1038-60-94   **Wei B Wu*** (`wbwu@galton.uchicago.edu`), 5734 S University Ave, Statistics Department, Chicago, IL 60637. *What is Dependence?*

In the study of random processes, dependence is the rule rather than the exception. To facilitate the related statistical analysis, it is necessary to quantify the dependence between observations. In the talk I will interpret random processes as physical systems and introduce physical and predictive dependence coefficients that quantify the degree of dependence of outputs on inputs. Such dependence measures provide a new framework for the study of random processes and shed new light on a variety of problems including robust estimation of linear models with dependent errors, nonparametric inference of time series, representations of sample quantiles, bootstrap for time series, spectral estimation among others. Relations with nonlinear system theory, experimental design, information theory, high dimensional covariance matrices estimation and riskmetrics will be discussed. (Received January 30, 2008)