Schedule of the Summer School in Bayesian Statistics for Ecologists

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Day 1 - August 14 - Introduction and Probability theory

- Introduction
  - Daily and weekly schedule
  - General information about the project
  - Expectation about the course
- Probability theory
  - Basic concept
  - Bayes theorem
- Discuss project
- Presentation of research on the topic of the day

Day 2 - August 15 - Maximum Likelihood and Optimization

- Iddentify the different characteristics of your data
- The likelihood principle
- Choose your distribution and formulate your model
- Methods for parameter estimation
  - Simulated annealing
  - Nelder-Mead simplex
- Preditions
- Model interpretation
- Write your own GLM function
- Presentation of research on the topic of the day

Day 3 - August 16 - MCMC and Model Evaluation

- Link between Frequentist and Bayesian statistics
- Informative and uninformative priors
- Conjugate prior distributions
- Markov Chain Monte Carlo
  - Metropolis-Hastings Algorithm
  - Gibbs sampling

- Trace plot
- Density plot
- Convergence diagnostics
- Good practices when using Markov Chain Monte Carlo
- Presentation of research on the topic of the day

Day 4 - August 17 - Hierarchical models

- Introduction to hierarchical models
- Construction of a hierarchical model
  - Directed acyclic graph
- Project
- Presentation of research on the topic of the day

Day 5 - August 18 - Model comparison and other estimation techniques

- Model comparison
- Information criteria
- Riversible jump MCMC
- Hamiltonian Monte Carlo
- Laplace approximation
- Project
- Presentation by students

Schedule of a Typical Day

7h00 - 8h30	Breakfast
8h30 - 10h00	Lecture/Exercice
10h00 - 10h15	Break
10h15 - 12h00	Lecture/Exercice
12h00 - 13h30	Lunch
13h30 - 15h30	Lecture/Exercice
15h30 - 15h45	Break
15h45 - 17h30	Lecture/Exercice
17h30 - 18h00	Presentation - Real ecological illustration
18h00 - 19h00	Free time
19h00 - 20h00	Supper
After 20h00	Free time