

DEPARTMENT OF ELECTRICAL ENGINEERING

Graduate Seminar Guest Speaker

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**“Cooperative Communications in Wireless Networks:
SER Performance Analysis and Optimum Power Allocation”**

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Knox 109

ABSTRACT

Cooperative communications and networking is a new and rapidly evolving wireless communication paradigm. Different from conventional point-to-point wireless communications, the concept of cooperative communications has been recently proposed for wireless networks, especially for sensor networks and wireless ad hoc networks. The basic idea of cooperative communications is that different users or nodes in a wireless network can help each other to transmit signals cooperatively. Different users may share their antennas to create a “virtual array” through distributed transmission, which results in increasing capacity and multiplexing gain and realizes a new form of space diversity to combat the effects of severe fading that has been termed cooperative diversity. In this talk, I will report some of our research results in this area. I will present closed-form symbol-error rate (SER) performance analysis for two kinds of cooperation protocols: Decode-and-Forward (DF) and Amplify-and-Forward (AF) cooperation protocols. We have obtained some tight SER upper bound or approximation to reveal the asymptotic performance of the cooperation systems. Based on these tight SER approximations, we are able to determine optimum power allocation for such systems. I will conclude the talk with some open problems and discussions.

BIOGRAPHY

Dr. Su received the Ph.D. degree in electrical engineering from the University of Delaware, Newark in 2002. He received his B.S. and Ph.D. degrees in mathematics from Nankai University, Tianjin, China, in 1994 and 1999, respectively. His research interests span a broad range of areas from signal processing to wireless communications and networking, including space-time coding and modulation for MIMO wireless communications, MIMO-OFDM systems, cooperative communications for wireless networks, and ultra-wideband (UWB) communications. He has published more than 20 journal papers and 30 conference papers in the related areas.

Dr. Su joined the Department of Electrical Engineering at the State University of New York at Buffalo as an Assistant Professor in March 2005. From June 2002 to March 2005, he was a Postdoctoral Research Associate with the Department of Electrical and Computer Engineering and the Institute for Systems Research (ISR), University of Maryland, College Park. Dr. Su received the Signal Processing and Communications Faculty Award from the University of Delaware in 2002 as an outstanding graduate student in the field of signal processing and communications. In 2005, he received the Outstanding Invention Award as “top one out of 35 inventions in year’04 in information science” from the Office of Technology Commercialization at the University of Maryland.