

IEEE SCV Signal Processing Society

Date: Apr 25th 2005

Title: How many antennas does it take to get broadband wireless access? - The story of MIMO

Speaker: Professor B. Friedlander, Dept of Electrical Eng, Univ of California at Santa Cruz

Location: National Semiconductor Credit Union Building (Building 31), 955 Kifer Rd., Sunnyvale (Near the intersection of Lawrence and Central Expressway);

Coordinates: N37deg 22.464' W122deg 00.272' (WGS84);

http://maps.yahoo.com/maps_result?ed=Lz2FO.p_0TpVKFWBuA124OtTr9dn&csz=Sunnyvale%2C+CA&country=us

Directions: Take 101 to Lawrence Expressway. Head south on Lawrence to Kifer (past Central). Turn right on Kifer. Go 0.5 miles on Kifer and turn right into the Credit Union parking lot. Entrance is on the back side of the building.

Time: 6:30pm: Fast Food & drinks (\$1 Donation Recommended towards Refreshments)

7:00pm: Announcement

7:05pm: Talks starts

Abstract:

The use of multiple antennas has a long and successful history in Wireless systems. Multiple receive antennas for diversity are standard in cellular and WLAN systems. MIMO systems attempt to improve upon this by the use of multiple antennas at the transmitter as well as at the receiver and by employing sophisticated signal processing to extract additional performance gains. Wireless systems employing MIMO are now available for 802.11 (pre 802.11n) and will be available for other WLAN and cellular systems. Progress is being made in standard body activities on incorporating MIMO into future wireless systems. After decades of research and development the cost of implementing multi-antenna systems has finally fallen to levels where commercial applications of the technology are feasible. As is often the case with a relatively new and promising technology, expectations of performance improvements are high, while the level of understanding of its limitations are low.

This talk will explain the basic concepts, the tradeoffs between diversity gain and spatial multiplexing gain. The ability of MIMO to increased throughput and extend the range of current base-stations and access points will be discussed for both fixed and mobile scenarios and for both indoor and outdoor applications from home networking to broadband wireless access. Various issues which tend to limit the theoretical performance advantages of MIMO will be addressed including the impact of channel conditions (e.g. small angular spread) and the costs associated with reliable channel estimation.

Biography:

Professor B. Friedlander is from the Dept of Electrical Eng, Univ of California at Santa Cruz, where he is the director of the Wireless Communications and Signal Processing Lab. He has over 35 years of experience in wireless and is an internationally known expert on performance analysis of communication systems. He has consulted extensively in the industry and has been involved in several Silicon Valley wireless startups.

He is currently working on: interference mitigation techniques for reliable operation in the license exempt spectrum using WiFi, WiMax and other wireless system; using multiple antennas for diversity and spatial multiplexing (MIMO, smart antennas); advanced techniques for fixed-point and mobile broadband; evaluating the perf. of wireless systems; 2G, 3G, 4G and beyond; wireless location estimation; and sensor networks (radar, sonar, and imaging systems).

He received the B.Sc. and the M.Sc. degrees in Electrical Engineering from the Technion in Israel, and the Ph.D. degree in Electrical Engineering and M.Sc. degree in Statistics from Stanford University. He is a Fellow of the IEEE, recipient of the IEEE Third Millennium Medal, the Technical Achievement Award of the IEEE Signal Processing Society, and various awards for papers published in the professional literature.

Chapter web: <http://www.ewh.ieee.org/r6/sps/>