

STANFORD UNIVERSITY  
DEPARTMENT OF STATISTICS  
DEPARTMENTAL SEMINAR

4:15 p.m., Tuesday, Apr 5, 2005  
Sequoia Hall Room 200  
(Cookies at 3:45 in 1st Floor Lounge)

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**Discrete Denoising for Channels with Memory**

Abstract:

The problem of estimating a finite-alphabet signal corrupted by a finite-alphabet noise process, aka "discrete denoising", is arising in an increasing variety of applications spanning engineering, statistics, computer science, and biology.

For the case where the corruption mechanism (channel) is memoryless (independent noise components), a practical (linear time) algorithm dubbed DUDE (Discrete Universal DEnoiser) was recently introduced. This denoiser was shown to achieve optimum performance (in the limit of large data sets), with no a priori knowledge of statistical (or any other) properties of the noiseless data.

This talk will present an extension of the algorithm that accommodates possible memory (dependence) in the noise. We establish asymptotic optimality of the proposed denoiser under a mild mixing condition on the noise process. We also establish the practicability of the algorithm. A small sample of empirical evidence supporting the theoretical predictions and highlighting the benefit in taking the channel memory into account will be presented.

Based on joint work with Rui Zhang.

Time permitting, I will briefly mention related research on discrete denoising.