

Mini-Course

“Magnetic Nanoparticles as Therapeutic Agents: A scientist's angle of view”

Theodoros Samaras

Department of Physics

Aristotle University of Thessaloniki

GR-54124 Thessaloniki, Greece

Thursday DECEMBER 6th at 14.15 room DIET 09

Friday DECEMBER 7th at 9.15 room 16

Friday DECEMBER 7th at 14.00 room 36

Abstract – This series of seminars addresses the use of magnetic nanoparticles (MNP) in therapeutic techniques and focuses on the role of engineers and scientists in this emerging field. This role has to do with (1) the manufacturing and physical characterization of MNP (using techniques like electron microscopy, magnetization measurements, etc.); (2) their biotoxicity and functionalization; (3) their introduction and fate in the human body. It also extends to the in vitro and in vivo dosimetry (quantification) of MNP effects, where quantities familiar to the bioelectromagnetics community are commonly used, and where new ones, like force per cell, are introduced. Technical persons working in this field are also challenged by uncertainty calculations and the reporting of MNP properties, as well as the design of appropriate magnetic fields, both for in vitro devices and in vivo applications, reaching to other disciplines of computational engineering and multiphysics, like computational fluid dynamics. The talks will include an introduction to the manufacturing and physical properties of MNP, a small review of current and proposed therapeutic applications of MNP and, in particular, their clinical use in magnetic fluid hyperthermia.

Prof. Theodoros Samaras - Theodoros Samaras is Professor of Bioelectromagnetics at the Department of Physics, Aristotle University of Thessaloniki, Greece. He is a trained Medical Physicist specializing in the non-ionizing spectrum. He is working with computational multiphysics/multiscale methods for applied electromagnetics. His research interests include exposure assessment (both numerical and experimental) to electromagnetic fields and radiation; applications of electromagnetic fields in cancer therapy (hyperthermia, thermal ablation techniques); non-invasive brain stimulation with transcranial techniques; patient monitoring with electrical impedance tomography. In recent years, he has been active in the area of biomedical uses of magnetic nanoparticles, where he is attempting to transfer knowledge in dosimetry from other areas of bioelectromagnetics. He has been serving as a reviewer for several journals and funding organizations and as the national representative to European research co-ordination actions (BM0704, BM1309, TD1104, CA17115, EMF-NET) and standardization committees (IEC TC106). He is currently member of the European Commission's Scientific Committee on Health, Environmental and Emerging Risks (SCHEER) and has been elected twice in the Council of the European Bioelectromagnetics Association (EBEA) and in the Board of the European Society for Hyperthermic Oncology.

Everyone interested is welcome.

The mini-course is organized by the Course in Nanotechnology Engineering

Contact:

Micaela Liberti and Francesca Apollonio, 0644585353, 0644585374

micaela.liberti@uniroma1.it, francesca.apollonio@uniroma1.it

