



The University of Chicago  
Department of Statistics

PhD Dissertation Presentation

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**Wavelet Analysis for Non-Stationary Time Series Models**

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**ABSTRACT**

We study statistical inference for processes with time-varying means and non-stationary time dependent errors using wavelet analysis. First we will introduce the asymptotical distribution of the wavelet coefficients based on the strong invariance principle (SIP) for non-stationary time series. When the mean function is Lipschitz continuous, the simultaneous confidence band is constructed from the distribution of the wavelet thresholding estimator. In the case of processes with structural breaks, inference for the breaks and empirical CI's for the break location will be discussed. For broader function space such as Besov space, the confidence band derived from the thresholding estimator can be constructed by using the CI of the  $L_2$  risk. We will apply the functional estimation and inference for structural breaks to analyze the yeast genome segmentation data.