



Department of Mechanical Engineering  
機械工程學系



THE HONG KONG  
POLYTECHNIC UNIVERSITY  
香港理工大學

## Seminar

Date: 15 June 2009 (Monday)  
Time: 11:00 am - 12:00 pm  
Venue: EF 305, The Hong Kong Polytechnic University

### **Design and Development of High-Strength, High-Toughness, Corrosion-Resistant and Low-Cost Steels for Infrastructure Applications**

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#### **Abstract:**

Several strategies are available to increase the strength of steels, such as grain refinement, work-hardening, incorporation of solutes and fine precipitates. However, these strategies are likely to decrease toughness and increase cost. In this talk, we discuss the idea of using nanoscale semi-coherent precipitates to increase both the strength and toughness of steels, without the use of carbon. The basic principle will be illustrated with the application of Cu-precipitation-strengthened steels in bridges. Further developments to develop high-strength high-toughness steels with properties comparable to maraging steels at much lower cost will be presented. Extension of these concepts to making steels with enhanced corrosion resistance and high-temperature performance will be discussed.

#### **Biosketch:**

Yip-Wah Chung is Professor of Materials Science and Engineering and Mechanical Engineering at Northwestern University. He obtained his BS and MPhil from the University of Hong Kong and PhD in Physics from the University of California at Berkeley. He has published over 180 papers in surface science, thin films, and tribology, and two textbooks – one on surface science and spectroscopy, and one on introduction to materials science and engineering. He was named Fellow, ASM International; Fellow, AVS; and Fellow, Society of Tribologists and Lubrication Engineers. His other awards include the Innovative Research Award and Best Paper Awards from the ASME Tribology Division, Technical Achievement Award from the National Storage Industry Consortium (now Information Storage Industry Consortium), Bronze Bauhinia Star Medal from the Hong Kong SAR Government, and Advisory Professor from Fudan University. Dr. Chung served two years as program officer in surface engineering and materials design in the Civil and Mechanical Systems Division at the National Science Foundation, acting as the Division representative for the nanoscale science and engineering initiative. He has served many years on the Hong Kong Research Grants Council and is currently a member of the University Grants Committee. He is Director of the NSF Summer Institute on Nanomechanics, Nanomaterials and Micro/Nanomanufacturing. In his spare time, he is often seen doing recreational flying all over the US. In 2003, he earned his commercial multi-engine instrument and advanced ground instructor certificates.

\* Refreshment will be served after the seminar.