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**THE CHINESE UNIVERSITY OF HONG KONG**
Department of Information Engineering

*Seminar*

# Wireless network information flow: a deterministic approach

**by**

## Dr. Salman Avestimehr

**Center for the Mathematics of Information**
**California Institute of Technology**

**Date : 6 March, 2009 (Fri.)**
**Time : 2:30 – 3:30pm**
**Venue : Room 833, Ho Sin Hang Engineering Building**
**The Chinese University of Hong Kong**

*Abstract*

"How does information flow over wireless networks? Answer to this basic question is one of the most challenging problems in the field of wireless network information theory. From a practical point of view, the answer to this question will have a significant impact on the architectural design of future wireless systems. So far, the majority of research done in this area have been based on the classical additive Gaussian noise model for wireless channels. However, due to the complexity of this model, except for the simplest networks, the analysis of most other networks has been an open problem for many years.

To make further progress, we develop a deterministic channel model which is analytically simpler than the Gaussian model, but at the same time captures the essential physical layer properties of the wireless medium: signal strength, superposition and broadcast. We will demonstrate how this model can be an effective tool to help visualize the flow of information and obtain intuitive insights in many challenging network scenarios. Furthermore, somewhat surprisingly, these deterministic results translate to good approximation for the Gaussian case. In particular, I will discuss recent applications of this approach to approximate the capacity region of the two-way relay network and wireless butterfly network."

*Biography*

"Salman Avestimehr is presently a postdoctoral scholar in the Center for the Mathematics of Information at Caltech. He will be joining the School of Electrical and Computer Engineering at Cornell University as an assistant professor. Salman received his Ph.D. in 2008 and M.Sc. degree in 2005 in electrical engineering and computer sciences, both from the University of California, Berkeley. Prior to that, he received his B.Sc. degree in Electrical Engineering from Sharif University of Technology in 2003. He has received a number of awards including the David J. Sakrison Memorial Prize for the most outstanding doctoral research in the EECS department of UC Berkeley in 2008. He also received the Vodafone U.S. Foundation Fellows Initiative Research Merit Award in 2005."

**** ALL ARE WELCOME ****

Host: Professor Sidharth Jaggi (Tel: 3163-4326, Email: sjaggi@ie.cuhk.edu.hk)
Enquiries: Information Engineering Dept., CUHK (Tel.: 2609-8385)