

## **SC 14: The calibration and evaluation of Individual Based Models using Approximate Bayesian Computation, ABC**

Richard Sibly, University of Reading, UK  
Elske van der Vaart, University of Reading, UK  
Sam Cartwright, University of Reading, UK

### **Abstract**

ABC is a fairly new approach to statistics which can do for computer models what classical statistics does for general linear models. It is a technique for optimising a model's parameter values given the data, and for selecting between structurally different model representations. It can be applied to any computer model of a process where data are available to calibrate and evaluate the performance of the model. It involves running the model some  $10^5$  times while varying the model's parameter values. Parameter values are identified which result in model outputs which best match all relevant data. Posterior distributions of parameter values are found from which credible intervals can be calculated. Comparisons of models are put on a firm statistical basis allowing informed decisions as to which best fits the data. The use of Bayes factors quantifies how much better one model is than another. In the workshop we show how ABC can be applied to Individual-Based Models (IBMs), which are increasingly being developed to support ecological risk assessments of plant protection products (PPPs). Participants should be familiar with computer models and ideally with R and Netlogo.

### **Course objectives**

Participants will:

- learn the theoretical framework of ABC
- learn how to use supplied R code to apply ABC to supplied output from running an existing model
- be encouraged to apply ABC to their own models

### **Course level**

Introductory

### **Note**

Participants should bring their own laptop in order to follow this course