



RESEARCH SEMINAR

Channel Selection Coding for Energy Efficient Wireless Communications

George Thomas, Ph.D. Professor
Department of Electrical and Computer Engineering
University of Louisiana, Lafayette
15:00 – 16:30, Thursday, March 31, 2016
Room 148 at Science Building

Abstract

Energy efficiency has in recent times become a key concern in almost all human enterprises, and especially so in wireless communications. The ubiquitous cell phones strive for delivering better performance and more advanced services while at once struggling to minimize battery drain. Autonomous sensor networks on unattended and remotely located platforms are challenged to survive long with limited energy resources. Advances in wireless communications using MIMO (multi-input, multi-output) antenna technology, and especially the newly emerging massive MIMO with hundreds of antennal elements, have created a need to minimize the energy drain per antenna element. ‘Green communications’ has become a hot topic for contemporary research. In this talk, we will present a novel technique for significant reductions in power consumption in multi-channel wireless systems. The key idea involves a method for powering up fewer than the total number of available channels. That this reduces power consumption is not remarkable. What is remarkable is that, when used appropriately, we can offset the loss of capacity. Indeed, under a range or realistic conditions, we can actually derive more capacity than what is attainable by powering up all channels at once. We will present this from an information theory perspective and present capacity expressions that define the limits of achievable performance. The case of performance at low SNR (signal-to-noise ratio) will be investigated. Examples of practically attainable performance will be presented. Applications to variety of wireless and other communication scenarios will be discussed.

Biography



Dr. George Thomas is a professor of electrical and computer engineering at the University of Louisiana in Lafayette, LA where he has been there on the faculty since 1988. He has recently served as the Department Head (2008-2015) and previously as the Graduate Coordinator (2000-2009). Dr. Thomas played a key role in building up the undergraduate degree program in telecommunications at UL Lafayette, followed by the development of a graduate program in telecommunications. More recently he was also instrumental in launching a Ph.D. program in systems engineering. At UL Lafayette Dr. Thomas teaches courses in communications engineering and conducts research with a current focus in wireless communications, including power efficient communications, cognitive radio, and wireless multiple access. His earlier research has included multi-access channels without feedback, multiuser coding for collision resolution in random access communications, high-performance packet switches, and coding for satellite communications. One of his papers on multi-access collision resolution was selected for inclusion in an IEEE compendium of key papers in multiple access theory. Dr. Thomas received his Ph.D. degree in electrical communications engineering from the Indian Institute of Science in Bangalore, India. He worked in satellite communications with the Indian Space Research Organization before joining the faculty at UL Lafayette.