"A Nonlocal Discrete Framework for Computational Mechanics: Theory and Application"

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Abstract: Classical theory of continuum mechanics has the issue of singularity for problem with spatial discontinuities such as cracks and interfaces. Externally devised numerical techniques such as cohesive elements and solution space enrichment can help to alleviate shortcomings when applying continuum theories to model propagation of various discontinuities using finite element method. For modeling of complex fracture phenomena such as crack branching, coalescence, and fragmentation, challenges still persist, especially for multidimensional problem. Discrete methods, such as Lattice Particle Model and Peridynamics, are advantageous in modeling various fracture phenomena due to their intrinsic features of discrete formulation, nonlocality and replacement of partial differential equations with integral-differential equations in the equations of motions. Cracks are represented and modeled by removal of interactions between discrete material points. Multi-site crack initiation and arbitrary propagation paths are the natural outcome of interaction removal.

In this talk, a novel nonlocal discrete framework for computational mechanics will be presented. Some salient features and interesting applications of the framework will be discussed.

Bio: Hailong Chen is currently a Postdoctoral Computational Scientist in the Fuels Modeling & Simulation Department at Idaho National Laboratory, where he has been working on developing new capabilities for fuels relocation modeling and simulation under accident conditions since 2015. Hailong holds his B.S. degree in Mechanical Design, Manufacturing and Automation from Shanghai Normal University (China) in 2010, and his M.S. degree in Mechanical Engineering from University of Florida in 2012. Hailong completed his Ph.D. degree in Mechanical Engineering from Arizona State University in 2015. Hailong has been the recipient of numerous honors and awards including an Achievement Award for engineering students from University of Florida in 2010, a University Graduate Fellowship (UGF) Block Grant Award from Arizona State University in 2013 and Exceptional Contribution Program Award from Idaho National Laboratory in 2016. His research interests lie in the area of computational mechanics and materials, with special focus on non-local mesh free methods development and their applications.

Date: **Monday, March 19th**   Time: **3PM**
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