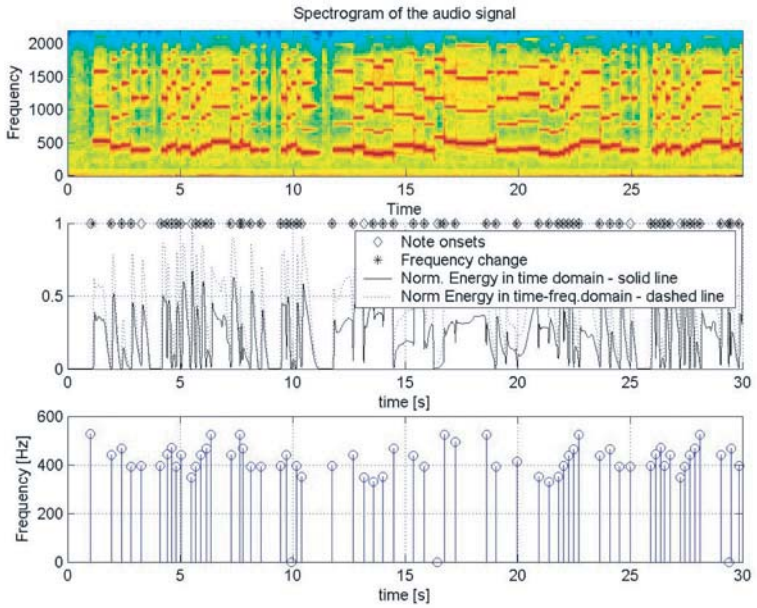
The Institute of OPTICS

Colloquium

UNIVERSITY of ROCHESTER

Future Music Technologies?



Professor Mark F. Bocko
Chair, Department of Electrical and Computer Engineering
University of Rochester

BA, Physics and Astronomy, Colgate University, 1978
PhD, Physics, U. of Rochester, 1984
U of R ECE, 1985-

The lecture will describe physical modeling based approach to music encoding that promises to be an extremely compact yet highly accurate and expressive music file format.

3:00 pm, Monday, November 3, 2008
Sloan Auditorium, Goergen Building
Refreshments provided

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Department of Electrical and Computer Engineering
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Abstract

Nearly as old as music itself are attempts to encode musical sound for transport, storage and reproduction. In the Music Research Lab we are exploring a number of possibilities in this area. We begin with a discussion of a new music transcription method that employs the relative phase of the spectral partials of complex musical sounds. Although there has been considerable success in the development of single instrument transcription techniques there has been much less progress in transcribing multi-instrument recordings. The ability of trained musicians to focus their attention on one instrument in an ensemble and produce notation for each separate part is currently unmatched by machines. We have employed psycho-acoustic results on the role of phase coherence of the partials of complex musical sounds to develop new computer-based tools that can separately "listen" to each individual instrument in an ensemble and notate the separate musical streams. The ability to produce notation from texturally rich music recordings will have a significant impact on how music databases are constructed and searched.

We also have developed a new music synthesis and encoding method that employs empirically determined physical models of the source of the music. Starting with a specific musical instrument and music recording, we identify an appropriate physical model of the sound source, and then, using various parameter estimation methods, we infer the time history of the control parameters of the physical model that best reproduces the original sound. This physical modeling based approach to music encoding promises to be an extremely compact yet highly accurate and expressive music file format.

Biography

Professor Bocko received his BA in Physics and Astronomy from Colgate University on 1978 and his Ph.D. in Physics from the University of Rochester in 1984. He joined the ECE department at the University of Rochester in 1985 where he currently is Professor and Chair of the Department. His research interests include sensors, quantum limits of measurements, superconductivity and music signal processing.