Title: On Power Control in Full Duplex Wireless Networks

Speaker: Professor Shiwen Mao
Time: December 23 (Tuesday), 2pm
Location: EOW430

Abstract:
Although full duplex (FD) transmissions have been used in wireline networks for years, FD in wireless networks has become feasible only in recent years, as made possible by breakthroughs in self-interference cancellation. To fully harvest the high potential of FD wireless networks, the power control problem should be carefully addressed with effective algorithms developed. In this talk, we first consider an FD wireless network consisting of multiple node pairs, where the two nodes in each pair transmit to each other (i.e., the point-to-point mode). We develop distributed power control algorithms for such a FD wireless network for the high signal-to-interference-plus-noise (SINR) regime as well as the general scenario without the high SINR assumption. In the second part of this talk, we investigate the problem of power control in an underlay CR network where the CR nodes are capable of FD transmissions. The objective is to guarantee the required quality of service (QoS) in the form of a minimum SINR ratio at each CR user and keep the interference to primary users below a prescribed threshold. We design a distributed power control scheme that integrates a proportional-integral-derivative (PID) controller and a power constraint mechanism to achieve the above goals. We analyze the stability performance of the proposed scheme and develop a hybrid scheme that can switch between FD and half duplex modes.

Biography:
Shiwen Mao (S'99-M'04-SM'09) received Ph.D. in electrical and computer engineering from Polytechnic University, Brooklyn, NY. Currently, he is the McWane Associate Professor in the Department of Electrical and Computer Engineering, Auburn University, Auburn, AL, USA. His research interests include wireless networks and multimedia communications, with current focus on cognitive radio, small cells, mmWave networks, free space optical networks, and smart grid. He is a Distinguished Lecturer of the IEEE Vehicular Technology Society in the Class of 2014. He is on the Editorial Board of IEEE Transactions on Wireless Communications, IEEE Internet of Things Journal, IEEE Communications Surveys and Tutorials, among others. He is the Vice Chair – Letters of the IEEE ComSoc Multimedia Communications Technical Committee. He received the 2013 IEEE ComSoc MMTC Outstanding Leadership Award and the NSF CAREER Award in 2010. He is a co-recipient of The IEEE ICC 2013 Best Paper Award and The 2004 IEEE Communications Society Leonard G. Abraham Prize in the Field of Communications Systems.

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