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HALF-DAY TUTORIAL
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Nanotechnology and multifunctional materials: bio/nano structures, multiscale designs and multiphysics

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Abstract

This tutorial will include several lectures that address the key issues concerning nanotechnology and multifunctional materials where mechanical function is one of the key properties. It will also provide a few highlights from the newly established NASA university-based institute (URETI) for bio/nano materials. Such materials may include various nanostructures (e.g., nanotubes), bio-inspired laminates, nanocomposites, novel piezoelectrics, etc. The lectures will review the contributions of molecular modeling and experimental characterization to the development of new nanotechnologies. Manipulation of biomaterial systems and their mechanical properties will be discussed. Overviews of basic issues in nanotechnology, new materials and multiscale modeling will be presented. An introduction to multiphysics models for material systems with different functionalities (electromagnetic, mechanical, etc) will be included as well.