Bayesian Methods for Ecological and Environmental Modelling Joining Instructions

CEH Edinburgh 9-13 Sep 2019
Monday 9 Sep 12 noon – Friday 13 Sep 12 noon

Location

CEH Edinburgh, Bush Estate, Penicuik, Midlothian, EH26 0QB
Directions: https://www.ceh.ac.uk/edinburgh
You may find our guide for accommodation near our Edinburgh site useful.

Things to bring

Laptop & power cable. We recommend at least 4 GB RAM, so you can run the exercises smoothly.
Have your software installed as outlined below.
Your own data/ previous project (optional)

Before the course – essential preparation

If your organisation does not allow you to install any software on your laptop, please let us know ASAP and we will provide a machine for you (limited availability).

The software installation may take a couple of hours. Please do not leave it until the last minute!
Please ensure the following software is installed on your laptop:

1. **R programming language** needs to be installed first (**open source; free**)
   Download from https://cran.ma.imperial.ac.uk/
   Please choose the correct version for your operating system (LINUX/ Windows/Apple).
   Please follow the installation instructions for your operating system at
   https://cran.ma.imperial.ac.uk/doc/FAQ/R-FAQ.html#How-can-R-be-installed_003f

   If you have never used R before, you may like to watch this 12-minute beginners' tutorial
   https://www.youtube.com/watch?v=e8B9YU_M5FM
   A full video library for R (The "R manual") is here:
   https://cphills33.github.io/LearnR/R%20Manual.nb.html

2. **RStudio Desktop 1.2**
   This is free open source software. Please install the correct version for your operating system (Windows/Mac/Linux) from https://www.rstudio.com/products/rstudio/download/

3. **JAGS 4.3.0**
   Background : http://mcmc-jags.sourceforge.net/
   Click "Download latest version button" on https://sourceforge.net/projects/mcmc-jags/files/

The JAGS 4.3.0 user manual:
http://web.sgh.waw.pl/~atoroj/ekonometria_bayesowska/jags_user_manual.pdf
Other helpful pdf on installing JAGS may be https://cran.r-project.org/web/packages/rjags/rjags.pdf
Or this page from 22/2/2019 https://www.jihongzhang.org/post/manual-learn-jags-in-rins/

Beginner tutorial how to install R-packages in R (5 min video)
https://www.youtube.com/watch?v=hndMg7ldBJk

4. **R-INLA (R-package)**
   Download instructions http://www.r-inla.org/download
   Installation & general troubleshooting: https://haakonbakka.bitbucket.io/btopic109.html

5. **Further R-packages we will use during the course**
   install the following R-packages (you can run these lines in R):

```
install.packages('BayesianTools')
install.packages('coda')
install.packages('emdbook')
install.packages('geoR')
install.packages('ggmap')
install.packages('ggplot2')
install.packages('inlabru')
install.packages('jagsUI')
install.packages('mvtnorm')
install.packages('rjags')
install.packages('rstanarm')
install.packages('R2jags')
install.packages('shiny')
```

If you get stuck with installing packages, don't worry, there will be help during the course (but please have a go yourself before the course starts!).

If you have software already installed, make sure it is the latest version.

Discussion board – Padlet

Please introduce yourself to the other learners on Padlet: https://padlet.com/CEHtraining/bayesian. You will need the **password: bayesian1234**. You do not need to create a padlet account. Only people with this link and password can see the information. Please provide brief answers to the following questions

1. Name
2. Organisation
3. Role or title of PhD
4. 3 things you are hoping to get out of the course

Recommended reading prior to the course

1) Hartig et al. (2012. J. Biogeogr. 39: 2240-2252; https://onlinelibrary.wiley.com/doi/epdf/10.1111/j.1365-2699.2012.02745.x (open access)

2) Van Oijen (2017). Curr. For. Rep. 3: 269-280; https://doi.org/10.1007/s40725-017-0069-9 and http://nora.nerc.ac.uk/id/eprint/518404/ (open access)

On arrival

If you arrive by car, there are four visitor parking spaces immediately in front of reception and more parking spaces at the back (please walk back to the front reception)

If arriving by bus, please ask driver for Bush Estate stop. Off the main road, look for signs to the walled garden and Bush Estate.

Please register at CEH reception. You will be issued with a pass and wifi password (academics will be able to access eduroam). Someone will take you from the reception to the training room.

Lunch

We will provide a buffet lunch from Monday to Thursday about 12:30 ~13:00 (we have taken a note of any allergies/ food requirements when you signed up). You will need to organise your own evening meals.

Other notes

This course has a mixed internal and external audience as well as people from academia and statutory organisations. Please make each other feel welcome. We trust that whatever level of experience and expertise you have, that you can bring that in with questions and/or answers to make the course participatory.

Invoice – you were send an automated email from support@mitingu.com containing your invoice on the day you signed up (please check SPAM folder).

Course leader:

Marcel van Oijen, Ecosystem modeller.

The other trainers are Kate Searle, Lindsay Flynn Banin, David Cameron and Peter Levy.

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Course leaders: Marcel van Oijen, Kate Searle, Peter Levy, David Cameron, Lindsay Flynn-Banin

DRAFT AGENDA

We will be flexible with the agenda to meet your needs.

Day 1 Monday 9 September

12:00 Arrival

12:30 Lunch

13:30 Introductions

14:00 Bayesian basics – overview of the course, Introduction to R, Rstudio, Rmd

17:00 Close

Day 2 Tuesday 10 September

09:00 tea & coffee & networking

09:30 review of Day 1

10:00 Hierarchical modelling, Graphical modelling, introduction to JAGS

13:00 Lunch

14:00 Spatial modelling, introduction to geoR

16:30 Recap Day 2

17:00 Close

Day 3 Wednesday 11 September

09:00 tea & coffee & networking

09:30 review of Day 2

10:00 Comprehensive uncertainty quantification, Emulation, introduction to Process-based modelling, BayesianTools

13:00 Lunch

14:00 Combining diverse datasets, introduction to rstanarm

16:30 Recap Day 3

17:00 Close

Day 4 Thursday 12 September

09:00 tea & coffee & networking

09:30 review of Day 3

10:00 Spatio-temporal modelling, introduction to R-INLA

11:00 Model comparison & evaluation

13:00 Lunch

14:00 Communication of results, introduction to ggplot2 & R-Shiny

16:30 Recap Day 4

17:00 Close

Day 5 Friday 13 September

09:00 tea & coffee & networking

09:30 review of Day 4

10:00 Software alternatives, Future use of Bayesian methodology, Group discussion

12:30 Recap course & Feedback Session

13:00 Close

If you are running late or experience any other problems before arrival, please call CEH Edinburgh reception on 0131 4454343 or Ingo Schüder (BDM training) on 07472794179.