Outline of Monte Carlo Short Course

The course will be based on material from

Introducing Monte Carlo Methods with `R`, Robert and Casella, Springer-Verlag 2009

Copies of all slides will be provided, as well as all `R` code. There is already an `R` package on CRAN, mcsm, which contains all of the `R` code from the book. Topics that will be covered include:

Chapter	Title	Contents
1	Introduction to `R`	Review of Basic `R` syntax and functions
2	Random Variable Generation	Generating uniform random variables, transformation methods, accept-reject
3	Monte Carlo Integration	Classical, importance sampling, and others
4	Monte Carlo Optimization	EM and related algorithms
5	The Metropolis Hastings Algorithm	The basic M-H algorithm and many variations and an introduction to Markov chains
6	Gibbs Samplers	The basic Gibbs sampler and many variations including the multi-stage sampler and hierarchical models
7	Diagnosing Convergence	Methods for detecting convergence of MCMC chains