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Bogazici-BME/Lifesci & TETAM & Inovita & ISEK Ortak Semineri

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Body Sensor Networks in the Era of Internet of Things

Sema Dumanlı, Ph.D.

Turkish Ministry of Health

21 Kasım, 2017 (Salı); 13.00 – 14.00

*Biyomedikal Mühendisliği Enstitüsü, TETAM Çatı Katı,
Boğaziçi Üniversitesi Kandilli Kampüsü, İstanbul*

About the Seminar:

Advances in sensing technologies, as part of the emerging era of the Internet of Things (IoT) are widely investigated as a solution to the challenges of modern healthcare. Wearable sensing technologies are valuable tools that can encourage people to monitor their own well-being and facilitate timely health interventions. Yet, the utility of wearable sensors rises when they are used alongside other healthcare systems and sensing technologies within smart environments. In the upcoming era of IoT, the future generation of wearable sensing devices, will be required to communicate with different kinds of things in the dynamic environments, efficiently supporting not only off-body communications (such as wearable sensor to smart home), but also on-body communications (such as between wearable sensors) and in-body communications (such as wearable sensor to smart implants).

Antenna design for wearable technologies is a challenging task due to the body being in the near-field of the antenna, the highly dynamic nature of the channel and the user acceptance issues. In the first part of this talk, I will discuss the aforementioned challenges and the

antenna design requirements such as minimization of near-field effects like detuning and efficiency degradation which translates to longer battery life time. A key for the success of both implantable and wearable antennas is configurability. In the second part of this talk, our solutions to satisfy almost contradictory requirements of different links and to cope with the dynamic channel conditions will be presented. I propose the utilization of multiple modes of patch antennas and co-excitation of cavity backed slot antennas in order to create radiation pattern configurability. Depending on the size restriction for a given sensor, digitally assisted switching can be realized or steering with frequency can be implemented in conjunction with relaying.

About the Speaker

Dr. Sema Dumanli received the B.Sc. degree in electrical electronics engineering from Middle East Technical University, Turkey in 2006 and the Ph.D. degree from University of Bristol, UK in 2010. Her Ph.D. was funded by Toshiba Research Europe Ltd. where she still works as a Senior Research Engineer. The main focus of her PhD was antenna array design for MIMO communications. Sema has taken lead and technical positions at various long and short term research projects and contributed to commercial products, namely, mm-Flash, FlashAir (wireless memory cards), and Silmee (wireless ECG monitoring device). She has published several articles in leading journals and international conferences and holds 7 patents and patent applications. She has been conducting research in the area of wireless communications with emphasize on the antenna design. Her research interests include e-Healthcare, IoT Body Sensor Networks, Implant communications, MIMO Communications, 5G, far field WPT. She is a reviewer of multiple conferences and has supervised several M.Sc. and B.Sc. students at University of Bristol.



Boğaziçi Üniversitesi Kandilli Yerleşkesi

BME Binası, 34684 Çengelköy-İstanbul

Tel: +90 216 516 34 82 Faks: +90 216 516 34 83

www.inovita.org , lifesci.boun.edu.tr

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