



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

*Seminar*

**Medium Access using Queues**

by

**Professor Devavrat Shah**

**Laboratory for Information and Decision Systems  
MIT**

**Date : 13 July, 2010 (Tue.)**  
**Time : 11:00am – 12:00noon**  
**Venue : Room 1009, William M.W. Mong Engineering  
Building**  
**The Chinese University of Hong Kong**

*Abstract*

Simple, distributed and iterative algorithms, popularly known as message-passing, have emerged as the architecture of choice for a variety of networks. They have been surprisingly effective despite their simplicity. In this talk, I will try to argue in favor of such algorithms by discussing an example from wireless communication networks.

Specifically, I will discuss the design of an efficient medium access algorithm for wireless networks using queue-sizes. Here nodes wish to transmit without interfering with each other while maximizing utilization of the wireless medium. To minimize co-ordination cost, solutions implemented in practice are based on 'random access'. However, they perform quite poorly as proved in theory and observed in practice. I will present an 'adaptive' random access algorithm that is provably efficient in both asynchronous and synchronous setup. This work draws insights from the classical variational principle, mixing times of Markov chains and reversibility.

The talk is based on joint work with Jinwoo Shin, MIT.

*Biography*

Devavrat Shah is currently a Jamieson career development associate professor with the department of electrical engineering and computer science, MIT. His research focus is on the theory of large complex networks which includes network algorithms, stochastic networks, network information theory and large scale statistical inference.

He was co-awarded the best paper awards at the IEEE INFOCOM '04, ACM SIGMETRICS/Performance '06; and supervised work that received the best student paper awards at Neural Information Processing Systems '08 and ACM SIGMETRICS/Performance '09. He received the 2005 George B. Dantzig best dissertation award from the INFORMS. He received the first ACM SIGMETRICS Rising Star Award 2008 for his work on network scheduling algorithms. He is currently an associate editor of Operations Research.

**\*\* ALL ARE WELCOME \*\***

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