1086-VI-2128   **Chester Ivan Ismay*** (`chester.ismay@gmail.com`) and **Randall Eubank**
(`randall.eubank@asu.edu`). *Testing Independence of Parallel Pseudorandom Number Streams:*
Incorporating the Data's Multivariate Nature.

Many Monte Carlo applications require that the different streams of random numbers created using parallel processors be independent of each other in a probabilistic sense. Unfortunately, pseudorandom number streams generated in parallel often do not exhibit this characteristic. The TestU01 software package is the standard testing suite for detecting this stream dependence and other properties that make certain pseudorandom generators ineffective in serial or parallel settings.

TestU01 has two methods for testing parallel generated streams. The first turns the parallel generated streams into one vector and runs the standard serial testing procedures on this concatenated stream. The second applies serial tests to the individual streams and then tests the resulting p-values for uniformity. Each technique fails to fully address the multivariate nature of the data. As a consequence of this, we are able to show that some of the data's potential correlations are missed by both of these techniques. We intend to investigate three different methods to better detect inter-stream dependencies: pairwise correlation, multivariate tests of independence, and vector time series tests for white noise. (Received September 25, 2012)