May 18th, 5:00 PM - 7:00 PM

Spatial Patterning of Predator-Prey Distributions Arising from Prey Defense

Evan C. Haskell
Nova Southeastern University, haskell@nova.edu

Jonathan Bell
University of Maryland, Baltimore County, jbell@math.umbc.edu

https://scholarscompass.vcu.edu/bamm/2022/wed/59

SPATIAL PATTERNING OF PREDATOR-PREY DISTRIBUTIONS ARISING FROM PREY DEFENSE

Evan Haskell
Department of Mathematics
Nova Southeastern University

Jonathan Bell
Department of Mathematics and Statistics
University of Maryland, Baltimore County

Predator and prey species share a common interest in survival. However, this common interest places these species at odds with each other. To meet their needs, predators may engage in optimal foraging behaviors described by directed movements or taxis; such as, prey-taxis or chemotaxis to seek areas of high prey density. For prey, on the other hand, there are numerous available defense strategies to engage such as, for example, aposematic mechanisms to warn a predator of potential danger in attacking the prey, safety in numbers mechanisms to mob the predator, chemical defense mechanism to repel the predator, or alarm calls to seek assistance. In this talk, we will focus on competition between prey-taxis and chemical defense, placing a particular emphasis on conditions leading to spatial segregation of predator and prey, or, pattern formation in the predator and prey densities that may be beneficial to maintaining prey survival and hence predator survival.

Bell, Jonathan, and Evan C. Haskell. "Attraction–repulsion taxis mechanisms in a predator–prey model." *Partial Differential Equations and Applications* 2.3 (2021): 1-29.