



**The University of New South Wales**  
**Faculty of Engineering**  
**School of Electrical Engineering & Telecom**



**Invited Lecture**

**Recovering the Multiplexing Loss of Half-Duplex Relaying  
via Spectrally Efficient Relay Selection**

**Aria Nosratinia, *IEEE Fellow***

**Professor, Department of Electrical Engineering  
University of Texas at Dallas, USA**



**Date: 8 December 2009, Tuesday**  
**Time: 11:00 a.m. – 12:00 noon**  
**Venue: G3, Electrical Engineering Building**

**Abstract**

This talk addresses one of the main issues in half-duplex relay systems: the well-known multiplexing loss due to the causality of relays. We propose relay selection methods to recover the multiplexing loss in decode-and-forward (DF) relay networks. A key feature of this work is that it does not require relay isolation. Two network topologies are studied: relaying with and without direct source-destination links. For the former topology we design relay selection methods that achieve the MISO upper bound on the Diversity-Multiplexing Tradeoff (DMT) with very little feedback and no carrier synchronization requirements. For the latter topology we propose non-orthogonal DF methods that feature unequal error protection ability via an embedded family of DMT curves. Even considering this method's minimal DMT, a marked improvement over previous DF methods is observed, especially in high spectral efficiencies. By addressing one of the most prominent drawbacks of relay systems, it is hoped that this work will pave the way to a more widespread acceptance of the usage of DF relays in communication networks.

**Biography**

Professor Aria Nosratinia is professor of Electrical Engineering at the University of Texas at Dallas, where he is also the director of the Multimedia Communications Laboratory. He received his Ph.D. in Electrical and Computer Engineering from the University of Illinois at Urbana-Champaign. He has held visiting appointments at Princeton University, Rice University, and UCLA. His interests lie in the broad area of information theory and signal processing, with applications in wireless communications and medical imaging. His recent work has been on relays and cooperative communication, cross-layer issues in communications, and functional Magnetic Resonance Imaging (fMRI). He currently serves as editor for the IEEE Transactions on Information Theory, and IEEE Transactions on Wireless Communications, and serves on the Board of Governors of the IEEE Information Theory Society. He has also been an editor for the IEEE Transactions on Image Processing, IEEE Signal Processing Letters, IEEE Wireless Communications (Magazine), and Journal of Circuits, Systems, and Computers. He has been the recipient of the National Science Foundation career award. He is a Fellow of the IEEE.

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**ALL ARE WELCOME**

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**For ENQUIRIES: Dr. Wei Zhang (Ph: 9385 4033)**