2014 SISG MODULE 4: Bayesian Statistics for Genetics
Introduction and Overview

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- Course Text: P.D. Hoff (2009), *A First Course in Bayesian Statistical Methods*, Springer.
- Supplementary Text: J.C. Wakefield (2013), *Bayesian and Frequentist Regression Methods*, Springer.
- Both texts can be downloaded (for free!) from UW libraries.
- Demonstrations of methods via `R` implementations will be carried out in class. Students are encouraged to follow along.
- Code and other materials (course notes, papers) are available at the course website:
  http://www.stat.washington.edu/hoff/SISG/
- There will be a lab session at the end of day 2, in which students will have the opportunity to go over some exercises and/or reproduce examples from the class notes.

Course Outline

1. Lecture 1 (Hoff): Why Bayes?
2. Lecture 2 (Hoff): Review of Probability.
3. Lecture 3 (Wakefield) Binomial Sampling.
4. Lecture 4 (Wakefield) Multinomial Sampling.
5. Lecture 5 (Hoff) Linear Regression.
6. Lecture 6 (Wakefield) Bayesian and Frequentist Multiple Testing.
7. Lecture 7 (Hoff) Model Selection and Averaging.
8. Lecture 8 (Wakefield) Generalized Linear Modeling.
9. Lecture 9 (Hoff) Prior Specification including Empirical Bayes.
10. Lecture 10 (Wakefield) Imputation, Hierarchical Mixture Models, Model Comparison.