Locusts gather in large numbers to feed on crops, destroying agricultural fields. Wingless juveniles marching together through a field demonstrate collective behavior that forms a coherent front of advancing insects. We examine this front through two models: an agent-based model and a set of partial differential equations. We construct the agent-based model using observations of individual behavior from the biological literature. The PDE model yields insight into collective behavior of the front. We demonstrate that resource-dependent behavior can explain the density distribution observed in locust hopper bands.

This talk is suitable for undergraduate students.