



THE CHINESE UNIVERSITY OF HONG KONG
Institute of Network Coding
and
Department of Information Engineering
Seminar



**A Clean-Slate Design of Wireless Ad Hoc Networks
Using On-Off-Division Duplex
by
Prof. Dongning Guo
Department of Electrical Engineering and Computer Science
Northwestern University**

Date : 6 October, 2010 (Wednesday)
Time : 2:30 – 3:30 pm
**Venue : Room 833, Ho Sin Hang Engineering Building
The Chinese University of Hong Kong**

Abstract

We introduce a novel paradigm, called rapid on-off-division duplex (RODD), for designing the physical and medium access control (MAC) layers of a wireless ad hoc network formed by half-duplex radios. A node equipped with such a radio cannot simultaneously transmit and receive useful signals at the same frequency. Unlike in conventional designs, where a node's transmission frames are scheduled away from its reception, RODD lets each node transmit its signal through a unique on-off duplex mask (or signature) over every frame interval, and receive a signal through each off-slot. Over the period of a single frame, every node can transmit a message to its peers, and simultaneously receive a message from each peer. Thus RODD allows full-duplex communication using half-duplex radios without complicated scheduling of node transmissions at the frame level. The throughput of RODD is determined under some simple settings, which is significantly larger than that of certain random access schemes. RODD is especially efficient in case the dominant traffic is simultaneous broadcast from nodes to their one-hop peers. Design issues such as peer discovery, synchronization and coding schemes will also be addressed.

Biography

Dongning Guo received the B.Eng. degree from the University of Science & Technology of China, the M. Eng. degree from the National University of Singapore, and the M.A. and Ph.D. degrees from Princeton University, Princeton, NJ. He was an R&D Engineer in the Center for Wireless Communications (now the Institute for Infocom Research), Singapore, from 1998 to 1999. He joined the the Department of Electrical Engineering and Computer Science at Northwestern University, Evanston, IL, in 2004, where he is currently an Associate Professor. He was a Visiting Professor at Norwegian University of Science and Technology in summer 2006. His research interests are in information theory, communications, and networking. He received the Huber & Suhner Best Student Paper Award in the International Zurich Seminar on Broadband Communications in 2000 and the IEEE Marconi Prize Paper Award in Wireless Communications in 2010. He is also a recipient of the National Science Foundation Faculty Early Career Development (CAREER) Award in 2007.

*** ALL ARE WELCOME ****

Host: Professor Raymond W.H. Yeung (Tel: 2609-8375, Email: whyeung@ie.cuhk.edu.hk)
Enquiries: Information Engineering Dept., CUHK (Tel.: 2609-8388)