Introduction

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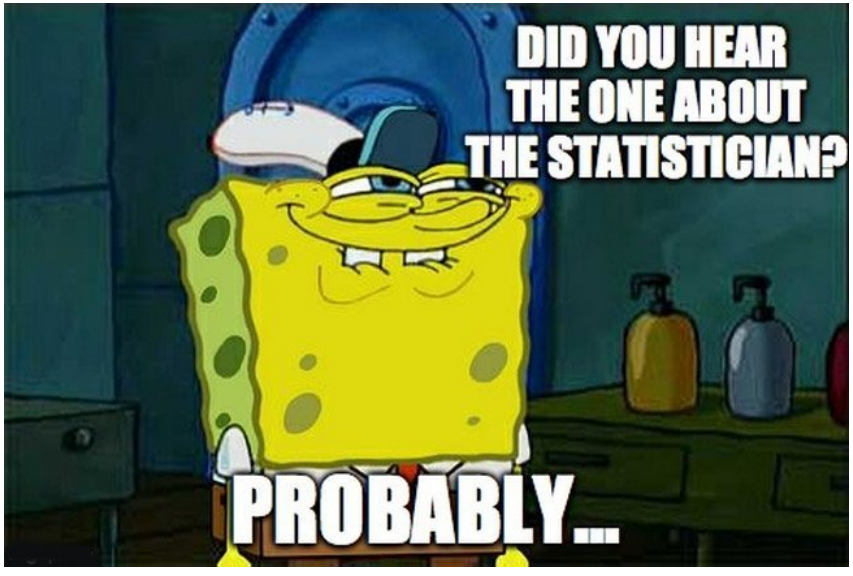
Who are you, and what do you do?

Who am I, and what do I do?



Welcome! 😄

Outline

See github for all material

Sessions from 14:00 to 20:00 (Monday to Thursday), 14:00 to 18:00 on Friday (Berlin time). Sessions will consist of a mix of lectures, in-class discussion, and practical exercises / case studies over Slack and Zoom.

- Monday: Introduction, sampling theory, simple LMs
- Tuesday: Multiple linear regression (ANOVA, ANCOVA) + GLM introduction
- Wednesday: Binomial regression, model comparison
- Thursday: Discrete responses (Poisson, NB) and other useful models (e.g., beta)
- Friday: Bring your own data, looking beyond (GLMMs? or GAMs, Bayesian statistics..)

Friday

1. Looking beyond (GLMMs? or GAMs, Bayesian statistics..)
2. Bring your own data

Which topic(s) should we look into on Friday?

How we will do it

Lectures of about 45 minutes
- with examples Practicals of about 45-60 minutes: datasets and R
- 2 parts

Practicals

The format of practicals is pretty loose, and can be adjusted

- Group exercises in break out rooms
- Live demonstration in the main room
- Individually work on larger tasks

Do you have a preference, or should we just see that works best?

Disclaimer

A small amount of maths

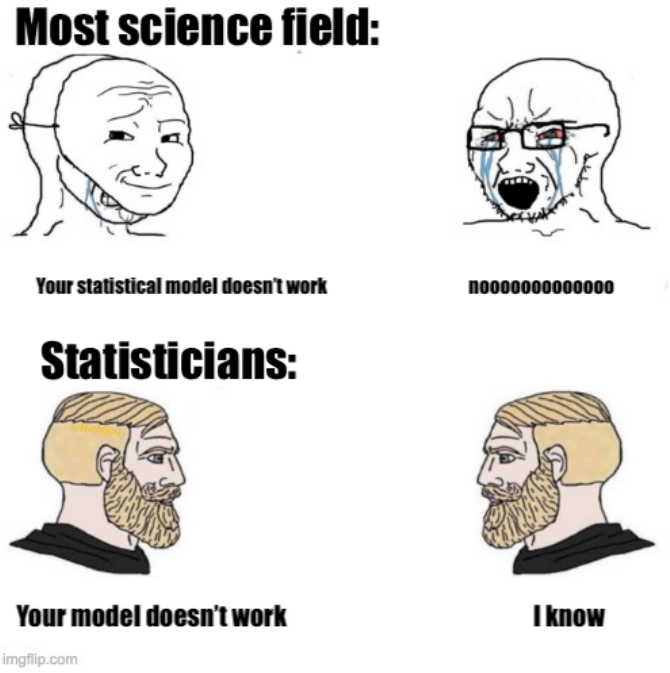
This is a statistics workshop after all

On learning maths

1. **Please ask if you do not follow**
2. Maths is difficult, and that is OK
3. It is a valuable tool
4. Vital for a full appreciation of Generalised Linear Models

What I hope you take away

1. There are many details you will forget, that is fine (you might recall them later)
2. Generalised Linear Models are very useful, and easy to use
3. Maths can be useful/stats can be useful
4. You pick the tools you want to work with



Detailed outline today

- Who am I, who are you
- Brief reminder of R programming
- Reminder of foundational statistical concepts (sampling theory)
- Introduction to linear models
- 15 minute break 15:45-16:00
- 45 minute break 17:45-18:30
- 2 Lectures/presentations
- 2 Practicals

Logistics

All material on github

Please make sure you've downloaded data and updated R/packages

I might make small updates to the material during the week

R-packages

We don't need any R-packages for fitting Generalised Linear Models.
We can use some R-packages for processing results, visualization and other additional tasks.

- AICcmodavg
- DHARMa
- DescTools
- MASS
- MuMIn
- car
- emmeans
- effects
- ggeffects
- ggplot2
- GLMsData
- glmtoolbox
- glmmTMB
- lattice
- marginaleffects
- performance
- patchwork
- statmod
- usingR
- visreg

Resources

- ST2304 by Bob O'Hara and Emily Simmonds
- Florian Hartig's online book
- John Fieberg's online book
- Zuur et al. 2013 or Zuur et al. 2009
- McCullagh and Nelder 1989
- Wood 2017
- Dunn and Smyth 2021
- Agresti 1990