The course provides an introduction to Bayesian Statistics and Markov Chain Monte Carlo (MCMC) techniques. MCMC is surprisingly simple, and it allows one to apply more advanced GLMM models.

Commencing with an application of MCMC on simple linear regression models the course slowly proceeds to more advanced generalised linear models (GLM). Temporal correlation, variances structures to model heterogeneity (GLS) and more advanced distributions (e.g. Tobit models for non-negative continuous data) are discussed.

During the course several case studies are presented, in which the statistical theory is integrated with applied analyses in a clear and understandable manner. Throughout the course MCMC is executed in JAGS (free) via the package R2jags from within R.

**KEYWORDS**

Introduction to Bayesian Statistics. MCMC. JAGS. R2jags. Multiple linear regression and MCMC. GLM and MCMC.
COURSE CONTENT

Wednesday
• Introduction to Bayesian Statistics and MCMC.
  • Theory presentation.
  • Exercise 1: Application of MCMC on a bivariate linear regression model.
  • Based on Chapter 1 in Zuur et al. (2012).

Thursday
• Exercises
  • Exercise 2: Application of MCMC on a multiple linear regression model.
  • Exercise 3: Application of MCMC on a Poisson GLM.
  • Exercise 4: Application of MCMC on a Negative binomial GLM.
  • Exercise 5: Application of MCMC on a binomial GLM.

Friday
• Exercise 6: Adding temporal correlation to multiple linear regression models.
• Exercise 7: Modelling heterogeneity structures in regression models (GLS) using MCMC.
• Time allowing: More advanced distributions (e.g. Tobit models).

GENERAL INFORMATION

COURSE FEE:
• £300 (+20% VAT).

COURSE TIMES AND DETAILS:
• Wednesday - Friday: 09.00am to 16.00pm including 1 hour lunch break and a 20 minutes break both morning and afternoon.
• The course fee does not contain refreshments or lunch.

COURSE MATERIAL:
• Chapter 1 from Zuur et al. (2012). Introduction to zero inflated models and GLMM. E-copy of this chapter is provided.
• Books are not included in the course fee. Pdf files of relevant powerpoint presentations are provided
• The course can be followed without purchasing these books.

PRE-REQUIRED KNOWLEDGE:
R, data exploration, multiple linear regression, Generalized linear modelling (Poisson, negative binomial, Bernoulli, binomial, overdispersion).

registration and information on course content
http://www.highstat.com/CourseReg1.htm
Dr. Alain Zuur
Highland Statistics Ltd.
Email: highstat@highstat.com
URL: www.highstat.com

Local contact: Dr. Martin Solan
Email: M.Solan@soton.ac.uk