



STATISTICS DEPARTMENT COLLOQUIUM

MONDAY, FEBRUARY 9, 2009

Talk: 4:00 PM – *Science Center 309*

Reception: 5:15 PM – *Science Center, 7th Floor*

“Wavelet-Based Intensity Estimation for Inhomogeneous Poisson Data”

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(Joint work with Keigo Hirakawa)

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ABSTRACT

A variety of real-world data are well modeled as Poisson random variables whose means are in turn proportional to an underlying vector-valued signal of interest—as witnessed by literature in digital communications, signal processing, astronomy, and other imaging applications. In this talk, we first show how certain wavelet and filterbank transform coefficients corresponding to measurements of this type are distributed as sums and differences of Poisson counts. We then derive Bayesian and frequentist estimators based on shrinkage of these transform coefficients, providing analytical performance bounds as well as a means of unbiased risk estimation in this setting. We conclude with a demonstration of empirical results for both standard wavelet test functions and examples from consumer camera imaging applications.