



IEEE Okanagan Subsection Presents

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Chasing Channels- Adaptive Codebooks for Limited Feedback MIMO



Time & Date: 10:30am-11:30pm, August 11, 2014

Location: EME 1121, UBC Okanagan campus

Talk Abstract:

Multiple-input multiple-output (MIMO) systems have received considerable attention over the last two decades owing to the improvements in link throughput and/or the reliability of signal reception. In order to achieve the full capacity gains, channel state information is required at the transmitter, thus necessitating feedback of this information from the receiver to the base station. Given the multi-carrier nature of 4G systems, this feedback overhead is restricted to a few bits per subcarrier. Consequently, the performance of limited feedback closed-loop MIMO systems is very sensitive to the codebooks used to achieve such channel quantization.

Codebooks in current standards, such as LTE, were optimized for independent identically distributed Rayleigh fading channels, whereas realistic propagation environments exhibit both temporal and spatial channel correlations. In this talk we will demonstrate the inefficiency and performance loss of standard codebooks in realistic channel models (such as WINNER II), thus motivating adaptive codebook techniques. We will present methods for perturbing the standard codebooks, specifically focusing them around the channel and following the channel trajectory throughout transmission - thus significantly reducing the quantization errors. Blind adaptation methods, i.e. without introducing additional feedback requirements, will be presented.



Speaker Biography:

Pawel A. Dmochowski (IEEE S'02, M'07, SM'11) was born in Gdansk, Poland. He received a BSc (Engineering Physics) from the University of British Columbia in 1998, and MSc and PhD degrees from Queen's University at Kingston in 2001 and 2006, respectively. He is currently a Senior Lecturer in the School of Engineering and Computer Science at Victoria University of Wellington, New Zealand. Prior to joining Victoria University of Wellington, he was a Natural Sciences and Engineering Research Council (NSERC) Visiting Fellow at the Communications Research Centre Canada as well as a Sessional Instructor at Carleton University in Ottawa. He is a Senior Member of the IEEE and is actively involved in the IEEE New Zealand Central Section Committee. His research interests include Cognitive Radio, limited feedback and Massive MIMO systems.