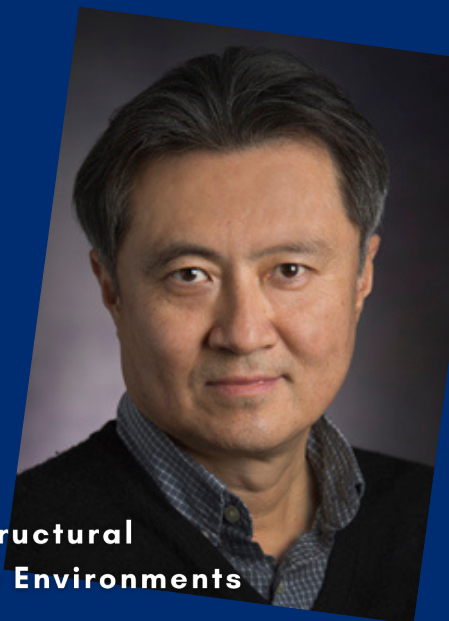


SEMINAR SERIES

Cheol Park

ADVANCED MATERIALS AND PROCESSING
BRANCH, NASA LANGLEY RESEARCH CENTER

Multifunctional Lightweight Structural Composites for Extreme Space Environments



Advanced multifunctional materials enable revolutionary design schemes for future aerospace vehicles and structures for the extreme environments of NASA missions. Recent studies of nanocomposite materials have shown the potential for both structural integrity and multifunctional capabilities, such as sensing, actuating, health monitoring, radiation shielding, energy harvesting, thermal management, and thermal protection in extreme environments. After the advent of carbon nanotube (CNT) in 1991, scientists predicted that boron and nitrogen, carbon's immediate neighbors on the periodic table, might also form perfect nanotubes, namely boron nitride nanotubes (BNNTs). The discovery and progress of a new catalyst-free method for synthesizing highly crystalline, very long, and small diameter BNNTs under a high temperature and pressure (HTP) environment have enabled new applications for multifunctional materials in extreme environments. The white color BNNTs synthesized under the catalyst-free HTP process offer extraordinary properties including neutron radiation shielding, piezoelectricity, wear resistance in vacuum, high thermal oxidative stability ($>800^{\circ}\text{C}$ in air), which is not present in CNTs, as well as excellent mechanical strength and toughness, equivalent to CNTs. The characteristics of the BNNTs and their composites along with CNT composites are discussed in this presentation including their potential aerospace applications in extreme environments.

Wednesday, November 10 @ 2:30 pm
See Event Page for Zoom info