

Draft/brain dump for SH presentation

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hour 1: introduction/overview

- basic ideas behind mixed models
- intuition: starting from simplest examples of problems with non-independence (e.g. paired t-test); giving some idea of the huge scope (e.g. GLMMs, unbalanced data, random-slope models, multiple random effects, spatial/temporal correlation ...)
- present some examples for reference
- some discussion of model specifications (primarily R but mention others: Stata, AS-REML, SAS ...)
- brief overview of estimation methods (linear algebra- or optimization/autodiff-based; MCMC)
- brief overview of inference challenges
- similar material to https://bbolker.github.io/mm_iowa2024/notes/glmm.html

(this might be overstuffed: will have to think about how to present/what to cut)

hour 2: workflow/extended example

Present a mixed modeling workflow (R-based but general, in principle), using one of the examples suggested above

- *a priori* modeling decisions (maximal model/power etc.)
- troubleshooting
- diagnosis and simplification
- interpretation (marginal effects etc.)

hour 3: frontiers and challenges

A selection of cutting-edge issues

- scaling to big data
- regularizing for small data
- should we all go Bayesian? pros and cons
- covariance structures (spatial/temporal, factor-analytic models, etc.)

Leave plenty of time for questions!