



**Electrical Engineering Seminar Series &
Dallas Chapter of IEEE Signal Processing Society Present**

Algorithm and Architecture Design and Evaluation on the Rice University Wireless Open-Access Research Platform (WARP)

**Professor Joseph Cavallaro
Dept. of Elec. & Comp. Eng., Rice University**

10am, Monday, Nov. 17, 2008 – ECSS 2.415

At Rice University, we focus on algorithms and architectures for the future generations of wireless devices that will provide hundreds of Mbits/sec processing speed, excellent quality of service, high spectral efficiency and flexibility. The Wireless Open-Access Research Platform (WARP) (<http://warp.rice.edu>) is being developed at the Center for Multimedia Communication (<http://cmc.rice.edu>). WARP provides a scalable and configurable platform mainly designed to prototype wireless communication algorithms for educational and research oriented applications. The programmability and flexibility allows for the implementation of various physical and network layer protocols and standards. Current topics of research include algorithms for multiple antenna systems (MIMO) using OFDM, along with advanced LDPC channel coding. We are also studying the extensions of these systems to cooperative or relay environments. Detection algorithms based on soft sphere detection (SSD) in iterative combination with outer LDPC channel decoding have great promise for improved performance. The WARP platform is reconfigurable and consists of FPGA baseband processors along with multiple attached radio subsystems, which enables quick prototyping of these wireless communication algorithms for over-the-air experimentation. The online open-access WARP repository is used to document and share different wireless architectures and cross-layer designs developed at Rice and at other educational and research centers. This repository provides a basis for students and researchers with a wide range of backgrounds in hardware implementation and algorithm development to collaborate and initiate multi-disciplinary system designs.

Joseph R. Cavallaro received the Ph.D. degree in electrical engineering from Cornell University in 1988. From 1981 to 1983, he was with AT&T Bell Laboratories, Holmdel, NJ. In 1988, he joined the faculty of Rice University, Houston, TX, where he is currently a Professor of Electrical and Computer Engineering. His research interests include computer arithmetic, VLSI design and microlithography, and DSP and VLSI architectures for applications in wireless communications. During the 1996–1997 academic year, he served at the U.S. National Science Foundation as Director of the Prototyping Tools and Methodology Program in the Computer (CISE) Directorate. During 2005, he was a Nokia Foundation Fellow and a Visiting Professor with the Centre for Wireless Communications at the University of Oulu, Finland. He is currently the Associate Director of the Center for Multimedia Communication at Rice University. Dr. Cavallaro is a recipient of the NSF Research Initiation Award and is a Senior Member of the IEEE. He was an IEEE Computer Society Distinguished Lecturer, 2004-2006, and was Co-Chair of the 2004 Signal Processing for Communications Symposium at the IEEE Global Communications Conference and General Co-Chair of the 2004 IEEE 15th International Conference on Application-specific Systems, Architectures and Processors (ASAP).

**For more information on the Dallas Chapter and directions to UTD, please refer to
<http://www.utdallas.edu/~kehtar/ieee-sp>**