BILKENT UNIVERSITY

unam - INSTITUTE of MATERIALS SCIENCE & NANOTECHNOLOGY

FACULTY OF SCIENCE

MATERIALS SCIENCE and NANOTECHNOLOGY GRADUATE PROGRAM SEMINAR

"Active Atomic Force Microscope Probes for High-speed Imaging and Quantitative Material Characterization at the Nanoscale "

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Starting with the development of *Scanning Tunneling Microscope* (STM), the co–winner of Nobel Prize in Physics in 1986, *Atomic Force Microscopy* (AFM) has accelerated research and development in *Nanoscale Science and Technology*. Especially, dynamic operation modes of *AFM* become more and more prominent since they increase the sensitivity, reduce the lateral forces during imaging, and provide additional information about sample. A typical *AFM* cantilever may not be the ideal probe for quantitative material characterization or fast topography imaging. Recently, we have developed a new *AFM* probe, *Force–sensing Integrated Readout and Active Tip*, to improve *AFM* in these areas. This probe combines the electrostatic actuation capability and the interferometric detection sensitivity, and it has a broad range of applications – from life sciences to microelectronics. In this talk, we show how to obtain quantitative information about nanoscale material properties by directly measuring the *Time–resolved Interaction Force*. We present the active tip control method to reduce tip indentation and the repulsive force on soft samples. We also investigate the optimum driving scheme to achieve the highest scan speed.

Date : May 15, 2009 (Friday)
Time : 10:00
Place : Faculty of Science Building, A Block, Seminar Room (SA 240)

Tea and cookies will be served after the seminar