



## ΙΔΡΥΜΑ ΤΕΧΝΟΛΟΓΙΑΣ ΚΑΙ ΕΡΕΥΝΑΣ

ΕΡΕΥΝΗΤΙΚΟ ΙΝΣΤΙΤΟΥΤΟ ΧΗΜΙΚΗΣ ΜΗΧΑΝΙΚΗΣ  
ΚΑΙ ΧΗΜΙΚΩΝ ΔΙΕΡΓΑΣΙΩΝ ΥΨΗΛΗΣ ΘΕΡΜΟΚΡΑΣΙΑΣ

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### ΣΕΜΙΝΑΡΙΟ

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**ΘΕΜΑ:** **SINGLE WALL CARBON NANOTUBES IN BIOSENSORY APPLICATIONS**

**ΤΟΠΟΣ:** Αίθουσα Σεμιναρίων ΙΤΕ/ΕΙΧΗΜΥΘ

**ΗΜΕΡΟΜΗΝΙΑ:** Πέμπτη, 13 Ιανουαρίου 2005

**ΩΡΑ:** 12:00

### ΠΕΡΙΛΗΨΗ

The fabrication, characterization and understanding of single-walled carbon nanotubes (SWNTs) have been of cornerstone importance in the development of nanotechnology as presently known. The ubiquitous dispersion in size and shape in SWNTs presents a major hurdle, among many others, that needs to be addressed in order to pave the way towards applicability in the semiconductor and bioelectronics industry. The first part of this presentation will cover our efforts into separating SWNTs according to type (metallic from semiconducting) and diameter. In the second part of this presentation will address our efforts into applying SWNTs into various biosensory applications. Our earlier development in self-organizing shortened-SWNTs into nano-needle arrays will be discussed in the context of amperometric peroxidase-linked immunoassays. Immunosensors were made by attaching antibodies to the carboxylated ends of nanotube forests. Utilizing direct electrochemistry of HRP labels and additives to minimize non-specific binding, amperometric SWNT immunosensors achieved sub-nanomolar detection limits for biotin-HRP and human serum albumin.

### Σύντομο βιογραφικό σημείωμα

Dr. Fotios Papadimitrakopoulos graduated in 1987 from the University of Athens, Greece, with a B.S. in Chemistry. He received his M.S. and Ph.D. degrees from the Polymer Science & Engineering Department of the University of Massachusetts at 1989 and 1993 respectively. After a two year postdoc at AT&T Bell Laboratories working on Optoelectronic Polymers and Light Emitting Diodes, he joined the faculty of the University of Connecticut as an assistant professor of Chemistry, at the Institute of Materials Science (IMS) (1994), and in 1999 was promoted to associate professor. Recently, (9/1/00) he accepted the position of the Associate Director of the Institute of Materials Science. With "self-organization" as a common theme, he has established a diverse research program that spans over single wall carbon nanotubes, Si/CdSe semiconductor nanoparticles, metallorganic chelates and DNA-assembly of colloidal microspheres for usage in OLEDs, nanoelectronics, biosensors, actuators, and photonic crystals respectively. His most recent work focuses on the purification and separation of SWNT by length, type and diameter. He has co-authored more than 75 publications, has given more than 100 invited presentations, and has co-organized 5 International Conferences. In 2004, he was elected member of the Connecticut Academy of Science and Engineering.