PDE Dynamics of Dislocations

The talk will describe a PDE framework to deal with the dynamics of dislocations leading to plasticity in solids. Dislocations are defects of deformation compatibility/integrability in elastic response. The presented framework will be shown to be capable of representing discrete defect dynamics as well as present a natural setting for asking questions related to macroscopic plasticity arising from the underlying dislocation dynamics.

Amit Acharya is a Professor in the Mechanics, Materials, and Computing group in the Department of Civil & Environmental Engineering at Carnegie Mellon University (CMU). He received a PhD degree in Theoretical & Applied Mechanics from the University of Illinois at Urbana-Champaign (UIUC) in 1994. Subsequently, he did post-doctoral work for a year at the University of Pennsylvania and then worked for HKS, Inc. in Providence, RI (now Simulia, Dassault Systemes) from 1995-1998, spending most of his time as a senior research engineer in the ABAQUS Std Development group. There, he was the lead developer of the *Hysteresis nonlinear viscoelastic material model and the S4, fully-integrated finite strain shell element, that are still in use in the ABAQUS general-purpose FE code. From 1998-2000, he was a Research scientist at the DOE-ASCI funded Center for Simulation of Advanced Rockets at UIUC, before joining CMU in 2000.

His broad research interests are in Continuum Mechanics, Mathematical Materials Science, and Applied Mathematics with special emphasis on theoretical and computational continuum dislocation mechanics and plasticity and its coupling to solid-solid phase transformations, liquid crystal mechanics, damage, coarse-graining of nonlinear time-dependent systems, nonlinear shell theory and fluid-structure interaction including mass transfer.

Amit Acharya
Professor
Carnegie Mellon University

Thursday, March 13, 2014, 12:00-1:15pm
JHU Homewood Campus, Hackerman Hall B-17

Seminar is FREE and open to the public. Attendance is required for all enrolled Civil Engineering graduate students. For parking please see link for visitors at www.jhu.edu and select information on Homewood Campus.