

BCWS Seminar Series

Blind Timing and Carrier Synchronization in Decode and Forward Cooperative Systems

by

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Time: Monday, September 13, 1:30 - 2:30 pm

Place: Room 2014 (Minto Board Room), Minto Centre, Carleton University

Abstract: Synchronization in Decode and Forward (DF) cooperative communication systems is a complex and challenging task requiring estimation of many independent timing and carrier offsets at each relay in the broadcasting phase and multiple timing and carrier offsets at the destination in the relaying phase. Multiple offsets arise in the relaying phase due to each relay node having its own local oscillator and because of the distributed nature of the network. This talk will give a brief introduction to the synchronization problem defined in the contexts of distributed Multiple Input Multiple Output (MIMO) and cooperative communication systems and provide an overview of the research in this area. It will then focus on blind channel, timing and carrier offset estimation in a DF cooperative system with one source, M relays and one destination equipped with N antennas. The multiple antennas at the destination are proposed for blind source separation at the destination, which converts the difficult problem of jointly estimating multiple synchronization parameters in the relaying phase into more tractable sub-problems of estimating many individual timing and carrier offsets for the independent relays. Finally, results will be presented characterising the robust performance of the proposed system in quasi-static flat-fading channels.

Biography: Salman Durrani received the B.Sc. (1st class honours) degree in Electrical Engineering from the University of Engineering & Technology, Lahore, Pakistan in 2000. He received the PhD degree in Electrical Engineering from the University of Queensland, Brisbane, Australia in Dec. 2004. Since March 2005, he has been a Lecturer in the College of Engineering & Computer Science, The Australian National University, Canberra, Australia. His current research interests include wireless and mobile communications, synchronization in cooperative communication systems, connectivity of ad-hoc networks and vehicular networks, MIMO and smart antenna systems and Code Division Multiple Access (CDMA) systems. He has 40 publications to date in refereed international journals and conferences. He is a Member of Institution of Engineers, Australia and a Senior Member of IEEE.