Models for Honeybee House-hunting

Thursday, Feb 18th
4:00 pm - 5:00 pm ET

Prof. Mary Myerscough

From time to time, colonies of honeybees need to come to an effective consensus about the choice of a new home, or at least what direction to set out in to arrive at a new home. The western honey bee Apis mellifera generates new colonies by swarming. In the spring, half the bees in the colony leave the hive, and scouts go out to search for suitable new nesting cavities. When a scout finds a suitable nest site, she returns to the swarm and advertises it through a waggle dance. We explore via mathematical models how the characteristics of these dances enable the swarm to optimize its nest site choice and consider the effect of scout numbers and swarm size on this process. On the other hand, the dwarf honeybee (Apis florea) is an open nesting species whose combs hang from shaded branches in tropical forests. To move its nest site, the colony needs to determine a suitable direction to set out. We present a model for A. florea decisions and show how these colonies use ideas of vector algebra to determine which direction to go.

Prof. Mary Myerscough received her first degrees in Applied Mathematics from the University of Sydney and then completed her DPhil at Oxford University at the Centre for Mathematical Biology, supervised by Jim Murray. She returned to Sydney to take up a research position in the School of Chemistry at Macquarie University where she studied the mathematics of exothermic chemical reaction kinetics and became interested in models for collective behaviour in social insects. Prof. Myerscough has worked on problems in social insect behaviour in collaboration with biological scientists at Sydney University, Macquarie University and CSIRO. More recently she has developed a strong interest in modelling the immunology of atherosclerotic plaque development. She is currently a Professor of Mathematical Biology and has just completed 7 years as Associate Head of School (Education) in the School of Mathematics and Statistics at the University of Sydney.

Hosted by the Soft Math Lab.

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To attend, join Zoom link here.

password: "honeybee"