



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



## Cooperative Interference Management in Wireless Networks

by

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**Time : 2:30 - 3:30 pm**

**Venue : Room 833, Ho Sin Hang Engineering Building  
 The Chinese University of Hong Kong**

### Abstract

With the growing number of users along with ever-increasing demand for higher data rates in modern wireless networks, interference has become the major barrier against efficient utilization of limited resources. On the other hand, opportunities for cooperation among radios also increase with the growing number of users, which potentially lead to better interference management. In traditional wireless system design, however, such opportunities are usually neglected, mainly due to lack of fundamental understanding on cooperative interference management.

In this talk, I will present some results that yield better fundamental understanding. First, we characterize both qualitatively and quantitatively how limited cooperation between transmitting terminals or receiving terminals helps mitigate interference in a canonical two-transmitter-two-receiver wireless system. We identify two regions regarding the gain from limited cooperation: linear and saturation regions. In the linear region, cooperation is efficient and provides a degrees-of-freedom gain, which is either one cooperation bit buys one over-the-air bit or two cooperation bits buy one over-the-air bit until saturation. In the saturation region, cooperation is inefficient and only provides a bounded power gain.

Time permitting, I will talk about another result where we investigate how relay nodes help resolve interference in delivering information from two sources to their respective destinations in multi-hop wireless networks. We focus on a linear deterministic approximate model for wireless networks, and when the minimum cut value between each source-destination pair is constrained to be 1, we completely characterize the capacity region.

### Biography

I-Hsiang Wang received the Ph.D. degree in electrical engineering and computer sciences from University of California at Berkeley, USA, in 2011. From 2007 to 2011, he was affiliated with Prof. David Tse's group in Wireless Foundations, Berkeley. In 2011, he joined Prof. Christina Fragouli's group in École Polytechnique Fédérale de Lausanne, Switzerland, as a postdoctoral researcher. His research interests include network information theory, wireless networks, coding theory and network coding.

Dr. Wang received a 2-year Vodafone Graduate Fellowship in 2006. He was a finalist of the Best Student Paper Award of IEEE International Symposium on Information Theory, 2011.

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