



The University of Chicago
Department of Statistics

Practice Job Talk Presentation

ZHOU ZHOU

Department of Statistics
The University of Chicago

**Nonparametric Inference of Quantile Curves
for Non-stationary Time Series**

**THURSDAY, January 29, 2009 at 4:00 PM
110 Eckhart Hall, 5734 S. University Avenue**

ABSTRACT

Nowadays non-stationary time series are frequently collected in various areas and the scientific questions involving such time series generally cannot be solved by traditional stationary time series approaches. In this talk I shall address nonparametric specification tests of quantile curves for a general class of non-stationary processes. Using Bahadur representation and Gaussian approximation results for non-stationary time series, simultaneous confidence bands and integrated squared difference tests are proposed to test various parametric forms of the quantile curves with asymptotically correct type I error rates. A wild bootstrap procedure is implemented to alleviate the problem of slow convergence of the asymptotic results.

In particular, our results can be used to test the trends of extremes and variability of climate variables, an important problem in understanding climate change. An interesting example involves the analysis of the maximum speed of tropical cyclone winds. It was found that an inhomogeneous upward trend for cyclone wind speeds is pronounced at high quantile values. However, there is no trend in the mean lifetime-maximum wind speed. This example shows the effectiveness of the quantile regression technique.