

Collective problem solving in ant colonies, bee hives and slime mould amoebas

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Abstract. I will present research on collective problem solving in three self-organised biological systems: slime mould amoebas, honey bee hives and ant colonies. Despite having near-microscopic brains (or in the case of the slime mould, no brain at all), ants, bees and slime moulds are capable of surprisingly complex decision making. My research combines laboratory studies with field work in an attempt to determine how complex biological systems make decisions in the dynamic, complex environments they inhabit. In this presentation, I will focus on three main examples of collective behaviour: navigation in honey bee swarms, multi attribute decision making in slime moulds, and transportation network design in ant colonies. While we are increasingly gathering evidence for the amazing information processing abilities of collective biological systems, our understanding of how these systems actually work is still in its infancy. As such, there is tremendous potential for collaboration between biologists and other complexity researchers.