



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



Making Cellular Networks Scalable and Flexible

by

Dr. Li Erran Li
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Date : 16 August 2013 (Friday)

Time : 2:30 - 3:30 pm

**Venue : Room 1009, William M. W. Mong Engineering Building
 The Chinese University of Hong Kong**

Abstract

The wide adoption of smartphones has made cellular networks an essential part of our digital life. As a result, it has become increasingly important to understand such networks, identify their performance bottlenecks, and then propose practical techniques to eliminate bottlenecks.

I present techniques to address the two aforementioned key problems through the principle of design-in-the-large. Design-in-the-large leverages the numerous and their emergent behaviors to achieve scalability and flexibility.

In particular, to scale access bandwidth at radio access networks, I will present the design and prototype of Argos, a base station architecture that employs an unprecedented number of antennas simultaneously to serve a smaller number of mobile devices in the same band of frequencies. Both analysis and early experimental results suggest this design can lead to orders of magnitude increase in both spectral and energy efficiency.

To enable direct control of the core of cellular networks, I will present the design and prototype of SoftCell, a scalable software-defined cellular core network architecture. SoftCell achieves scalability by moving functionality from packet gateways to the many base stations and by aggregating traffic along multiple dimensions—the service policy, the base station, and the mobile device—at different switches in the network.

This is joint work with collaborators at Princeton, Rice, Yale and Bell Labs.

Biography

Li Erran Li received his Ph.D. in Computer Science from Cornell University in 2001. Since graduation, he has been with Bell Labs. He is also an adjunct professor at the Department of Computer Science at Columbia University, New York. He was elected to be an IEEE Fellow in 2013. His research interests are in networking and systems with a focus on cellular networks and mobile computing. He has published over 70 papers and holds 13 US Patents.

Li Erran Li is an Associate Editor for IEEE Trans. on Networking, IEEE Trans. on Mobile Computing (TMC), and a Guest Editor for JSAC Special Issue on Non-Cooperative Behavior in Networking. He co-founded two ACM workshops to address pressing challenges in cellular networks and mobile computing: ACM SIGCOMM Workshop on Cellular Networks: Operations, Challenges, and Future Design (CellNet), August 2012, ACM MobiSys Workshop on Mobile Cloud Computing and Services (MCS), June 2010. He also co-organized two DIMACS Workshops to advance the state-of-the-art in SDN and cloud computing: DIMACS Workshop on Software Defined Networking, Dec 2012, DIMACS Workshop on Systems and Networking Advances in Cloud Computing, Dec 2011.

****ALL ARE WELCOME ****