



**BILKENT UNIVERSITY**

**unam** - INSTITUTE of MATERIALS SCIENCE & NANOTECHNOLOGY

***FACULTY OF SCIENCE***

**MATERIALS SCIENCE and NANOTECHNOLOGY  
GRADUATE PROGRAM SEMINAR**

**“Current Induced Crystallization & Thermoelectric Effects in Si  $\mu$ -wires”**

**Dr. Ali Gokirmak**

Short duration large amplitude electrical stresses result in melting of Si  $\mu$ -wires and growth from melt takes place after the stress. The electrical current density can reach up to  $\sim 100$  MA/cm<sup>2</sup> during the process. These extreme current densities has lead to observation of asymmetric melting, attributed to significant electron-phonon scattering. We also verify this assymetry by observing light emission from these structures during long duration AC and DC stresses. We attribute these observations to significant electron-phonon scattering events resulting in dominant phonon-drag. Phonon-drag is a component of Thomson effect which is related to more commonly known thermoelectric effects, Peltier and Seebeck effects. Thermoelectric effects under extreme thermal gradients and current densities and their relevance to current device technologies (e.g. phase-change memory, thermoelectric generators) will be discussed.

**Date : June 11, 2010 (Friday)**

**Time : 15:40**

**Place : Faculty of Science Building, A Block, Seminar Room (SA 240)**

**Tea and cookies will be served after the seminar**