8th Eawag Summer School in Environmental Systems Analysis 2016

Lecturers: Theory: Carlo Albert (CA), Peter Reichert (PR), Andreas Scheidegger (AS), Simone Ulzega (SU) [Eawag], Dmitri Kavetski (DK) [University of Adelaide, Australia].
Practice sessions and support in R: Jenny Held (JH), Lorenz Ammann (LA), Juan-Pablo Carbajal (JP) [Eawag].

Lectures and practice sessions will take place in FC-C20 (Thursday afternoon with a parallel session in FC-D24), lunch in the restaurant downstairs.

Sunday, June 12: Optional Preparatory Course

10:30 - 11:30	lecture	AS	**Review of probability theory**
13:00 - 14:00	lecture	LA	**Review of the R programming language**
14:30 - 16:00	practice	LA	Practice in R

Monday, June 13: Probabilistic Models

08:45 - 09:15	lecture	CA	**Introduction to the Course**
09:30 - 10:15	lecture	PR	**Representation of models, likelihood function**
10:45 - 11:30	lecture	SU	**Sensitivity and identifiability analysis**
11:45 - 12:30	lecture	CA	**Monte Carlo simulation**
14:00 - 17:00	practice	AS, all	Practice of likelihood functions, sensitivity analysis, and identifiability analysis; exercises 1 and 2
17:00 - 17:30	discussion	AS	Discussion of exercises

Tuesday, June 14: Introduction to Bayesian Analysis

08:30 - 09:15	lecture	PR	**Concepts of Bayesian analysis**
09:30 - 10:15	lecture	DK	**Simple Bayesian schemes, identifiability**
10:45 - 11:30	lecture	CA	**Bayesian computation with Monte Carlo methods**
11:45 - 12:30	lecture	DK	**Posterior diagnostics**
13:45 - 14:00	*course picture*		*Outside or in the atrium, depending on the weather*
14:00 - 17:00	practice	JP, all	Practice of Bayesian inference and diagnostics, exercise 3
17:00 - 17:30	discussion	JP	Discussion of exercises
18:00 - 21:00	*barbecue*	*all*	*At the small river close to Eawag; only if the weather is nice*

Wednesday, June 15: Bayesian Computation and Alternative Techniques

08:30 - 09:15	lecture	DK	**Hierarchical models (including Gibbs sampling)**
09:30 - 10:15	lecture	CA	**Population methods and filters**
10:45 - 11:30	lecture	AS	**Practical aspects of Bayesian computation**
11:45 - 12:30	lecture	DK	**Alternative methods of model calibration**
13:30 - 14:30	*guided tour*	*Anne Dietzel*	*Guided tour through the building and to the river (optional)*
14:30 - 17:00	practice	CA, all	Practice of Bayesian inference / advanced methods, ex. 4
17:00 - 17:30	discussion	CA	Discussion of exercises

Thursday, June 16: Advanced Topics

08:30 - 09:15	lecture	PR	**Considering input and structural uncertainty**
09:30 - 10:15	lecture	CA	**Approximate Bayes computation, emulators**
10:45 - 11:30	lecture	DK	**Hydrological modeling, uncertainty and hypothesis testing**
11:45 - 12:30	lecture	SU	**Bayesian inference and physics**
14:00 - 17:00	practice	All	Practice of Bayesian inference / problems of participants
14:00 - 15:00	(specific topics par-	CA	Exercise 6: Approximate Bayes Computation (ABC)
15:00 - 16:00	allel to general pract.	JP	Exercise 7: Emulation
16:00 - 17:00	session, FC-D24)	PR	Exercise 5: Structural and input uncertainty
17:00 - 17:30	discussion	DK	Discussion of exercises

Friday, June 17: Discussion of Problems of the Participants

08:30 - 11:30	discussion	all	**Discussion of problems of the participants**
11:45 - 12:30	discussion	all	**Feedback to the course**
14:00 - 16:30	practice	all	Practice of Bayesian inference and exercises (cont.), Discussion of problems of the participants