Hybrid statistics course (onsite and online)

Introduction to GLMM and GAMM with R

Provided by: Highland Statistics Ltd

Instructors: Dr. Alain F. Zuur and Dr. Elena Ieno

Organised by: Maastricht University, Department of System Earth Science, Venlo, The Netherlands

This is an onsite course but you can also join online via Zoom

This course is a hands-on introduction to generalised linear mixed effects models (GLMMs) and generalised additive mixed models (GAMMs) in R. The course is delivered onsite, but participants can also join remotely via Zoom.

The course begins with an introduction to linear mixed-effects models, including models with nested structures and random intercepts and slopes. Participants will work through several practical exercises to understand how mixed-effects models are fitted and interpreted. We then introduce GLMMs for analysing non-Gaussian data, including Poisson, negative binomial, and Bernoulli responses.

The next part of the course focuses on generalised additive models (GAMs), which provide a flexible way to model non-linear relationships. Through practical examples, participants will learn how to interpret smoothers, perform model selection, and understand interactions between smooth terms. Building on this, we extend the framework to generalised additive mixed models (GAMMs), combining the flexibility of GAMs with the hierarchical structure of mixed-effects models. Examples include hierarchical GAMs and GAMMs for count data.

Venue:
- Maastricht University. Department of System Earth Science. Brightlands Campus Venlo, The Netherlands

Dates and times:
- 17 - 21 August 2026
- 09.00 - 16.00 (local time)

Price: £500

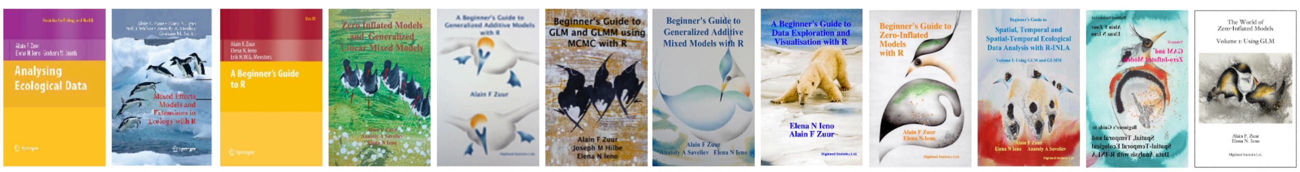
Included: 1 hour face-to-face video chat about your data.

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

Authors of 12 books and providers of over 250 courses.

In the final part of the course, participants will work with GLMMs and GAMMs for different types of response variables, including continuous data with and without zeros, counts, and proportional data. Distributions covered include Tweedie, Gamma, beta, binomial, Poisson, and negative binomial.

All examples are implemented in R, primarily using the mgcv and glmmTMB packages. The course emphasises practical modelling, interpretation of results, and model validation, rather than mathematical derivations.



COURSE CONTENT

Preparation material (in case you are not familiar with the required background knowledge; estimated time: 3 hours)
- Exercise on linear regression (with on-demand video).
- Exercise on Poisson and negative binomial GLMs (with on-demand video).
- Short explanation of DHARMa (with on-demand video).

Monday (linear mixed effects models)
- General introduction.
- Theory presentation on linear mixed-effects models.
- One exercise using one-way nested linear mixed-effects models.
- One exercise using two-way nested linear mixed-effects models.
- One exercise using random intercepts and slopes in a linear mixed-effects model.

Tuesday (GLMM)
- Catch-up session.
- One exercise on a Poisson GLMM.
- One exercise on a negative binomial GLMM.
- One exercise on a Bernoulli GLMM.

Wednesday (GAM)
- Theory presentation on GAMs.
- Two introductory GAM exercises.
- GAM exercise discussing model selection and smoother interactions.

Thursday (GAMM)
- One exercise on Gaussian additive mixed-effects models (GAMs with random effects).
- One exercise using hierarchical GAMs (the GAM equivalent of random-slope models).
- Two exercises on Poisson and negative binomial GAMMs.

Friday (GLMMs and GAMMs)
- One exercise using a Tweedie GLMM or GAMM for the analysis of continuous data (with zeros).
- One exercise using a Gamma GLMM or GAMM for the analysis of continuous data (without zeros).
- One exercise using a beta GLMM or GAMM for the analysis of proportional data.
- Time allowing: one exercise using a binomial GLMM or GAMM for the analysis of proportional data.

PREREQUISTES

Participants should have working knowledge of R, data exploration, linear regression, and generalised linear models(Poisson and negative binomial).

Participants will receive access to the course website two weeks before the course starts. The website contains approximately 3 hours of preparatory material, including exercises, R scripts, and on-demand videos covering:
- Multiple linear regression
- Generalised linear models
- Model validation using DHARMa

Participants who are not familiar with these topics are encouraged to review the preparatory material before the course begins, as there will be limited time during the course to discuss these basic methods.

If you have questions while working through the preparatory material, you can use the course Discussion Board on the website to ask questions before the course starts.

GENERAL INFORMATION

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 meeting needs to take place within 12 months after the last live zoom module.

We reserve the right to change the exercises. Pdf files of all theory material will be provided. All exercises consist of data sets and annotated R scripts. Access to the course website is for 12 months. The course website also contains on-demand video.

COURSE FEE: £500

- Credit card payments are processed in GBP.
- UK participants: Subject to 20% VAT.
- EU participants (non-UK): Not subject to UK VAT but must provide their institutional VAT number.
- Non-EU participants: Not subject to VAT. Canadian participants are subject to GST/HST tax.

COURSE TIMES:

- Monday-Friday: 09.00am to 16.00pm including a 1 hour lunch break and a 20 minutes break both morning and afternoon.

COURSE VENUE:

Maastricht University
Department of System Earth Science
Brightlands Campus Venlo
Innovalaan 1
5928 SX Venlo
The Netherlands

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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 presentations 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: https://www.highstat.com.

REGISTRATION

https://www.highstat.com/index.php/joine-an-onsite-course

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Payment via credit card or bank transfer