University of Cyprus
School of Engineering

Department of Electrical and Computer Engineering

The Department of Electrical and Computer Engineering

Rohit Chandra

Title: **MICROWAVE IMAGING BASED LOCALIZATION OF WIRELESS CAPSULE ENDOSCOPES, & ANTENNAS AND PROPAGATION FOR WIRELESS BODY AREA NETWORKS**

Wednesday 18 of February 2015, 17:00- 18:30 p.m.

Room KENTR. A019, Old Campus - University of Cyprus

Abstract:
In some biomedical applications such as wireless capsule endoscopy, the localization of an in-body RF-source is important for the positioning of any abnormality inside the gastro-intestinal tract. With knowledge of the location, therapeutic operations can be performed precisely at the position of the abnormality. Electrical properties (relative permittivity and conductivity) of the tissues and their distribution are required to estimate the position more accurately. This seminar presents a method for the localization of an in-body RF-source based on microwave imaging. The electrical properties of the tissues and their distribution are found from microwave imaging and the position of an RF-source is then estimated based on the image. The method is applied on synthetic noisy data, obtained after the addition of white Gaussian noise to simulated data of a simple circular phantom, and a realistic phantom in a two dimensional case. The root-mean-square of the error distance between the actual and the estimated position is found to be within 10 mm, showing the capability of the proposed algorithm to work with a good accuracy even in the presence of noise for the localization of the in-body RF-source.
Further, the talk will give an overview of antennas and propagation for some applications in wireless body area networks. These applications include hearing aids, sensors placed around the torso, and in-mouth tongue controlled wireless devices.

Biography
Rohit Chandra received his Ph.D. in Radio Communications at Faculty of Engineering, Lund University, Sweden in 2014. The title of his Ph.D. thesis was Antennas, Wave Propagation and Localization in Wireless Body Area Networks. He received his Bachelor of Technology and Master of Technology degree in Wireless Communication (Integrated) from Indian Institute of Technology, Roorkee in 2008. From 2008 to 2009, he worked on LTE protocol stack for Samsung, Bangalore, India. He has received SEMCAD-X student research award in 2011 and 2012. His research interest includes antennas and propagation for medical implants and on-body devices. He has authored more than 20 publications in international journals and peer-reviewed conference proceedings. Currently, he is an ERCIM post-doctoral researcher at the Department of Electronics and Telecommunication, NTNU, Norway working on localization of wireless capsule endoscopes using microwave imaging techniques.