



Cornell University

Information, Systems, and Networks seminar

## On Error Correction for Networks and Deadlines

Rhodes Hall 310: September 12, 2012 @ 12:00PM



ISN Seminar Speaker:

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### Abstract

Classical coding theory deals with the problem of robust transmission on individual unreliable channels. Network error correction coding is a generalization that considers coding for networks where some links may be erroneous. Many existing works have studied network error correction coding for single-source multicast networks with uniform link capacities. For the case of multiple sources, multiple receivers with different demands, or nonuniform link capacities, we show new coding schemes and capacity bounding techniques. We also introduce new applications beyond the original problem context. One application is streaming communication, where specific information must be decoded by specific deadlines. This can be modeled as a network error/erasure correction problem where each deadline corresponds to a receiver with different demands. We use this perspective to characterize capacity and design good codes. Another application is decentralized distribution of information (such as keys from a pool) when not all participating nodes are trustworthy, which can be modeled as a multi-source network error correction problem. We also construct rateless network error correction codes which can be combined with cryptographic techniques in networks of computationally limited devices.

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### Biography

Tracey Ho is an Assistant Professor in Electrical Engineering and Computer Science at the California Institute of Technology. She received a Ph.D. (2004) and B.S. and M.Eng degrees (1999) in Electrical Engineering and Computer Science (EECS) from the Massachusetts Institute of Technology (MIT). She was a co-recipient of the 2009 Communications & Information Theory Society Joint Paper Award. Her primary research interests are in information theory, network coding and communication networks.