



**BILKENT UNIVERSITY**

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

***FACULTY OF SCIENCE***

**MATERIALS SCIENCE and NANOTECHNOLOGY  
GRADUATE PROGRAM SEMINAR**

**“Subwavelength Acoustic Interactions in Microfluidic Systems and Applications in Colloidal Nanoscience and Biotechnology”**

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Acoustic waves exhibit manipulative effects on the matter through two nonlinear phenomena: acoustic streaming and acoustic radiation pressure force. Despite their century long history, their use in technology was limited due to problems in efficiency and scalability of the force range. Recently, as a promising solution to the problem of micro and nano particle handling in “Lab on a Chip” microfluidic devices, interest in these nonlinear acoustical phenomena is increasing. By using a glass capillary attached to a piezoelectric Lead Zirconate Titanate (PZT) plate, we have demonstrated the generation of extreme subwavelength acoustical modes inside the microfluidic glass capillary even at few volts of voltage drive. These modes generate 2 dimensional acoustic force traps inside the capillary leading to controlled micro/nano particle and biological sample collection, separation and mixing in a single device mechanism without use of any other specific methods such as magnetic beads or electrophoretic interactions. Presented actuator mechanism enables battery operated, inexpensive, portable microfluidic systems which may lead to the production of cost efficient point of care diagnostic devices. Wide range of applications on colloidal micro and nano particles and biological samples such as blood, bacteria and cells will be presented during the talk.

**Date : September 24, 2010 (Friday)**

**Time : 15:40**

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

**Tea will be served after the seminar**