

Multi-scale Modeling of Dynamic Behavior of Materials
12th U.S. National Congress on Computational Mechanics
Raleigh, NC (July 22-25, 2013)
<http://12.usnccm.org>

Abstract:

Presentations are sought that incorporate important microstructural information for simulating dynamic materials behavior. New analytic material models and numerical techniques that are able to effectively describe materials response are encouraged. Hierarchical models that incorporate a combination of deformation, localized damage and failure mechanisms, and which are consistent with each other are also of interest. Talks are solicited for a wide range of materials: polycrystalline, poly-phase metals and alloys, composites, ceramics, porous foams, cellular, bio-materials (bio-mimetic/bio-inspired), etc.

Topics relevant to this symposium include but are not limited to:

- Modeling (implicitly or explicitly) microstructural features and their evolution within a continuum framework, e.g. flaws/defects, through homogenization, stochasticity in material properties, implementation of micromechanics-based constitutive models.
- Structural transformations in solids including, but are not limited to, polymorphic phase transitions, twinning, shear localization, amorphization, and fracture and fragmentation.
- Validations of advanced models based on experimental measurements of microstructural evolution.
- Bridging length and time scales with an example application to a specific material.
- High performance multi-scale simulations.
- Modeling localized failure, e.g. ductile damage evolution, shear banding. Linking relevant length scale parameters in higher scale nonlocal damage models to simulation results obtained from finer scales with the aim of improving the ability to predict the softening response of materials under general loading conditions.
- Microstructure generation incorporating features such as: distribution of grain-boundary types, dislocation densities and their gradients, poly-phase structures, texture and data from tomographic techniques.

While the focus of the workshop is on modeling and simulation, studies incorporating analytical and/or experimental methods are also welcome.

Please don't hesitate to let us know if you have any questions about this minisymposium. We look forward to your participation at USNCCM12 in Raleigh!

Sincerely yours,

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[Organizers -- Multi-scale Modeling of Dynamic Behavior of Materials]