

## **Kolloquium „Statistische Methoden in der empirischen Forschung“**

Wann: 29. Oktober 2013, 17:00 – 18:30 Uhr

Wo: Landwirtschaftlich-Gärtnerische Fakultät der HU, Hörsaal 2, 2. Etage,  
Invalidenstr. 42, 10115 Berlin

### **Christian Ritz**

Dep. Nutrition, Exercise and Sports, Faculty of Science, University of Copenhagen

### **Aspects of dose-response modelling**

Concentration- and dose-response experiments are used to elicit effects or responses in biological systems for a specific range of doses administered. In this context dose may refer to any biological, chemical, radioactive stimulus or stress that can be applied gradually.

Major application areas include biology, chemistry, medicine, pharmacology and toxicology, and are found within industry, regulatory bodies, and science. The range of applications is wide: from experiments in hearing and speech science over pulse oxygen saturation modelling to routine toxicity testing within regulatory frameworks.

The presentation will touch upon topics such as:

- standard dose-response models
- examples going beyond s-shaped models
- issues in estimation and hypothesis testing
- ways of dealing with model misspecification:
  - model averaging
  - robust standard errors
- benchmark/low dose methods
- analysis of complex dose-response data:
  - using a two-step approach
  - based on mixed-effects models

This presentation attempts to provide an up-to-date overview of dose-response methodology, both from a theoretical and an applied perspective. In particular, the R extension package *drc* (Ritz & Streibig, 2005) as well as a few supplementary packages, which extend its basic functionality, will be introduced.

### *References*

Ritz C and Streibig JC (2005). Bioassay analysis using R. *Journal of Statistical Software*, 12, issue 5, 1-22. <http://www.jstatsoft.org/v12/i05>.

Ritz C (2010). Towards a unified approach to dose-response modeling in ecotoxicology. *Environmental Toxicology & Chemistry* 29, 220-229.