BAYES 20 @LUND 14

The purpose of this half day conference is to bring together researchers at Lund University working with or interested in Bayesian methods. The focus will be on how Bayesian methods are used in research at Lund University, what advantages Bayesian methods have over classical alternatives, and how the use and teaching of Bayesian methods at Lund University can be encouraged.

The conference is free to attend but in order to know how much coffee to arrange and if you want to attend the lunch (however at your own cost) we ask you to register in advance here: http://www.lucs.lu.se/bayes-at-lund-2014/ . For more info, contact Rasmus Bååth, Cognitive Science, (rasmus.baath@lucs.lu.se) or Ullrika Sahlin, Lund University Centre of Environmental and Climate Research (ullrika.sahlin@cec.lu.se) .

Program

Location: Röda Rummet, Ekologihuset, Sölveg. 37

12.00   Lunch Restaurant Bryggan at Ingvar Kamprad Design Centrum (IKDC), Sölvegatan 26
13.30 – 13.35 Welcome and introduction

Session 1
13.35 – 13.55 An introduction to Bayesian and hierarchical modelling – *Johan Lindström, Mathematical Statistics*
13.55 – 14.05 An example of a Bayesian model in BUGS and R – *Yf Jiang, Biology*
14.05 – 14.25 A generalized approach to modeling and estimating indirect effects in ecology – *Yann Clough, Centre of Environmental and Climate Research*
14.25 – 14.45 Resting time for migrating birds, and x-ray time variability of galaxies: using Baysian Cramér-Rao bounds – *Dragi Anevski, Mathematical Statistics*
14.45   Fika break

Session 2
15.15 – 15.35 Bayesian First Aid: Replacing null hypothesis tests by Bayesian estimation. – *Rasmus Bååth, Cognitive Science*
15.35 – 15.55 Bayesian approach, non-observed variables, and collecting long term data – *Krzysztof Podgorski, Statistics*
15.55 – 16.15 Reasons to be Bayesian – *Ullrika Sahlin, Centre of Environmental and Climate Research*
16.15 – 16.35 Incorporating uncertainty when evaluating subsidy effects on farmland bird biodiversity - a Bayesian wannabe analysis – *Martin Stjernman, Biology*
16.35   General discussion moderated by Ullrika and Rasmus. The final discussion will be on the slow adoption of Bayesian methods at Lund University. Topics of discussion will be: Why are Bayesian methods not well represented in courses at Lund University? How to deal with aversions to the application of Bayesian methods? How to strengthen the role of Bayesian methods at Lund University?
17.00   End of the day

The post-conference discussion will be held at Bishops Arms (S:t Petri Kyrkogata 7).

Abstracts

An introduction to Bayesian and Hierarchical modelling

Johan Lindström, Mathematical Statistics

I will introduce some basic Bayesian concepts and models from my courses at Mathematical Statistics and my research.

An example of a Bayesian model in BUGS and R

Yf Jiang, Master student in Biology

I will demonstrate how I implement a regression model in BUGS using the graphical device doodle. I specify priors and run a Markov Chain Monte Carlo simulation until the parameters of the model converge. I could alternatively write the model as a code and run it from R. With this I hope to demonstrate that it is not that difficult to run a fairly simple Bayesian model and get started.

A generalized approach to modeling and estimating indirect effects in ecology.

Yann Clough, Centre of Environmental and Climate Research

Many ecologists get into Bayesian methods because traditional tools do not offer what they need. I present a generalized approach to path analysis using a Hierarchical Bayes approach that I developed when I found myself in a situation where traditional tools to estimate effects in a hypothesized causal multiple dependencies between two insect and a plant species were not satisfactory. I give an overview on plans to use this approach in present and future work. Clough Y (2012). Ecology 93:1809–1815.

Resting time for migrating birds, and x-ray time variability of galaxies: using Baysian Cramér-Rao bounds

Dragi Anevski, Mathematical Sciences

We will look at two estimation problems, one from Biology and one from Physics. In the first we are interested in estimating how long migrating birds stay at a geographical area, based on measurements of time between two catches. The method is illustrated on data from Thomas Alerstams group at Lund University. In the second we are interested in describing the frequency (or wavelength) content of the x-ray variability of galaxies. For both problems it is possible to state qualitatively how difficult they are to solve, by deriving the optimal rate: the rate that the best possible estimator should have. This is done using Bayesian methods.

Bayesian First Aid: Replacing null hypothesis tests by Bayesian estimation

Rasmus Bååth, Cognitive Science

Just pick up any psychology statistics textbook and you will find the same canonical list of tests: Binomial test, one sample t-test, two sample t-test, correlation test, etc. Using Bayesian statistics you can quickly escape these cookbook solutions, once you get a hang of the basics you are free to tinker with distributional assumptions and functional relationships. This talk will introduce Bayesian First Aid, an R package that implements Bayesian alternatives to the most commonly used statistical tests. It is intended both as a practical tool and as a teaching aid.

Bayesian approach, non-observed variables, and collecting long term data
Krzysztof Podgorski, Statistics

After formulation of the main Bayesian controversy in statistical inference, it will be presented how a prior can be reinterpreted as an unobserved variable. Using an example of a practical model, it will be shown that the Bayesian perspective can simply mean the lack identifiability in data observed over long time. It will be also shown that not observing some data does not necessarily mean that we deal with a Bayesian reality. A simple experiment will be performed and practical implications will be discussed.

Reasons to be Bayesian
Ullrika Sahlin, Centre of Environmental and Climate Research

I will talk about reasons to use Bayesian methods in research. Reasons can be distinguished into being Bayesian by force, Bayesian by application and Bayesian by conviction. Examples are taken from decision analysis, chosen perspective of risk, treatment of uncertainty in system assessments, the integration of multiple sources of knowledge, the need to combine expert knowledge with empirical observations, and the calibration and validation of predictive or complex computer models. I argue for a flexible attitude towards when to use Bayesian methods. Still these methods are becoming more and more useful in research and are in some situations to be seen as the better, or the only, alternative.

Incorporating uncertainty when evaluating subsidy effects on farmland bird biodiversity - a Bayesian wannabe analysis
Martin Stjernman, Biology

I will describe how I helped the Swedish board of agriculture to evaluate a few of the EU subsidies and how I ended up doing a frequentist analysis in a Bayesian mindset.

Acknowledgement