

School of Mathematics and Applied Statistics
2013 Colloquium Series
University of Wollongong

Title: The Mathematics of Honey Bee House Hunting: Scale and Complexity in Modelling Social Insects

Speaker: Mary Myerscough (University of Sydney)

Time and Date: Friday 27 September 2013, 3:30pm

Location: 6-210

Abstract: Social insects—ants, bees and termites—live in colonies that are capable of finely tuned, sophisticated behaviour but are made up of thousands, even millions of simple individual insects that interact in simple ways. The links between simple individuals and complex, self-organising colony behaviour has been a fertile field for mathematical modelling and mathematical thinking has made a significant contribution to developing an understanding of collective behaviour in insects and to extending that knowledge to applications in computing, robotics and the dynamics of vertebrate groups, including humans.

Social insects seem to exist at an intermediate scale mathematically, and so the type of modelling that is required depends on the particular system that is being modelled and even on the particular question that is being asked. A range of mathematical formalisms, from differential equations to individual-based modelling can be applied to a single example of behaviour, depending on the scale at which the behaviour is being analysed and the level of detail that the analysis requires.

I will use honey bee behaviour during nest site selection to exemplify these ideas.