

**UNIVERSITY OF MACAU**  
**FACULTY OF SCIENCE AND TECHNOLOGY**  
**DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING**

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**Network Coding: Theory and Applications**

by

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**Date** : 8 May 2015 (Friday)  
**Time** : 15:00 – 16:30  
**Venue** : E11-G015

**ABSTRACT**

In recent years, network coding has generated much interest in information theory, coding theory, networking, wireless communications, cryptography, and computer science. Consider a point-to-point communication network on which a number of information sources are to be multicast to certain sets of destination nodes. The problem is to characterize the maximum possible throughput. Contrary to one's intuition, network coding theory reveals that it is in general not optimal to regard the information to be transmitted as a "fluid" which can simply be routed or replicated. Rather, by employing coding at the nodes, bandwidth can in general be saved. In this talk, we will give an overview of network coding theory and its extensions for error correction and information security. We will also discuss applications of network coding in computer networks, wireless communications, and cloud storage.

**BIOGRAPHY**



Raymond W. Yeung received the BS, MEng and PhD degrees in electrical engineering from Cornell University in 1984, 1985, and 1988, respectively. He joined AT&T Bell Laboratories in 1988. He is currently Choh-Ming Li Professor of Information Engineering. A cofounder of network coding, he has been serving as Co-Director of the Institute of Network Coding since 2010. He is the author of the books *A First Course in Information Theory* (Kluwer Academic/Plenum Publishers, 2002) and *Information Theory and Network Coding* (Springer 2008), which have been adopted by over 60 institutions around the world. His research interest is in information theory and network coding. He was a consultant in a project of Jet

Propulsion Laboratory for salvaging the malfunctioning Galileo Spacecraft.

Professor Yeung is a member of the Board of Governors of the IEEE Information Theory Society from 1999 to 2001. He has served on the committees of a number of information theory symposiums and workshops. He was the General Chair of the First Workshop on Network, Coding, and Applications (NetCod 2005), a Technical Co-Chair of the 2006 IEEE International Symposium on Information Theory, and a Technical Co-Chair of the 2006 IEEE Information Theory Workshop, Chengdu. He will

organize with David Tse the 2015 IEEE International Symposium on Information Theory in Hong Kong.

Professor Yeung also has served on the editorial board of a number of academic journals. He was an Associate Editor for Shannon Theory of the IEEE Transactions on Information Theory from 2002 to 2005. He currently serves as an Editor-at-Large of Communications in Information and Systems, an Editor of Foundation and Trends in Communications and Information Theory and an Editor of Foundation and Trends in Networking. He was a recipient of the Croucher Senior Research Fellowship for 2000/01, the Best Paper Award (Communication Theory) of the 2004 International Conference on Communications, Circuits and System, the 2005 IEEE Information Theory Society Paper Award, and the Friedrich Wilhelm Bessel Research Award from the Alexander von Humboldt Foundation in 2007.

Professor Yeung is a Changjiang Chair Professor of Xidian University and an Advisory Professor of Beijing University of Posts and Telecommunications. He is a Fellow of the IEEE and the Hong Kong Institution of Engineers.

**ALL ARE WELCOME!**