Abstract: We present a new approach to soft demodulation for MIMO channels. The proposed method is an approximation to the exact a posteriori probability-per-bit computer. The main idea is to marginalize the posterior density for the received data exactly over the subset of the transmitted bits that are received with the lower signal-to-noise-ratio, and marginalize this density approximately over the remaining bits. Unlike the exact demodulator, whose complexity is huge due to the need for enumerating all possible combinations of transmitted constellation points, the proposed method has very low complexity. The algorithm has a fully parallel structure, suitable for implementation in parallel hardware. Additionally, its complexity is fixed, which makes it suitable for pipelined implementation. We also show how the method can be extended to the situation when the receiver has only partial channel state information, and how it can be modified to take soft-input into account. Numerical examples illustrate its performance on slowly fading 4x4 and 6x6 complex MIMO channels.

Monday, September 22, 2008
11:00 a.m.
Bryan Hall, room 305

Host: Dr. Arye Nehorai

Bio: Erik G. Larsson is Professor and Head of the Division for Communication Systems in the Department of Electrical Engineering (ISY) at Linkoping University (LiU) in Linkoping, Sweden. He joined LiU in September 2007. He has previously been Associate Professor (Docent) at the Royal Institute of Technology (KTH) in Stockholm, Sweden, and Assistant Professor at the University of Florida and the George Washington University, USA. His main professional interests are within the areas of wireless communications and signal processing. He has published some 50 papers on these topics, he is co-author of the textbook Space-Time Block Coding for Wireless Communications (Cambridge Univ. Press, 2003) and he holds 10 patents on wireless technology. He is Associate Editor for the IEEE Transactions on Signal Processing and the IEEE Signal Processing Letters and a member of the IEEE Signal Processing Society SAM and SPCOM technical committees.