

Physicist gets buzz from better bee behaviour model

October 13 2009



(PhysOrg.com) -- A physicist at the University of Manchester has paved the way for better research into how honey bees choose where to live.

Dr Tobias Galla has used methods from statistical physics to mathematically 'solve' a computer model developed by other researchers, which shows how a swarm of honey bees collectively decide on a new home and accurately pick the best.

In February 2009 a research paper published in *Philosophical Transactions of the Royal Society B* reported on a computer-based model showing that bees' remarkable reliability in picking the best nest site stems from a sophisticated interplay of individual and collective decision making.



Now thanks to Dr Galla's mathematical description of the model, biologists will be able to refine it, add in more factors and build a more realistic picture of the behaviour of bees.

Dr Galla is interested in 'complexity science', a relatively new field of research that has developed in the last 15 years.

The scope for the application of <u>theoretical physics</u> to modern society is not always immediately obvious.

But physicists seek to describe and understand the behaviour of very small, individual 'agents' - such as molecules and atoms - in relation to a collective outcome.

Complexity science builds on this knowledge and understanding, and has been successfully applied to models of economics, to study financial markets, traffic management and social phenomena like crowd disasters, spreading of rumours and opinions, as well as models of decision making and learning.

Simulations incorporating statistical physics also have the potential to help build better models in biology, to understand how diseases spread or what controls blood pressure.

Dr Galla is part of a group of physicists in Manchester who meet regularly with social scientists to discuss potential collaborations - and it was from these meetings that his latest paper arose.

'Independence and interdependence in the nest-site choice by <u>honeybee</u> swarms: agent-based models, analytical approaches and pattern formation' is due to be published in the *Journal of Theoretical Biology* in October.



<u>More information</u>: The previous paper referred to is: 'Independence and interdependence in collective decision making: an agent-based model of nest-site choice by honeybee swarms'. *Phil. Trans. R. Soc. B* (2009) 364, 755-762. doi:10.1098/rstb.2008.0277

Provided by University of Manchester (<u>news</u> : <u>web</u>)

Citation: Physicist gets buzz from better bee behaviour model (2009, October 13) retrieved 10 May 2024 from <u>https://phys.org/news/2009-10-physicist-bee-behaviour.html</u>

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