



---

## Department of Electrical and Computer Engineering

### Title: RF and Microwave Photonics in Biomedical Applications

**Prof. Afshin Daryoush**

Department of ECE, Drexel University, Philadelphia, PA, USA.

**Tuesday 13<sup>th</sup> March 2012, 18:00-19:00**

**Room KENTP-E010, Old Campus**

**University of Cyprus**

**Abstract:** Microwave Photonics has made a significant contributions to fields of telecommunication, microwave signal processing, and radar sensors. Recently Microwave Photonics is making inroads to biomedical applications. This presentation introduces biomedical applications of RF and Microwave Photonics to medical imaging. Of particular interest are applications of medical “theragnostics”, where both therapeutic and imaging aspects of biological tissue are performed. Both ultrasound and diffused photon near IR (DPNIR) are benefitted from special optical sensors that are designed using high frequency modulated light. In this presentation, first custom designed fiber sensors are to be reviewed that were developed for micron resolution broadband ultrasound medical imaging in conjunction with high intensity focused ultrasound. In addition, practical challenges of broadband DPNIR are addressed for realization of a helmet mounted untethered system using UWB wireless communications for traumatic brain injury detection.



**Biography:** Dr. Afshin S. Daryoush is Professor of Electrical and Computer Engineering at Drexel University, Philadelphia, PA and has also conducted research in *microwave photonics* for telecommunication, radar, and biomedical engineering applications, resulting in publication of over 200 technical papers and five book chapters. He was also a lecturer as part of the Second Summer School on “Optics Interaction with Microwave Circuits” in 1999, Autrans, France and the NATO sponsored LS-229 on “Optics Microwave Interactions” in three countries of France, Germany, and Hungary in 2002. Dr. Daryoush has been awarded four US patents; one of his patents was licensed for commercialization.

Prof. Daryoush is a member of Sigma Xi since 1986, and has served as president of the Drexel University Chapter in 1999. He had co-organized and served as the TPC chair of the 2008 IEEE Radio Wireless Symposium incorporating WAMICON, General Chair of the IASTED’s Antenna, Radar, and Wave Propagation Conference (ARP 2008), Baltimore, MD, and General Symposium Chair of the 2009 IEEE Radio Wireless Symposium (RWS2009) in San Diego, CA, and General Chair of MWP2010, Montreal, Canada. He has served as guest editor for The IEEE Trans. on Microwave Theory & Techn., The Journal of Franklin Institute, and Microwave & Lightwave Technology Letters. He has also served as associate editor of Journal on Microwave Science and Technology, Hindawi Publications since its inception in 2006. Prof. Daryoush was elected as a Fellow of IEEE in 1998 for contributions to the field of “*nonlinear microwave photonics with applications to high-speed fiber optic links.*”