Shannon’s celebrated channel coding theorem established the fundamental limit on information flow over point-to-point channels and showed the existence of codes that achieve this limit. The ensuing 65 years have witnessed the development of ingenious practical codes that approach the Shannon limit. These codes are now widely used in communication networks and storage systems.

Results from network information theory, however, suggest that we may need to develop new types of codes to improve the achievable rates in networks with multiple sources and destinations and shared resources. How well do point-to-point codes perform over such networks relative to their information flow limits? Do we need to spend another 65 years (or more) to develop new “network codes”?

Professor El Gamal will argue that (random) point-to-point codes, when coupled with more sophisticated decoders than the ones in use today, can perform extremely well, and sometimes optimally, over several multiple access, broadcast, interference, and relay networks. In some other scenarios, we may need to develop new network codes.

This talk is based on joint work with Bernd Bandemer, David Tse, Francois Baccelli, and Young-Han Kim.

**Wednesday, May 1, 2013, 4 PM**

3:00 PM – Reception, CMRR
4:00 PM – Lecture, Calit2 Auditorium – Atkinson Hall

**Presented by**

Center for Magnetic Recording Research
California Institute of Telecommunications and Information Technology
Information Theory and Applications Center