Reuben G. Stephen

Biography: Reuben George Stephen received the B. Tech. degree in electronics and communication engineering from the Cochin University of Science and Technology, Kerala, India in 2009, and the M. E. degree in telecommunications from the Indian Institute of Science, Bangalore, India in 2012. He is currently a Ph.D. candidate with the NUS Graduate School for Integrative Sciences and Engineering (NGS), National University of Singapore (NUS). From August 2012 to December 2013, he was a Research Engineer with the Center for Development of Telematics (C-DoT), Bangalore, and was involved in the development and testing of LTE femto base stations. His research interests include resource allocation and optimization problems in wireless systems.

Session Title: Green OFDMA Resource Allocation in Cache-Enabled CRAN

Abstract: Cloud radio access network (CRAN), in which remote radio heads (RRHs) are deployed to serve users in a target area, and connected to a central processor (CP) via limited-capacity links termed the fronthaul, is a promising candidate for the nextgeneration wireless communication systems. Due to the content-centric nature of future wireless communications, it is desirable to cache popular contents beforehand at the RRHs, to reduce the burden on the fronthaul and achieve energy saving through cooperative transmission. This motivates our study in this paper on the energy efficient transmission in an orthogonal frequency division multiple access (OFDMA)-based CRAN with multiple RRHs and users, where the RRHs can pre-fetch popular contents. We consider a joint optimization of the user-SC assignment, RRH selection and transmit power allocation over all the SCs to minimize the total transmit power of the RRHs, subject to the RRHs' individual fronthaul capacity constraints and the users' minimum rate constraints, while taking into account the caching status at the RRHs. Although the problem is non-convex, we propose a Lagrange duality based solution, which can be efficiently computed with good accuracy. We compare the minimum transmit power required by the proposed algorithm with different caching strategies against the case without caching by simulations, which show the significant energy saving with caching.