Managing Interference

Professor Robert Calderbank
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Date: 1 December 2011 (Thursday)
Time: 11.00am – 12.00pm
Venue: SPMS-LT3, SPMS-03-02
School of Physical and Mathematical Sciences

We consider a framework for full-duplex communication in ad-hoc wireless networks recently proposed by Dongning Guo. An individual node in the wireless network either transmits or it listens to transmissions from other nodes but it cannot to both at the same time. There might be as many nodes as there are 48 bit MAC addresses but we assume that only a small subset of nodes contribute to the superposition received at any given node in the network.

We use ideas from compressed sensing to show that simultaneous communication is possible across the entire network. Our approach is to manage interference through configuration rather than to eliminate or align it through extensive exchange of fine-grained Channel State Information.

Our approach to configuration makes use of old fashioned coding theory.

Speaker Biography

Professor A. Robert Calderbank is the dean of Natural Sciences and professor of Computer Science, Electrical Engineering, and Mathematics at Duke University, and a professor of Electrical Engineering, Mathematics and Applied and Computational Mathematics at Princeton University. He received a BSc degree from University of Warwick in 1975, a MSc degree from University of Oxford in 1976, England, and a PhD degree from the California Institute of Technology, all in mathematics. He became a member of the technical staff at Bell Labs in 1980. Over the next 23 years, he rose through the ranks, eventually becoming vice president for research and Internet and network systems at AT&T Labs. In 2003, he retired from his AT&T Labs position to join Princeton University.

He has made numerous contributions to the fields of coding and information theory, and he is a two-time winner of the IEEE Information Theory Prize Paper award. While at Bell Labs, he was part of a team which discovered space–time coding. He was elected to the US National Academy of Engineering in 2005.

He is married to Ingrid Daubechies.

Host: Professor Ling San, Division of Mathematical Sciences, School of Physical and Mathematical Sciences