

BAYESIAN MODELS IN ECOLOGY

The application of Bayesian methods to research problems in ecology is advancing rapidly. Although training in these methods for graduate students is becoming far more available than it was even five years ago, it is still limited to a small number of institutions. There is a large, unfulfilled need for educating ecologists in the use Bayesian principles and methods. These methods

GOALS

This is a 6-day workshop designed to accelerate learning of Bayesian methods by practicing ecological researchers. The workshop will consist of a series of compact lectures interspersed with extensive laboratory exercises chosen to engage participants in the principles and concepts introduced in lecture. The goals of the workshop are to:

1. Provide a principles-based understanding of Bayesian methods needed to train students, to evaluate papers and proposals, and to solve analysis problems in research.
2. Communicate the statistical concepts and vocabulary needed to foster collaboration between ecologists and statisticians.
3. Provide the conceptual foundations and quantitative confidence needed for self-teaching modern analytical methods.

LEARNING OUTCOMES

At the end of workshop participants will be able to:

1. Explain key principles of Bayesian statistics including the concepts of posterior, marginal, and prior distributions, likelihood, conjugacy, conditioning, and the relationship among simple Bayesian, hierarchical Bayesian, and maximum likelihood methods.
2. Use basic statistical distributions (e.g., binomial, Poisson, normal, lognormal, binomial, beta, gamma) to write posterior and joint distributions for hierarchical Bayesian models including models of ecological processes, models of data, and random effects.
3. Explain how Monte Carlo Markov Chain (MCMC) methods estimate the posterior distributions of parameters. Write algorithms and computer code implementing MCMC for parameters in simple models composed in 2.
4. Use software implementing MCMC methods (i.e., JAGS, OpenBUGS, coda) to estimate posterior distributions of parameters and derived quantities of interest, to evaluate convergence, and to assess goodness of fit of models to data.
5. Understand approaches for evaluating the strength of evidence in data for alternative models of ecological processes.

Instructors

- [María Uriarte](#), Columbia University
- [Alexandre Oliveira](#), Universidade de São Paulo

- Leandro Reverberi-Tambosi, IBUSP

Schedule

The course will take place at Instituto de Biociências, Universidade de São Paulo.

- 22-29 September 2015
- 9am to 5 pm
- room 252, Department of Ecology

- [Schedule Details](#)

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