

**The University of Chicago**

Department of Statistics

**Seminar**

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**“Long-range Dependence, Linear Processes  
and Asymptotic Expansions”**

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**Monday, February 4, 2002 at 4:00 pm  
133 Eckhart Hall, 5734 S. University Avenue**

**ABSTRACT**

A generalized  $U$ -statistic based on a random sample  $X_1, \dots, X_N$  has the form  $U_N = \sum_{1 \leq n_1, n_2 \leq N} K_{n_1, n_2}(X_{n_1}, X_{n_2})$  where for each  $n_1, n_2$ ,  $K_{n_1, n_2}$  is a symmetric measurable function. A large class of statistics can be expressed as generalized  $U$ -statistics or variations thereof. We consider the asymptotic behavior of  $U_N$  when the sample observations come from a long-memory linear process. It is shown that for a wide class of kernels  $K_{n_1, n_2}$ ,  $U_N$  can be decomposed into a sum of “long-memory” components which each has a uniquely identifiable rate and follows a non-central limit theorem plus a “short-memory” component which follows a central limit theorem. Thus, the asymptotic distribution of  $U_N$  can be conveniently determined by identifying the dominant terms.