



### **Generating Random Numbers (classical)**

- generating random uniforms (and why it matters)
- using IIT (including Box-Muller)
- using histograms/tables
- the accept/reject method

### **Generating Random Numbers (modern)**

- MCMC and stationary distributions
- Gibbs sampling
- Metropolis-Hastings
- generating CIs and posterior distributions

### **Randomization tests and CIs**

- exchangeability
- generating permutations (possibly with constraints)
- the relationship between tests and CIs

### **Bootstrap distributions**

empirical distribution	nonparametric bootstrap
smooth nonparametric bootstrap	parametric bootstrap
semiparametric bootstrap	

### **Bootstrap Inference**

naive CIs	Bootstrap-t
Pivots	Bootstrap tests

### **Computational issues**

- speeding things up (and does it matter?)
- HPC
- maintainable code
- R, Matlab and computational speed

The grade will be based on several homework assignments and a computing project.

Text: *Introduction to Statistical Computing*, Givens and Hoeting, Wiley Pub.