



**BILKENT UNIVERSITY**

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

**FACULTY OF SCIENCE**

**MATERIALS SCIENCE and NANOTECHNOLOGY**

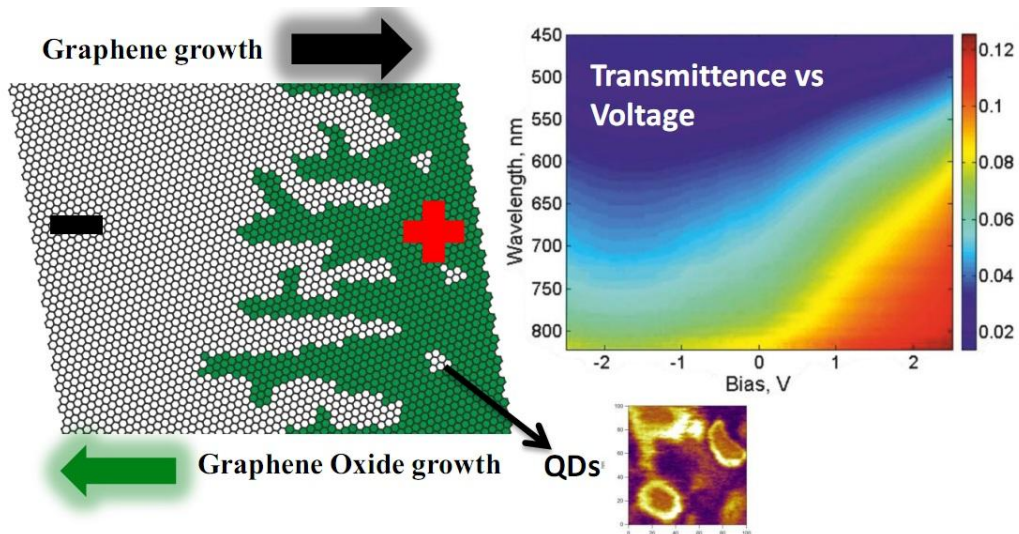
**GRADUATE PROGRAM SEMINAR**

**“Control of Linear and Ultrafast Optical and Electronic properties  
through Electrochemical Effects  
in the Graphene/Graphene Oxide system”**

**Res. Asst. Prof. Dr. Aykutlu Dâna**

*UNAM, Bilkent University*

We will discuss our recent findings of electrochemical effects in the Graphene/Graphene Oxide system. In a properly designed multilayer film of graphene oxide, upon application of electrical stimulus, resistive switching is observed. The resistive switching is accompanied by a change in the linear absorption spectrum, shifting the absorption edge from the visible into the infrared. Ultrafast pump-probe characterization shows that the nonlinear optical properties can also be tuned, a transition from saturable absorption to non-linear absorption is observed as a function of the oxidation state, controlled by external electrical stimulus. We investigate the origin of observed optical and electronic property changes at the nanoscale using scanning probe microscopy as well as other complementary techniques such as XPS. It is seen that, electrochemical oxidation and reduction are not uniform, and segregation of graphene quantum dots within graphene oxide can be clearly resolved in electrical measurements. We will discuss potential applications of the graphene/graphene oxide system. We also point out that oxidation can be an important failure mechanism for nanoscale graphene devices.



**Date : February 25, 2011 (Friday)**

**Time : 15:40**

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

*Tea will be served after the seminar*