



Electrical Engineering Colloquium
Dallas Chapter of IEEE Signal Processing Society Presents

**Cooperative Communication where Network
meets the Channel**

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Within the last ten years, there has been a cultural shift from wired landlocked connectivity to pervasive wireless information access. Most mobile devices are now equipped with some form of embedded wireless radio. The market demands for high data rates and increased battery longevity have put tremendous pressure on all aspects of wireless system design. To meet the challenges of next generation wireless system, we need fundamentally new methods to exploit all available dimensions of communication channels as well as network.

Over the last few years, our research group at Rice has focused on emerging systems and network level techniques to increase spectral and power efficiency of communication systems, and extend coverage of wireless networks. The cooperative communication paradigm pools distributed resources of different nodes, such that the nodes act like a collaborative system instead of greedy adversarial participants. In this talk, I will first introduce Rice's Electrical and Computer Engineering Department, and then will talk briefly about various research activities in the Center for Multimedia Communication, and finally I will present the cooperative communication methodology and discuss its merits and challenges. The approach will be information theoretic and will consider coding, channel state information, and feedback. I will conclude by presenting our research and development plans to demonstrate feasibility of cooperation in the context of a scalable experimental wireless system for mobile broadband Internet.

Behnaam Aazhang received his PhD in Electrical and Computer Engineering from University of Illinois at Urbana-Champaign in 1986. He is the J.S. Abercrombie Professor, Chair of the Department of Electrical and Computer Engineering, and also the Director of Center for Multimedia Communications at Rice University. His research interests are in the areas of communication theory, information theory, and their applications with emphasis on multiple access communications, cellular mobile radio communications, and wireless communication networks. He is a distinguished lecturer of IEEE Communication Society and has received numerous awards for his contributions. He has been listed in the Thomson-ISI Highly Cited Researchers and has been keynote and plenary speaker of several conferences. He is currently serving as the general chair of the 2006 Communication Theory Workshop, Dorado, Puerto Rico. Dr. Aazhang is a Fellow of IEEE.

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