Organization

The course will be held online. Details about used tools and how to connect will be shared with registered participants.

Registration

Deadline for registration is November 05, 2020.

Course fee

The fee for the course is € 645; discounted rate for affiliated with a university € 430.

Cancellation

The cancellation policy is as follows: 100% refund for cancellations till November 11; 75% refund for cancellations between November 12 and November 18; no refund for cancellations after November 19, 2020. Attendee substitutes may be made at any time.

Information

http://www.biometrie.uni-heidelberg.de/datascience

Concept and Contents

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Organization

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Aims
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.

Course content
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.

Pre-requisites
The participants must have
- Basic knowledge of statistics and probability theory
- Basic knowledge in (generalized) regression models
- Basic knowledge in R

Preliminary schedule
The course will take place on each day from Monday to Saturday (23rd to 28th of November), starting at 16.00 or 9.00 (Saturday). The following lectures will be given:
- Introduction to Bayesian statistics (with a practical session)
- Bayesian linear models (with a practical session)
- Bayesian generalized linear models (with a practical session)
- Bayesian classifiers
- Bayesian hierarchical models
- Advanced topics (with two case studies)

Number of Participants
The number of participants is limited to 20.

Course instructor
Dr. Lorenz Uhlmann, Novartis Basel

Further lecturers
Svenja Seide M.Sc., IMBI Heidelberg
Moritz Pohl M.Sc., IMBI Heidelberg

Further information
Participants will need their own laptop. Interactive hands-on lessons will be part of the course. As we will need to use numerical estimation procedures, we will hand out instructions on necessary software and packages before the course. Laptops with full administrative access are therefore needed.

Basic Reading
Christensen, R., Johnson, W. Branscum, A.Hanson, T.E. Bayesian Ideas and Data Analysis - An Introduction for Scientists and Statisticians. 2011.