2016 SISG MODULE 17: 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://faculty.washington.edu/kenrice/sisgbayes/
- 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 (Rice): Why Bayes? Introduction.
2. Lecture 2 (Wakefield): Review of Probability. Start Binomial sampling
3. Lecture 3 (Wakefield) Binomial Sampling.
4. Lecture 4 (Rice) Linear Regression. Continuous sampling.
5. Lecture 5 (Wakefield) Multinomial Sampling.
6. Lecture 6 (Rice) Model Selection and Averaging.
7. Lecture 7a (Rice) Bayesian and Frequentist Multiple Testing.
8. Lecture 7b (Wakefield) Bayesian and Frequentist Multiple Testing.
9. Lecture 8 (Wakefield) Generalized Linear Modeling.
10. Lecture 9 (Rice) Meta analysis.
11. Lecture 10a (Wakefield) Imputation, Model Comparison.
12. Lecture 10b (Rice) Software (WinBUGS/JAGS/INLA/Stan).