



Department of Mathematical Sciences

Spring 2016

Colloquium Series

Friday, February 19, 2016 at 3pm in Bell Hall 143

Dr. Timothy Hanson

Department of Statistics
University of South Carolina

Assessment of DPOAE Test-Retest Difference Curves via Hierarchical Gaussian Processes

Distortion product otoacoustic emissions (DPOAE) testing is a promising alternative to behavioral hearing tests and auditory brainstem response testing of pediatric cancer patients. The central goal of this study is to assess whether significant changes in the DPOAE frequency/emissions curve (DP-gram) occur in pediatric patients in a test-retest scenario. This is accomplished through the construction of normal reference charts, or credible regions, that DP-gram differences lie in, as well as contour probabilities that measure how abnormal (or in a certain sense rare) a test-retest difference is. A challenge is that the data were collected over varying frequencies, at different time points from baseline, and on possibly one or both ears. A hierarchical structural equation Gaussian process model is proposed to handle the different sources of correlation in the emissions measurements, wherein both subject-specific random effects and variance components governing the smoothness and variability of each child's Gaussian process are coupled together.

For further information, please contact Dr. Emil Schwab, eschwab@utep.edu