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BAYESIAN STATISTICS

COURSE CONTENT

Most statisticians are well trained in frequentist statistical analyses, with a toolbox that covers techniques from simple testing procedures up to complex modeling approaches. This course aims to teach basic and advanced techniques in a Bayesian framework. We will start with the basic Bayesian principles and the way of thinking. After that, classical linear and generalized linear regression models will be discussed and applied in a Bayesian context. We will also dive into hierarchical models, before we briefly touch more advanced topics and complex modeling techniques by case studies. At the end of the course, the participants will be able to understand the Bayesian idea of statistical modeling and will know how to apply these models to various data problems. Furthermore, the participants will be trained in the correct interpretation of the resulting parameter estimates.

The course will cover the following topics:

- Introduction to Bayesian statistics: The basic idea and techniques will be presented.
- Bayesian linear and generalized regression models: Starting from a simple linear model, the regression techniques will be extended to different data situations.
- Markov Chain Monte Carlo Methods and Gibbs sampling: These techniques are crucial to obtain posterior distributions and estimates in complex models.
- Implementation in R and JAGS: The theory is important to understand. However, with application to datasets the models come to life.

SCHEDULE*

- Thursday 09:00 – 17:00, Friday 09:00 – 17:00, Saturday 09:00 – 12:30

PRE-REQUISITE

The participants must have basis knowledge in:

- R programming; statistics and probability theory; (generalized) regression models

BASIS READING

- Christensen, R., Johnson, W. Branscum, A.Hanson, T.E. Bayesian Ideas and Data Analysis - An Introduction for Scientists and Statisticians. 2011.
- Kruschke, JK. Doing Bayesian Data Analysis: A Tutorial with R, JAGS, and Stan. 2015.

REGISTRATION

- Deadline for registration is 3 weeks before.
- The fee for the course is € 645; discounted rate for affiliated with a university € 600.
- The courses may take place in parts or as a whole online (virtual conferences) if in-classroom teaching is not possible.

*subject to change

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