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Chris Cosner* (gcc@math.miami.edu). *Recent advances in understanding the dispersal of organisms: ideal and real.*

The problem of understanding how organisms disperse has attracted much attention from both mathematicians and biologists. There have been significant recent advances in our understanding from both viewpoints. I will describe some current work in this area. In a static environment with spatial variation, models suggest it is possible for a population to disperse optimally on the basis of local information about the environment by precisely tuning advection and diffusion. In the time-periodic case that is still possible but requires nonlocal information. In many models all members of each population are assumed to disperse in the same way. Empirically, organisms are known to find resources fairly well, but their dispersal patterns often involve switching between two or more modes of advection and/or diffusion rather than finely tuning a single mode, and may use nonlocal information. There has been some mathematical work on models with switching or nonlocal information but not much. I will describe some recent modeling work on these topics. The talk is not based on any single paper but some of the work it will describe was done in collaboration with R. S. Cantrell, W.F. Fagan and members of his lab, Y. Lou, or X. Yu. (Received August 14, 2019)