IEEE COMMUNICATIONS SOCIETY

Free Event organized by IEEE Communications Society WA Chapter for IEEE members and public.

IEEE Communications Society WA Chapter Seminar

Title: Interference Management for MIMO Wireless Networks—To Align or To Cancel?

Presenter: Wei Zhang, School of Electrical Engineering & Telecommunications, The University of New South Wales

Time/ Date: 10:00am to 11:00am, Monday, 19 November 2012

Venue: Billings Room, EECE Building, UWA

Abstract:

There is an increasing research interest in approximate capacity characterization of wireless networks. The degree of freedom (DOF), also known as multiplexing gain or capacity pre-log scaling factor, provides a capacity approximation in the high signal-to-noise ratio (SNR). Recently, much research efforts have been made to characterize the DOF of communication over multiple-input multiple-output (MIMO) interference channels or MIMO X channels. In this talk, a novel interference alignment and cancellation scheme with asymmetric signaling is presented to achieve or approach the upper bound of the DOF of the wireless networks where each transmitter/receiver is equipped with multiple antennas. We first show that the proposed scheme can obtain the exact upper bound of the DOF for 2-user MIMO X channels with constant channel coefficients for some cases of antenna configurations. Then, we show that the proposed scheme can obtain the DOF of M/2+N when $N<M\leq 2N$ for 3-user MIMO interference channels with constant channel coefficients, where each transmitter and receiver are equipped with M antennas and N antennas, respectively. The achievable DOF is further proved to achieve or approach very close to the upper bound of the 3-user MIMO interference channels.

Biography:

Wei Zhang received Bachelor's and Master's degrees from Jilin University in 1998 and 2002, respectively, and his PhD degree in Electronic Engineering from the Chinese University of Hong Kong in 2005. In May 2008, he joined the School of Electrical Engineering and Telecommunications, The University of New South Wales, Sydney, Australia, where he is currently Associate Professor. He was Research Fellow at the Department of Electronic and Computer Engineering, Hong Kong University of Science and Technology in 2006-2007. He was Visiting Scholar at the University of Delaware in 2004 and Visiting Research Collaborator at Princeton University in 2009, respectively.

His current research interests include cognitive radio, cooperative communications, space-time coding, and multiuser MIMO. He has published over 80 IEEE journal and conference papers with total citations more than 2100 times. He received the best paper award at the 50th IEEE Global Communications Conference (GLOBECOM), Washington DC in 2007 and the IEEE Communications Society Asia-Pacific Outstanding Young Researcher Award in 2009.

He is an Editor of IEEE Transactions on Wireless Communications and an Editor of IEEE Journal on Selected Areas in Communications (Cognitive Radio Series). He serves as a TPC Co-Chair of Communications Theory Symposium of IEEE ICC 2011, a TPC Co-Chair of Wireless Communications Symposium of IEEE ICCCAS 2009, and Guest Editor of Journal of Communications special issue on "Cognitive Radio Enabled Communications and Networking" and special issue on "Coding and Modulation for Cooperative Communications". He has been serving as a TPC member of many conferences including IEEE ICC, IEEE GLOBECOM, IEEE WCNC, IEEE DySPAN, etc. He is a Senior Member of the IEEE.