



## SEMINAR ANNOUNCEMENT

**IEEE Gainesville Section  
and  
Department of Electrical and Computer Engineering Present**

### **Iterative Viterbi Algorithm (IVA): A Turbo Decoding Method for Conventional Serial Concatenated Codes**

by  
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Time: 11:40am-12:40pm  
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Place: NEB 102

#### Abstract

Over the last 30 years, the Viterbi algorithm (VA) and serial concatenated codes have been widely applied in digital communications systems and adopted in many standards such as cable modem, digital TV, wireless systems and NASA deep-space communication systems. Manufacturers around the world have accumulated much experience in how to build VA decoders and their supporting circuits.

Since 1993, Turbo decoding has completely revolutionized the field of error control coding. The excitement about the Turbo codes was sparked by their close approach to the Shannon limit with a very low decoding complexity. Turbo decoding is based on three new concepts: (a) soft-output information, (b) random-interleaver, and (c) parallel concatenation. These new concepts require manufacturers to completely redesign their decoders and standards to achieve the superior performance. However, our research results have showed that the Turbo code performance can be achieved using the VA decoding hardware and without (or with very little) modification of many telecommunication standards.

In this seminar, we will introduce the concept of the Iterative Viterbi decoding. A low density parity code (LDPC) can be constructed for serial concatenated codes by using simple even parity codes to replace the powerful block codes in the serial concatenated codes. We will present results for two typical cases: CRC concatenated codes which have been widely applied in wireless communications and multilevel TCM codes with trellis shaping which has been widely used in ADSL/Cable modem. It is showed that the IVA can achieve Turbo code performance for many applications.

#### Author's biography

Dr. Lei Wei received the M.E. degree from the University of New South Wales, Australia, in 1993, and the Ph.D. degree from the University of South Australia, in 1995, all in Electrical Engineering.

From 1995 to 2000, he was the Australian National University (ANU). From 2000-2001, TITR, University of Wollongong, Australia, as an associate professor. He is now with Department of Electrical Engineering, University of Central Florida. His current research interests include iterative decoding, digital modulation, multiuser CDMA systems and spread spectrum multiple access with applications to mobile communications. He is Co-Chair of the IEEE Information Theory Workshop, Cairns, Australia, Sept. 2001. He is currently an Editor for IEEE Transactions on Communications in the area of wireless communications.

If you have any questions, please contact Dr. Michael Fang at [fang@ece.ufl.edu](mailto:fang@ece.ufl.edu) or (352) 846-3043.