



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

## **A Signal Processing Approach to Modeling Vision, and Applications**

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***Distinguished Lecturer of IEEE Signal Processing Society***

**11am, Wednesday, May 4, 2011  
ECSS 2.102 (TI Auditorium)**

Current state-of-the-art algorithms that process visual information for end use by humans treat images and video as traditional signals and employ sophisticated signal processing strategies to achieve their excellent performance. These algorithms also incorporate characteristics of the human visual system (HVS), but typically in a relatively simplistic manner, and achievable performance is reaching an asymptote. However, large gains are still realizable with current techniques by aggressively incorporating HVS characteristics, combined with a good dose of clever signal processing. Achieving these gains requires HVS characterizations which better model natural image perception ranging from sub-threshold perception (where distortions are not visible) to suprathreshold perception (where distortions are clearly visible). In this talk, I will present results from our lab characterizing the responses of the HVS to natural images, and contrast these results with 'classical' psychophysical results. I will also present applications of these results to image compression and quality assessment, as well as some signal processing problems (and their solutions) that emerged in applying the psychophysical results.

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Sheila S. Hemami received the PhD degree from Stanford University in 1994. Her PhD thesis was entitled "Reconstruction of Compressed Images and Video for Lossy Packet Networks" and she was one of the first researchers to work on what we now call "error concealment." She was with Hewlett-Packard Laboratories in Palo Alto, California in 1994 and worked on video-on-demand. She joined the School of Electrical Engineering at Cornell University in 1995, where she holds the title of Professor and directs the Visual Communications Laboratory. Dr. Hemami's research interests broadly concern communication of visual information, both from a signal processing perspective (signal representation, source coding, and related issues) and from a psychophysical perspective. Dr. Hemami is an IEEE Fellow and has held various visiting positions, most recently at the University of Nantes, France and at Ecole Polytechnique Federale de Lausanne, Switzerland. She has received numerous college and national teaching awards, including Eta Kappa Nu's C. Holmes MacDonald Award. She is currently a Member-at-Large of the IEEE Signal Processing Society Board of Governors (2009-11) and an SPS Distinguished Lecturer (2010-11). She has chaired the IEEE Image and Multidimensional Signal Processing Technical Committee (2006-07), served as Associate Editor of the IEEE Transactions on Signal Processing (2000-06), and served as Editor-in-Chief of the IEEE Transactions on Multimedia (2008-10).

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