



THE CHINESE UNIVERSITY OF HONG KONG

Institute of Network Coding in collaboration with  
the Department of Information Engineering

Distinguished Lecture



## Resource Sharing in Networks

by

**Professor Frank Kelly**

**Professor of the Mathematics of Systems**

**University of Cambridge**



### **Distinguished Lecture**

**Date** : 8 February, 2010 (Mon.)  
**Time** : 2:00pm - 3:00pm  
**Venue** : 5/F., T.Y. Wong Hall, Ho Sin Hang Engineering Building  
The Chinese University of Hong Kong

### **Dialog with Graduate Students\***

**Date** : 8 February, 2010 (Mon.)  
**Time** : 4:00pm - 5:00pm (drinks will be served from 3:00pm - 4:00pm)  
**Venue** : Room 1009, William M.W. Mong Engineering Building  
The Chinese University of Hong Kong

(\* For non-CUHK students, please register via email : [cpleung@ie.cuhk.edu.hk](mailto:cpleung@ie.cuhk.edu.hk))

### *Abstract*

How should flows through a network be organized so that resources are shared fairly, and so that the network operates in a stable and efficient manner? This question arises in a number of application areas, including communication and transportation networks.

This talk will review definitions of fairness, with particular emphasis on some of the attractive features of proportional fairness. Next the talk will describe stochastic models of network routing and resource allocation, when routing and scheduling policies are designed to implement proportional fairness. Particular examples discussed will include Internet congestion control and ramp metering policies for motorway networks.

### *Biography*

Frank Kelly is Professor of the Mathematics of Systems, University of Cambridge, and Master of Christ's College. His main research interests are in random processes, networks and optimization. He is especially interested in applications to the design and control of networks and to the understanding of self-regulation in large-scale systems.

Frank Kelly has received several prizes for his work. In 1979 he won the Davidson Prize of the University of Cambridge. In 1989 he was awarded the Guy Medal in Silver of the Royal Statistical Society, and in the same year he was elected a Fellow of the Royal Society. He was awarded the 1991 Lanchester Prize of the Institute for Operations Research and the Management Sciences, and in 1997 the Naylor Prize of the London Mathematical Society. In 2005 he received the IEEE Koji Kobayashi Computers and Communications Award in 2008 the John von Neumann Theory Prize, and in 2009 the SIGMETRICS Achievement Award and the Gold Medal of the Association of European Operational Research Societies.

He served as Director of the Statistical Laboratory in the University of Cambridge from 1991 to 1993. He has served on the Scientific Board of HP's Basic Research Institute in Mathematical Sciences, the Scientific Council of EURANDOM, the Conseil Scientifique of France Telecom, and the Council of the Royal Society. He has chaired the Advisory Board of the Royal Institution/University of Cambridge Mathematics Enrichment Project, and the Management Committee of the Isaac Newton Institute for Mathematical Sciences. He spent the academic year 2001-2 as a visiting professor at Stanford University. From 2003 to 2006 he served as Chief Scientific Adviser to the United Kingdom's Department for Transport.

**~ ALL ARE WELCOME ~**