

1163-37-229

Jasper Weinburd* (jweinburd@hmc.edu) and **Andrew J Bernoff**. *Emergent patterns in locust swarms using agent-based and continuous models.*

Locusts are devastating pests that infest and destroy crops in regions of the world already afflicted by drought and food shortage. Swarms of flightless juvenile locusts take on distinctive shapes that appear to serve ecological processes. How does individual locust behavior lead to these various shapes and help the swarm to cope with its current environment? We model this phenomenon using two approaches in tandem; an agent-based model that tracks individuals and a partial differential equation for the mean locust density. The agent-based model allows direct comparison to empirical data and captures the systems inherent stochasticity. The PDE provides a framework for theoretical analysis and allows extensive exploration of the model's sensitivity to changes in input parameters. In this talk, we discuss the effects of social forces and attraction to resources on the collective behavior of the band. (Received August 28, 2020)