Format: Online

Introduction to GAMM and GLMM with R

- With GAM applications to spatial, and spatial-temporal data -

Provided by: Highland Statistics Ltd

This course offers an introduction to generalised additive models (GAMs), linear mixed-effects models, generalised linear mixed-effects models (GLMMs), the combination of GAMs and GLMMs, and also includes examples of GAMMs applied to spatial and spatio-temporal data.

The course begins with a review of multiple linear regression, followed by a non-technical introduction to GAMs. Through a series of exercises, we demonstrate the application of GAMs to accommodate non-linear covariate effects.

The second part of the course introduces linear mixed-effects models, which are suitable for data with complex structures, such as observations from clustered or hierarchical sources (e.g., multiple measurements from the same subject). These models extend traditional models by incorporating random effects to account for the non-independence of data points.

Once familiar with mixed models, we will integrate them with GAMs, resulting in generalised additive mixed-effects models (GAMMs). We will do various exercises using GLMMs and GAMMs.

In the third part of the course, we will apply GAMs and GAMMs to various spatial and spatio-temporal datasets.

Dates:
- 10 - 14 February 2025
- 09.00 - 16.00 (CET)

Location: Online

Price: £500

Included: 1 hour face-to-face video chat about your data

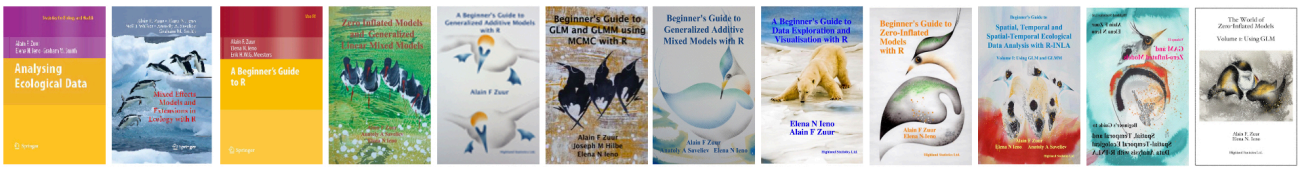
Instructors:
- Dr. Alain Zuur
- Dr. Elena Ieno

Authors of 12 books and providers of over 250 courses

Throughout the course, we will utilise GAMMs and GLMMs on different types of data (continuous and count), employing Gaussian, Poisson, and negative binomial distributions.

Interaction between participants and instructors after the course:

- The course fee includes a 1-hour face-to-face video chat with the instructors. You can ask questions related to your own data or to the course.
- A Discussion Board allows for interaction between instructors and participants. You can ask detailed questions related to the course material.



COURSE CONTENT

Module 1
- General introduction.
- Revision exercise on multiple linear regression.
- Theory presentation on GAM.
- Two introductory GAM exercises.

Module 2
- GAM exercise discussing model selection and smoother interactions.
- Theory presentation on linear-mixed effects models.
- One exercise using linear mixed-effects models.
- One exercise on Gaussian additive mixed-effects models (GAM with random effects).

Module 3
- Time allowing: Exercise using hierarchical GAMs (the GAM equivalent of random slope models).
- Two revision exercise on Poisson and negative binomial GLMs.
- One exercise on negative binomial GAM.

Module 4
- One exercise on Poisson GLMM.
- Time allowing: One exercise on negative binomial GLMM.
- Two exercises on Poisson and negative binomial GAMM.

Module 5
- One exercise on (Gaussian) GAM applied to spatial data.
- One exercise on GAM applied to spatial count data.
- One exercise on GAM(M) applied to spatial-temporal count data.
- Time allowing: Guidance for the analysis of binary, continuous, proportional and continuous data (Bernoulli, binomial, beta, Tweedie and Gamma distributions).

We will predominately use the R packages mgcv and glmmTMB for the exercises.

PRE-REQUIRED KNOWLEDGE:
Working knowledge of R, data exploration, linear regression and GLM (Poisson, negative binomial). This is a non-technical course.

The course website provides preparatory materials, including on-demand videos and R scripts covering multiple linear regression, basic matrix notation, generalised linear models, model validation using DHARMa, and the explanation of variograms. If you are not familiar with these methods, please review them before the course begins.

FREE 1-HOUR FACE-TO-FACE MEETING
The course fee includes a 1-hour face-to-face meeting with one or both instructors. You can discuss your own data, but we strongly advice that the statistical topics are within the content of the course. The 1-hour consultancy needs to be consumed in one sessions, and will take place at a mutual convenient time. It is not transferable. The meetings needs to take place within 12 months after the last live zoom module.

GENERAL INFORMATION

COURSE FEE: £500
Credit card payments are charged in GBP currency.
VAT Charge:

- UK participants are charged a 20% VAT.
- Non-EU participants (including Norway and Switzerland) are not subject to VAT.
- We do not charge VAT to EU participants who provide their institutional VAT number.
- EU participants who do not provide a VAT number will be charged VAT at their national rate.
- The course fee does not contain coffee, tea, lunch or accommodation.
- Access to the course website is 12 months.

COURSE TIMES (CET):

- Monday - Thursday: 09.00-16.00
- Friday: 09.00-15.00
  - Including a 60-minutes lunch break and two short 20 minutes tea/coffee breaks.
- You can use this link for a time zone converter: https://www.timeanddate.com/

CANCELLATION POLICY:
What if you are not able to participate? Once participants are given access to course exercises with R solution codes, pdf files of certain book chapters, pdf files of powerpoint files and video solution files, all course fees are non-refundable. However, we will offer you the option to attend a future course or you can authorise a colleague to attend this course.

Terms and conditions: See the footer at: www.highstat.com

GENERAL

- Please ensure that you have system administration rights to install R and R packages on your computer.
- Instructions what to install will be provided.

REGISTRATION

www.highstat.com

Dr Alain F Zuur
highstat@highstat.com
www.highstat.com
Payment via credit card or bank transfer