Carnegie Mellon
Materials Science and Engineering Seminar Series

Professor Scott Mao
Mechanical Engineering
University of Pittsburgh

"Deformation process in nanocrystalline materials under in-situ TEM observation"

Friday, February 10, 2005
11:00 AM, Baker Hall 136A
Refreshments at 10:30 AM in Wean Hall 2327 (Mehl Room)

In general, the plastic behavior of crystalline materials is mainly controlled by the nucleation and motion of lattice dislocations. The presentation will be on in situ dynamic transmission electron microscopy observations of nanocrystalline nickel films with an average grain size of about 10 nanometers, which show that grain boundary mediated processes have become a prominent deformation mode. Additionally, trapped lattice dislocations are observed in individual grains following deformation. This change in the deformation mode arises from the grain-size dependent competition between the deformation controlled by nucleation and motion of dislocations and the deformation controlled by diffusion assisted grain boundary processes.

Dr. Mao's Bio: Currently, Scott Mao is William K. Whiteford Professor in the Dept. of mechanical engineering, adjunct professor in the dept. of Materials science and engineering, University of Pittsburgh. He has PhD in Mechanical Behavior of Materials, Tohuku University, Japan in 1988. Scott X. Mao joined the department in January 1999 after 9 years of teaching and research at the University of Calgary (UC) professor. He was working at Harvard University in 1996 as a visiting professor and a postdoctoral research associate at MIT in 1989.

Mao's research interests are in the area of materials science, experimental and applied mechanics, fracture mechanics, and mechanical behavior of metal/ceramic composites, thin film, and coatings.

Mao is a member of ASME, MRS, and TMS and serves as chair of the mechanical behavior committee in TMS. He was awarded several research and teaching excellence awards. He was Leighton E. & Mary N. Orr Faculty Fellow during 1999–2000.