UNH Materials Science Seminar

11:10-12:00, Thursday, October 12, 2006
DeMeritt Hall 209B
University of New Hampshire

Processing and Mechanical Behavior of Nanocomposite Thin Films

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Nanocomposite materials are multiphase materials with characteristic microstructural length scale less than or comparable to 100 nm. Examples include multilayered materials with submicron layer thicknesses and materials composed of a matrix embedded with second phase nanospheres or nanowires. Thin film deposition methods have proven very useful in producing nanocomposites with very sensitive microstructural control. Owing to the very small structural length scale, nanocomposites often display unusual and enhanced properties compared to bulk materials, and have potentially important technological applications. Deposition of metal/metal and metal/ceramic nanocomposite materials using novel electrochemical and sputtering methods will be presented. In addition to crystalline systems, the materials include metallic glass multilayered films where the bilayer thickness represents a long range microstructural length scale, and crystalline metal-amorphous ceramic nanoparticulate composites that display percolation effects as the metal volume fraction is varied. Results of nanoindentation measurements, enhanced anelastic and fatigue behavior will be shown.

Professor Cammarata obtained his S.B. in Materials Science and Engineering at MIT and Ph.D. in Applied Physics at Harvard University. He is Professor and Chair of Materials Science and Engineering at Johns Hopkins University, and holds a joint appointment with Mechanical Engineering.