EE Department Seminar

January 26, 2012, Thursday, 2 p.m.
Yorgo Istefanopulos Meeting Lounge (KB 201)

Recent Trends on Integrating MEMS Technology with Nano and Bio Sciences

M. Çağatay Tarhan
University of Tokyo

Abstract:

There have been significant developments in the miniaturization of devices in the last decades. However, for future innovation, technological revolution is crucial. Due to the saturation in the miniaturization of microelectronics as well as the maturity of MEMS, further advances are required. MEMS technology can be used to perform atomic level experiments at the nano scale as well as single molecule manipulation for biotechnological research. This talk introduces some of the recent developments in the integration of MEMS technology with nano and biosciences. While briefly introducing MEMS-in-TEM system to perform experiments at the nano-scale, the main focus of this talk will be combining top-down handling capabilities of MEMS technology with bottom-up functionalities of the bio-world. A motor protein-based system will be explained to build a sorting & transport device. Furthermore, an innovative method to build multidirectional and multilayered assembly of microtubule network using MEMS tweezers will be introduced. Finally, a possible future direction of such heterogeneous integrated systems, i.e. bio/MEMS hybrid system will be investigated as a potential molecular detection system that can lead to a device for neurodegenerative disease diagnosis.

Short bio:

M. Cagatay Tarhan is a project researcher in the Center for International Research on Micro Mechatronics (CIRMM) at the Institute of Industrial Science, The University of Tokyo. He received his B.S. degree in electrical and electronic engineering from Middle East Technical University, Ankara, Turkey in 2003 and an M.S. and Ph. D. in electrical engineering from the University of Tokyo, Tokyo, Japan in 2007 and 2010, respectively. His research interests include micro electromechanical systems (MEMS) and applications to biotechnology. He has focused on obtaining bio/MEMS hybrid systems by integrating MEMS technology with motor protein based microfluidic systems.