

**564 - Stochastic Methods**  
**Michelmas Term - 2014-2015**  
**Homework 1 - Due Oct. 22nd, 2014**

1. Download and compile the DieHarder battery of random number tests from <http://www.phy.duke.edu/~rgb/General/dieharder.php>. Compare the test results for
  - (a) The Mersenne Twister
  - (b) RANDUand detail your findings.
2. Write a ‘card shuffler’, that is a program which randomly permutes a series of  $n$  objects. Feel free to use a previously implemented RNG or to write your own. Run many shuffles starting from the same initial ordering and calculate the  $p$ -value that the RNG is uniform using the  $\chi^2$ -test on the ‘cards’ which appear in the first position.