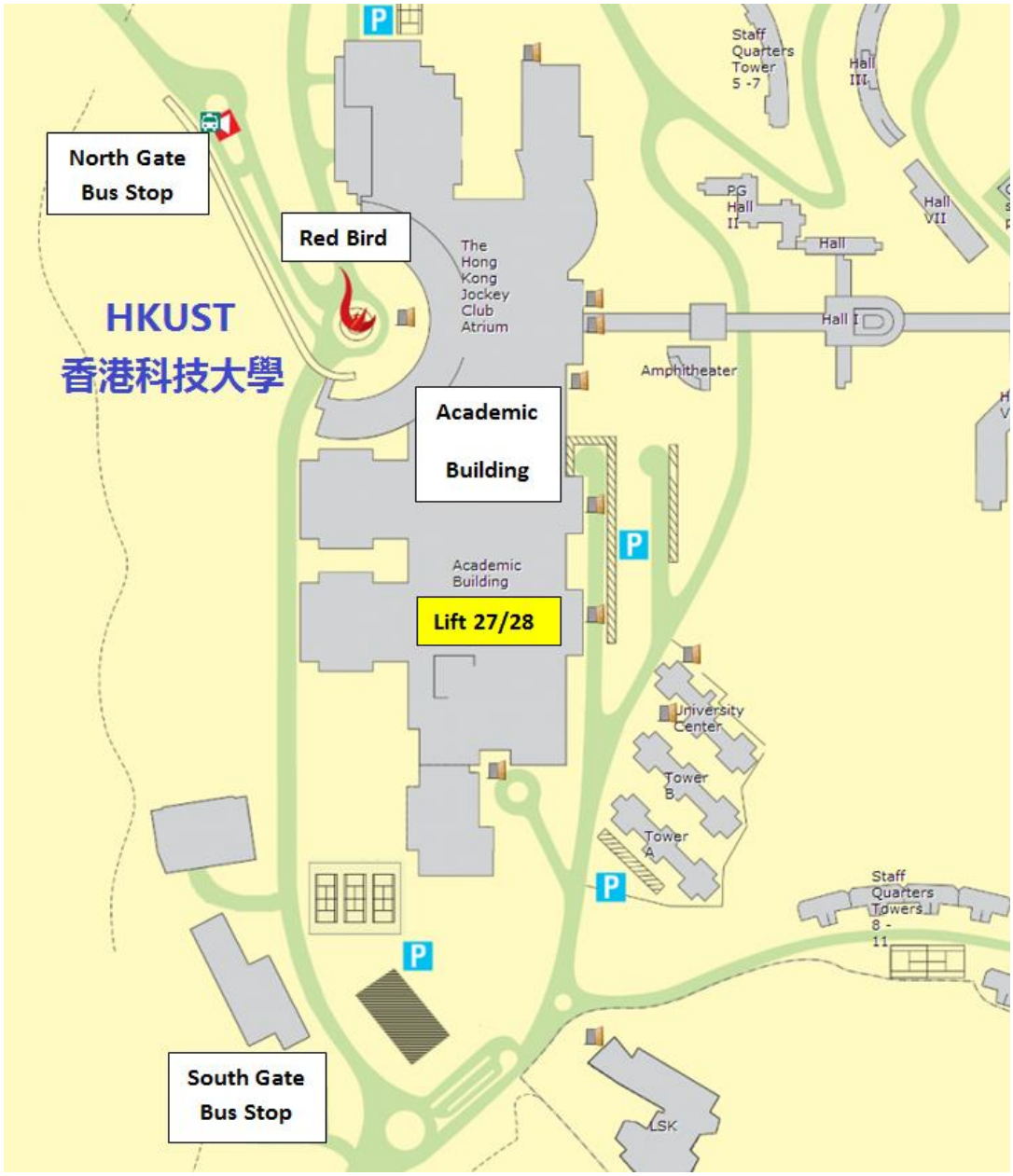
His current interests include mechanics of biological materials, damage and fracture mechanics. He has authored and co-authored two books and more than 200 international journal papers. Selected Feng's honors include the Award of Science and Technology for Young Scientists of China (2007), Distinguished Young Scholars Award of NSFC (2005), Young Scientist Award of Fok Ying Tong Education Foundation (2004), Award for Best Doctoral Theses of China (1999), etc.

The seminar is jointly organized by Hong Kong Society of Theoretical and Applied Mechanics and HKUST Department of Mechanical and Aerospace Engineering

– ALL ARE WELCOME –

Map and Direction

(1) HKUST Campus map and Lift 27/28



(2) Public transport guide to HKUST https://www.ab.ust.hk/cso/transport_guide.htm