UNIVERSITY OF CONNECTICUT

INSTITUTE OF MATERIALS SCIENCE

POLYMER PROGRAM SEMINAR

"Bulk Nanostructured Materials: Fundamentals and Applications"

Prof. Brian Wardle
Massachusetts Institute of Technology

Friday, February 27, 2015
11:00 AM, IMS Room 20

Bulk nanostructured materials offer tremendous opportunity for re-inventing materials, but also pose many challenges both in terms of characterization, design, processing, and scaling. This presentation will focus on recent work developing nanoengineered hierarchical advanced composites with a focus on enhancing mechanical properties. Such hybrid advanced composites employ aligned nanowires (in our work, carbon nanotubes, CNTs) in several architectures to enhance laminate-level bulk properties of existing aerospace-grade advanced composites. Intrinsic and scale-dependent characteristics of the CNTs are used to engineer bulk property improvements including critical mechanical design parameters for composite laminates such as open-hole compression (OHC) and tension bearing strengths. Building multifunctionality concurrent with these mechanical property improvements includes thermal and electrical conductivity tailoring for damage detection and ice protection, among others. Fundamental studies on polymer-CNT interactions led to the development of a combined top-down and bottom-up fabrication methodology that addresses several of the key issues (agglomeration, viscosity, CNT wetting, scale, alignment) that have frustrated the use of nanomaterials in bulk materials, particularly advanced composites. New research directions, particularly new applications in related disciplines such energy storage and transport, will be highlighted.

**For further information, please contact YH Chudy ychudy@ims.uconn.edu*

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