Graduate Seminar (EEL 6936)
Department of Electrical Engineering
http://ee.eng.usf.edu/Grad_Seminar

Dr. Cicek Cavdar

Royal Institute of Technology (KTH), Sweden
School of Information and Communication Technology (ICT)

Thursday, December 17, 2015, 3:30 - 4:30 p.m.
Engineering Building II (ENB) Room 109

Green 5G Mobile Networks

Abstract

Base stations consume the largest part (80%) of the total power consumption in wireless access networks, significant amount of which comes from the times when there are no active users transmitting. In this talk, traffic adaptive network operation strategies will be presented for Macro-only, Heterogeneous, and Massive MIMO systems in multi-cell mobile networks. Different Sleep modes (short term and long term) are considered in our study. Quality of service guaranteed cell sleep problem is solved by convex optimization aiming area power optimization by jointly considering bandwidth allocation and Base Station (BS) User Equipment (UE) association. It gives the optimum potential power savings when bandwidth is jointly optimized with cell sleep. Together with the sleep mode of operation, deployment and network dimensioning plays an important role on the energy savings. The second part of this talk presents the potential area power consumption reduction with the small cell offloading in a heterogeneous deployment scenario. We show that area power consumption can be reduced by deployment of small cells especially when Cell DTX is applied in dense urban scenarios.

Massive MIMO is a promising technology to meet the exponential growth of mobile traffic demand. However, contrary to the current systems, energy consumption of next generation networks is required to be load adaptive as the network load varies significantly throughout the day. The third part of this talk will be about a load adaptive multi-cell massive MIMO system where each base station (BS) adapts the number of antennas to the daily load profile (DLP) in order to maximize the downlink energy efficiency (EE). The EE maximization problem is formulated in a game theoretic framework where the number of antennas to be used by a BS is determined through best response iteration.

Biography

Dr. Cavdar is a researcher at School of Information and Communication Technology (ICT) of the Royal Institute of Technology (KTH) in Sweden. She finished her Ph.D studies in Computer Science, University of California, Davis in 2008 under supervision of Biswanath Mukherjee and in Istanbul Technical University, Turkey in 2009. After her PhD, she worked as an Assistant Professor in Computer Engineering Department, Istanbul Technical University. Her research interests include design and analysis of telecommunication networks with focus on 5G mobile networks, cloud computing, big data in the network, survivability, energy efficiency, end-to-end converged wireless-optical networks and techno-economics of green mobile networks. Currently, she is with the Wireless@KTH research center, where she has been leading several EU EIT Digital projects, including “5GrEEn: Towards Green 5G Mobile Networks” and “Seamless DA2GC in Europe”.