KTH SOLID MECHANICS SEMINAR; Wednesday, May 14th, 10.00 am

KTH Solid Mechanics Seminar room, Teknikringen 8D and https://kth-se.zoom.us/j/5775210342

Wen Jin Meng
"Probing mechanical integrity of metals and metal/ceramic interfaces through small-scale mechanical testing"

Engineering and manufacturing better structural materials and components demand basic understanding of the mechanical response of metals and metal/ceramic interfaces under various loading conditions. One key part to this understanding is testing. Traditional mechanical testing using macroscale specimens has limitations when it comes to quantifying basic responses related to interfacial integrity, micromanufacturing processes, and fatigue failures. Technological advances in nanoscale machining and nano-/micro-scale actuation enable quantitative mechanical testing to be performed at the micron length scale and in range of frequencies at least one order of magnitude beyond macroscale testing capabilities. In this talk, three examples related to mechanical integrity of metals and metal/ceramic interfaces will be used to illustrate the power of small-scale mechanical testing in combination with multiscale materials characterization and simulation for gaining basic understanding of metal/ceramic interfaces, micron scale plasticity, and fatigue crack growth and initiation.

Wen Jin Meng received his B.S. degree in Physics and Ph.D. degree in Applied Physics, both from Caltech. He was a postdoc at Argonne National Laboratory and a staff research scientist at the General Motors/Delphi R&D Center. Since 1999, he has been a faculty member with Louisiana State University, where he is currently the Smiley and Bernice Romero Raborn Endowed Chair and Professor of Mechanical Engineering. His research spans topics concerning solid-state phase transformations, vapor phase growth of ceramic and metal thin films, nanostructured coatings and surface engineering, mechanical testing at small length scales, and microfabrication and assembly of metal-based structures and devices. He was elected to the National Academy of Inventors in 2014. From 2015 to 2021, he served as the scientific lead for a U.S. National Science Foundation program awarded to the state of Louisiana to establish the Consortium for Innovation in Manufacturing and Materials, with focus on advanced manufacturing technologies and associated materials research.