



## QMC Opening Workshop August 28-September 1, 2017

**Lecture:** *Lattice Rules for Quasi-Monte Carlo*

**Speaker:** Pierre L'Ecuyer

**Abstract:**

Lattice rules are one of the two main classes of methods for quasi-Monte Carlo (QMC) and randomized quasi-Monte Carlo (RQMC) integration. In this tutorial, we recall the definition and summarize the key properties of lattice rules. We discuss what classes of functions these rules are good to integrate, and how their parameters can be chosen in terms of variance bounds for these classes of functions. We consider integration lattices in the real space as well as in a polynomial space over the finite field  $F_2$ . We provide various numerical examples of how these rules perform compared with standard Monte Carlo. Some examples involve high-dimensional integrals, others involve Markov chains. We also discuss software design for RQMC and what software is available.