



Electrical Engineering Colloquium
Dallas Chapter of IEEE Signal Processing Society Presents

Signal Processing Challenges in Wireless Location

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Wireless location refers to obtaining the geographic coordinates of a mobile subscriber in cellular or WLAN environments. Wireless location finding has emerged as an essential public safety feature of future cellular systems. This has been in response to a 1996 federal order in the US that mandates all wireless service providers to provide accurate location information of an emergency 911 (E-911) caller to public safety answering points. The mandate aims to solve a serious public safety problem that emerges from the fact that today more than half of the 911 emergency calls originate from mobile phones whose location cannot be determined with existing technology. However, there are many difficulties that are characteristic of the wireless environment that make meeting the mandated objective within the desired accuracy rather challenging. This talk provides an overview of some of the signal processing challenges that arise in this application and describes advances that have been made in this regard over the last few years. Some of the advances include the development of enhanced receiver structures that are robust to fast channel fading, low signal-to-noise ratio conditions, and severe multipath propagation conditions. Once fully developed and deployed, there will be many other applications of the E-911 technology beyond its original motivation such as location sensitive billing, fraud protection, asset tracking, fleet management, intelligent transportation systems, mobile yellow pages, and even cellular system design and management. Increasingly, application-level software programs will be incorporating location information into their features in order to utilize this information when it becomes available. For example, asset tracking and management software would incorporate location information into their database for enhanced tracking capabilities. As such, wireless location information will add a new dimension to many future applications. A demo illustrating the operation of wireless location schemes developed in the speaker's research laboratory will be shown.

Biography - Ali H. Sayed is Professor and Vice-Chairman of Electrical Engineering at UCLA where he directs the Adaptive Systems Laboratory (www.ee.ucla.edu/asl). He has published widely in the areas of adaptive filtering, estimation theory, and signal processing for communications with over 200 articles and 4 books. He is the author of the textbook *Fundamentals of Adaptive Filtering* (Wiley, NY, 2003). He is a Fellow of IEEE and serves as the Editor-in-Chief of the *IEEE Transactions on Signal Processing*. His research has received several recognitions including the 1996 IEEE D. G. Fink Prize, a 2002 Best Paper Award from the IEEE Signal Processing Society, the 2003 Kuwait Prize, and two Best Student Paper Awards at international meetings (1999, 2001). He has consulted with industry on different aspects of adaptive filtering, channel equalization, echo cancellation, OFDM receivers, and DSL. He currently serves as a Distinguished Lecturer of the IEEE Signal Processing Society. He is also a member of the Publications and Award Boards of the IEEE Signal Processing Society and serves as General Chairman of ICASSP 2008.

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