

Introduction to Bayesian statistics with R

6. Conclusions

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This workshop

Objectives

- Try and demystify Bayesian statistics, and what we call MCMC.
- Make the difference between Bayesian and Frequentist analyses.
- Understand the Methods section of ecological papers doing Bayesian stuff.
- Run Bayesian analyses, safely hopefully.

What's on our plate?

- Section 1 - Motivation and Bayes theorem.
- Section 2 - Markov chain Monte Carlo algorithms (MCMC).
- Section 3 - Introduction to NIMBLE and brms.
- Section 4 - Priors.
- Section 5 - Case studies and GLMMs.
- Section 6 - Conclusions.

Free the modeler in you (M. Kéry)

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- Uses probability to quantify uncertainty for everything (propagation of uncertainty).
- Allows use of prior information ('better' estimates: avoid boundary param estimates, acknowledge existing knowledge).
- Can fit complex (hierarchical) models with same MCMC algorithms.
- Credible intervals make more sense than confidence intervals

**With great tools come great
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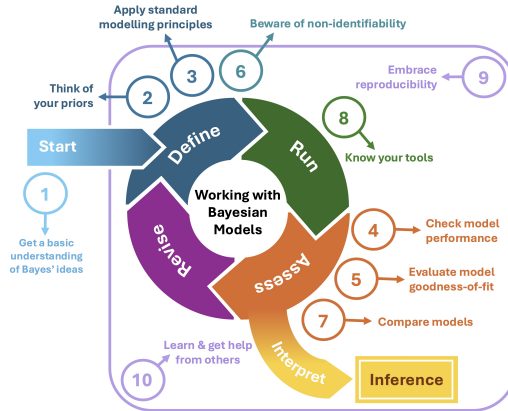
- Checking convergence is painful.
- Specifying priors might be tricky.
- Model adequacy should be checked (posterior predictive checks - not covered).
- Computational burden can be high.

Tips and tricks

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<https://hal.science/CEFE/hal-04731240v2>

Ten quick tips to get you started with Bayesian statistics



So what?

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- Make an informed and pragmatic choice.
- Are you after complexity, speed, uncertainties, etc?
- Talk to colleagues.