

## Applied (generalized) Linear Mixed Models

Instructor: [Dr. Ben Bolker](#) of McMaster University

### Course Description and Outline:

Assuming a basic knowledge of generalized linear models and mixed models (at least at the level of classical mixed ANOVA models), this workshop will review the practical use of (generalized) linear mixed models in ecological applications. In particular, it will demonstrate how to define and fit (G)LMMs, primarily using R's lme4 package, but also covering the alternative glmmADMB and MCMCglmm packages. The workshop will cover:

- model-building decisions: model selection, nested vs crossed random effects, overfitted random effects models
- model fitting: basic algorithms for LMMs (penalized least squares) and GLMMs (penalized iteratively reweighted least squares, using Laplace approximation or Gauss-Hermite quadrature)
- model diagnostics (mostly graphical)
- graphical presentation of results
- trouble-shooting fitting problems
- inference/confidence-interval construction via likelihood ratio tests and parametric bootstrapping

Additional/advanced topics (computational issues, more complex model designs) will be covered as time and audience interest allow.

There will be a hand-on session in the short course. **A laptop with R installed** is highly recommended.