

**STANFORD UNIVERSITY**  
**DEPARTMENT OF STATISTICS**  
**DEPARTMENTAL SEMINAR**

4:15 p.m., Tuesday, June 12, 2007  
Sequoia Hall Room 200  
(Cookies at 3:45 in 1st Floor Lounge)

*John Rice*  
Department of Statistics  
University of California, Berkeley

**Event Weighted Tests for Detecting Periodicity in Photon Arrival Times**

I will discuss the statistical problem of detecting periodicity in a sequence of photon arrival times. This occurs, for example, in attempting to detect gamma-ray pulsars. A particular focus is on how auxiliary information, typically source intensity, background intensity, and incidence angles and energies associated with each photon arrival should be used to maximize the detection power. I will present a class of likelihood-based tests, score tests, which give rise to event weighting in a principled and natural way, and derive expressions quantifying the power of the tests.