



IEEE

IEEE Okanagan Subsection

Presents

Mr. Mingbo Niu

School of Engineering, UBC, Okanagan campus

**Multiple-Input Multiple-Output
Technology: Theory and
Application**



Time & Date: 4:30pm-5:30pm, May 09, 2012

Location: EME 2181, UBC Okanagan Campus

Talk Abstract:

Multiple-input multiple-output (MIMO) communication systems employing multiple transmit and receive antennas at both transmitter and receiver ends are able to provide a huge performance improvement compared to traditional single antenna systems (known as single-input single-output (SISO) systems). MIMO is adopted by various international standards, i.e., long term evolution (LTE), worldwide interoperability for microwave access (WiMAX), etc. However, such performance improvement is dependent upon the fact that the channels from a transmitter to a receiver are independent or with low correlation (making use of multi-path effects). The performance of MIMO systems can be shown to degrade when, for example, severe correlations present between transmitter and/or receiver antennas. In this talk, after a quick introduction of the MIMO history and current applications in radio frequency communications, the advantages and working mechanism of MIMO systems are presented. Different types of MIMO systems are discussed. Several typical applications with MIMO are then presented (such as MIMO-OFDM and virtual MIMO). Interestingly, MIMO has also been applied to free-space optical communications, especially in strong atmospheric turbulence which is shown to degrade the free-space optical (FSO) system performance severely. Recent work at UBC's Research Group of Optical Communications demonstrated that optical MIMO technique can be effectively applied in terrestrial FSO links. It can mitigate the turbulence effect substantially for ultra-high speed data communications.



Speaker Biography:

Mingbo Niu received the B. Sc. degree in Electrical Engineering from Northwestern Polytechnical University, China in 2003, and the M. Sc. degree in Communication and Information Systems from the same university in 2006. From 2002 to 2006, he also was a Research Assistant with the research Institute of Multimedia Communication and Software Technology at Northwestern Polytechnical University where he contributed to the development of distributed long-distance power monitor systems. He collaborated in the research on multiple-robot systems (MRS) with the National Key Lab on Underwater Information and Control Technology after Master studies. He is currently a Ph.D. candidate in the School of Engineering at the University of British Columbia, Canada. His current research interests include digital communications over fading channels, MIMO transmission systems, MRS, and wireless optical communication networks.

Pizza and pop will be served after the seminar! For further information regarding the seminar, please contact Julian Cheng (Email: julian.cheng@ubc.ca)