Course title: Bayesian statistics for ecologists

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Course overview: Bayesian statistics provides flexible and useful modeling framework for ecological inference and prediction. However, the resistance of discarding old and familiar tools in frequentist statistics (classic statistics), and seemingly complexity of Bayesian statistics mainly due to philosophical discussion between frequentist and Bayesian statistics, can scare away the classically trained researchers, without offering them a fair exposure to Bayesian inference. This course provides an accessible introduction to Bayesian statistics, equipping students with alternative and powerful tools for analyzing ecological data.
The course is composed of six 3-hour classes. Each class has lecture and lab components. **The students are expected to bring laptops to complete lab assignments.**

Prerequisites: Probability theory, R language (**R tutorial attached**)

Tentative schedule:
Class 1:
Lecture: Bayes' theorem. Why use Bayes'? Laws of probability.
Lab: DAGs and marginal distribution
Class 2:
Lecture: Bayes' theorem derived. Probability distributions. Maximum likelihood.
Lab: The components of Bayes' theorem
Class 3:
Lecture: Introduction to priors
Lab: Conjugate priors
Class 4:
Lecture: Markov Chain Monte Carlo simulations, simple Bayesian regression
Lab: JAGS primer
Class 5:
Lecture: Hierarchical model – Designed experiments and multi-level model
Lab: Multi-level model
Class 6:
Lecture: Model check
Lab: Posterior predictive checks