Title of the webinar:
Nanomechanics and the Atomic Force Microscope

The mechanical properties of surfaces at the nanoscale can have a major influence on macroscale surface properties, especially when dealing with complex nanostructured materials or composites. Properties such as adhesion, friction, elastic modulus, loss and storage moduli, piezoelectric constants etc. of such materials can change significantly over a few nanometers leading to changes in macroscale properties of the surfaces/materials. The Atomic Force Microscope is a tool which is now quickly moving out of the domain of applied physics into materials and mechanical engineering to tackle relevant problems in these fields. In this talk, we will go over some of the basics of the Atomic Force Microscope and provide an overview of the application of the AFM to number of interesting nanomechanics problems in engineering ranging from composite materials, semiconductors, and battery materials to biomimmetics and biomaterials.

What you will learn:
- What an Atomic Force Microscope is, how it basically works
- What an Atomic Force Microscope can do for characterizing materials properties of surfaces
- Examples of the use of AFM to understand nanomechanics

Presenter Bio:
Arvind Raman is Professor of Mechanical Engineering and University Faculty Scholar at Purdue where he joined as an Assistant Professor in 2000, and was promoted to Associate and full Professor in 2005 and 2009 respectively. His research focuses on applications of nonlinear dynamics and fluid-structure interactions to problems in micro- and nano-systems, mechanobiology, and human biodynamics. He is an internationally recognized expert in the field of cantilever dynamics in scanning probe microscopy especially for applications in mechanobiology and complex materials, and has published more than 100 journal papers, many highly cited in top journals. Prof Raman's group is the originator of the most popular online simulator for AFM – Virtual Environment for Dynamic AFM (VEDA) which is deployed on the cyber-infrastructure of the nanoHUB (www.nanohub.org) and is used widely in industry and academia. He has held visiting positions at the Universidad Autonoma de Madrid and the University of Oxford. He is the recipient of the 2011 ASME Gustus Larson Memorial Award, the Keeley fellowship from Wadham College (Oxford), the NSF CAREER award (2002), and the College of Engineering Young Researcher award from Purdue