**Abstract**

Most people experience the way objects plastically deform on a macroscopic scale. From a car crash to the bending of a paper clip plastic deformation occurs in the form of a smooth flow as a response of an applied stress. But due to the constant shrinking on the dimensions of mechanical devices -such as micro electro mechanical systems (MEMS) and micro electronic interconnects- the notion that plasticity is governed not by a steady flow but by the occurrence of intermittent avalanches of defects moving through the material is gaining increasing attention.

To model the deformation of metallic materials at micron and submicron scales a continuum theory of dislocations is derived. Our simulations show the formation of structures and their influence in macroscopic deformation and the dependence on the yield stress on the characteristic size of the sample, known as the Hall-Petch effect.

We also study the jerky character of dislocation motion and its analogy to earthquakes, biological systems and other systems showing critical behavior.

**When & Where**

Monday, Oct. 1, 2007, 2:30pm to 3:30

ECE 317, Purdue University

**Prof. Marisol Koslowski**

Dr. Marisol Koslowski is an assistant professor of Mechanical Engineering, Purdue University. Previously she was a Technical Staff Member in the Theoretical Division at Los Alamos National Laboratory. She received her B.S. degree in Physics in 1997 from the University of Buenos Aires, Argentina and her M.S in 1999 and her Ph. D. in Aeronautics in 2003 from the California Institute of Technology. Her research interests include computational solid mechanics, mechanical properties of micro- and nano- structured materials. She currently works in the development of theoretical and numerical tools to study the reliability and performance of micromechanical systems. Dr. Koslowski received the Leon Heller award for a postdoctoral publication in Theoretical Physics from Los Alamos National Laboratory in 2006.