

# Play Interference for Communications over MIMO Wireless Networks – To Align or To Cancel?

by

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**Date: 20 October 2011 (Thursday)**

**Time: 2:30 p.m. – 4:00 p.m.**

**Venue: Room 222, 2/F, Ho Sin Hang Engineering Building, CUHK**

## 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 prove 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 of the Speaker

**Wei Zhang** (S'01, M'06, SM'11) received the Ph.D. degree in Electronic Engineering from the Chinese University of Hong Kong in 2005. He was a Research Fellow at the Department of Electronic and Computer Engineering, Hong Kong University of Science and Technology in 2006-2007. From 2008, he has been with the School of Electrical Engineering & Telecommunications at the University of New South Wales, Sydney, Australia, where he is a Senior Lecturer. His current research interests include cognitive radio, cooperative communications, space-time coding, and multi-user MIMO.

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 Co-chair of International Conference on Communications (ICC) - Communications Theory Symposium, Kyoto, Japan in 2011. He is an Editor of IEEE Transactions on Wireless Communications and an Editor of IEEE Journal on Selected Areas in Communications – Cognitive Radio Series.

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**ALL ARE WELCOME**

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**For ENQUIRIES: (852) 3943-4351**

*\* Light refreshment will be served at 2:15 p.m. before the lecture \**