



## Bayesian statistical methods in ecotoxicology

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### Abstract

This short course intends to introduce and equip participants with the basic skills necessary to analyse ecotoxicological data within a Bayesian framework. The course material will consist of introductory presentations covering issues such as (i) classical models and modes of inference in ecotoxicology, (ii) basics of Bayesian inference with distinguishing points with conventional (frequentist) statistics explained, (iii) introduction to parameter estimation and inference within a Bayesian framework and (iv) background to case-studies which will be analysed in 'hands-on' session in the afternoon. As basic practice, participants will be shown how to set up concentration-response models, for various kinds of biological response (mortality, growth, reproduction), define prior distributions for the model parameters, analyse and interpret the results within a Bayesian context and incorporate the resulting uncertainty at a higher level, e.g. in the derivation (through SSD fitting) of hazardous concentrations (HCs). Even though very basic examples will be covered during this short course, participants will be introduced to the essential statistical skills to apply Bayesian inference whatever the model, including time-dependent models, such as TK/TD models.

This short course, dedicated to a very large audience of both ecotoxicologists and modellers, is supported by the SETAC Advisory Group MeMoRisk because of its relation to the challenge of parameter estimation in mechanistic effect models.

### Course objectives

On completion of this course, participants will:

- have been introduced to basic probabilistic concepts underpinning Bayesian statistics;
- be able to set up and run programs using the combo JAGS/R/rjags;
- be able to use Bayesian methods to fit and evaluate various models.

### Course level

Intermediate