

Call for Abstracts

2018 World Congress in Computational Mechanics (July 22-27, 2018, New York)

Symposium 1107: Computational Mechanics and Multiscale Modeling in Manufacturing of Low-dimensional Materials and Structures

Low-dimensional nanomaterials including zero-dimensional (0-D) nanoparticles, one-dimensional (1-D) nanotubes/nanofibers/nanobelts/nanowires and two-dimensional (2-D) atomically thin sheets have attracted tremendous attention over the past decades for their unique mechanical, electronic, and thermal properties because of a superhigh specific surface area at the nanoscale. More importantly, either their seamless integrations with traditional materials or their own assembly into bulk quantity opens a new era in exploration of advanced materials, structures and devices with unprecedented properties and functionalities at large scale. Both synthesis of these low-dimensional nanomaterials with well-defined structures and properties at the nanoscale and integration/assembly of them into bulk form with ordered arrangements at the large scale are amongst the most paramount challenges in manufacturing. At the root of manufacturing techniques in either low-dimensional nanomaterials or their enabled large scale structures, the elementary steps rely critically on atomistic interactions and/or self-assembly and structural deformation and instability, sometimes, in a harsh environment, which is underpinned by mechanics in close integrations with chemical reactions and/or energy and mass transports. Understanding the underlying complex and multiplex mechanics mechanisms not only is crucial to optimize existing manufacturing techniques with enhanced controlling accuracy, but also will help explore new manufacturing solutions with unique capability, cost efficiency, and high precision.

This symposium aims to provide an interdisciplinary forum for discussing the mechanics that underpins manufacturing and synthesis of both low-dimensional materials at the nanoscale and their enabled advanced materials, structures and devices at the large scale. Topics are included but not limited to **computational methods and multiscale modeling** of:

- Mechanics in manufacturing and synthesis of 0/1/2-D nanomaterials (e.g. growth, sintering, cutting/machining, exfoliation, self-assembly, printing, spinning, dip/flow/shear-coating)
- Mechanics-driven manufacturing of functional structures and devices from low-dimensional nanomaterials (e.g. self-assembly, transfer printing, folding, collapsing, evaporation, crack/buckling/delamination-driven templating techniques)
- Mechanics in manufacturing of heterostructures and hybridization of low-dimensional nanomaterials and traditional materials (e.g. doping, nanojunction, nanowelding/soldering)
- Mechanics-chemical/thermal/optical/electric/magnetic couplings in manufacturing of relevance to low-dimensional nanomaterials in various environments

Submission Website: <http://www.wccm2018.org/abstract-submission>

Submission Deadline: December 31, 2017

Organizers:

Baoxing Xu, University of Virginia
Dong Qian, University of Texas at Dallas
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