



**THURSDAY  
SEPTEMBER 28,  
2006**

**LOCATION: SCAIFE 125  
TIME: 4:30PM  
REFRESHMENTS: 4:00PM**



**M. KAVEH**  
**UNIVERSITY OF MINNESOTA**

M. Kaveh received the B.S. and PhD degrees from Purdue University in 1969 and 1974, respectively, and the M.S. degree from the University of California at Berkeley in 1970. He has been at the University of Minnesota since 1975. He served as the Head of the Electrical and Computer Engineering Department during 1990-2005, and currently holds the Centennial Chair in ECE, and serves as the Associate Dean for Research and Planning for the Institute of Technology, a combined college of engineering, physical sciences and mathematics.

Dr. Kaveh's research has spanned the areas of statistical signal and array processing with applications to communications, radar and sonar, image processing and ultrasonic imaging. His recognitions include several awards from the IEEE Signal Processing Society, including the 2000 Society Award, and a 2002 Purdue University Outstanding Electrical and Computer Engineer Award.

## **EXPLOITING SPACE-TIME CHANNELS AND CO- OPERATIVE TRANSCEIVERS FOR WIRELESS LOCALIZATION AND COMMUNICATION**

The continuing demand for high performance wireless services and the desire for more reliable communication dictate better understanding of the propagation channels, and the exploitation of various possible mechanisms for bandwidth and energy-efficient signal separation, and diversity utilization. The spatial dimension can be used for user separation and/or diversity through the design of multi-element antenna systems (arrays) at the receiver and/or the transmitter. Arrays also provide the opportunity to localize mobiles for location-based services and/or monitoring. Following introductions to wireless channels and arrays, a localization system is described that exploits the complexity of location-dependent propagation channels in urban or indoor settings through the use of array spatial signatures. This is followed by a high level description of a class of *distributed* multiple-antenna systems for communications that are variously known as collaborative, cooperative or mesh systems. In such a system a transmitter collaborates with other units in its proximity that can serve as relays to provide enhanced, power-efficient connectivity and diversity. Several recent results on the design and performances of cooperative systems using amplify-and-forward and regenerative relaying strategies will be presented.