Perennial and Personalized Sensing through Wireless Energy Transfer and Intra-body Networks

Idris Yamanturk Conference Hall, 1304, EEF
August 7 at 2 pm (Monday)

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Abstract:

In a future where implanted and wearable sensors continuously report physiological data, how to power such sensors without battery replacement and developing new communication methods that are safe for human tissues remain as unexplored frontier. This talk describes recent advances in designing systems and protocols for contactless wireless charging using using RF waves and the use of weak electrical currents for data transfer among body implants. It explores the fundamental tradeoffs that exist between achieving high data and recharging rates, constructive mixing of radiated signals through beamforming, MAC protocols that allow differential data/energy access, and the promise of simultaneous transfer of data over energy. The talk shall also cover some latest results in charging sensors purely from ambient cellular signals in Boston city. On the implant side, advances in channel modeling and topology placement strategies are discussed with experimental results on low-overhead data transfers from an embedded implant to an on-skin relay node.

Biography:

Prof. Kaushik R. Chowdhury received the PhD degree from the Georgia Institute of Technology, Atlanta, in 2009. He is currently Associate Professor and Faculty Fellow in the Electrical and Computer Engineering Department at Northeastern University, Boston, MA. He was awarded the Presidential Early Career Award for Scientists and Engineers (PECASE) in Jan. 2017 by President Obama, the DARPA Young Faculty Award in 2017, the Office of Naval Research Director of Research Early Career Award in 2016, and the NSF CAREER award in 2015. He received multiple best paper awards, including the IEEE ICC conference, in 2009, ’12 and ’13, and ICNC conference in 2013. His h-index is 33 and his works have gathered over 8000 citations. He is presently a co-director of the Platforms for Advanced Wireless Research project office, a joint $100 million public-private investment partnership between the US NSF and wireless industry consortium to create city-scale testing platforms.

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