1053-35-229 **Stephen Cantrell*** (rsc@math.miami.edu), University of Miami, Department of Mathematics, Coral Gables, FL 33124. *The interplay of advection and diffusion in the evolution of dispersal.*

In this talk we examine a Lotka-Volterra reaction-diffusion-advection model for two competing species in a closed bounded heterogeneous habitat. The species are assumed to be identical except for their dispersal strategies: one disperses by random diffusion only, while the dispersal of the other combines random dispersal and advection along an environmental resource gradient. When there is no advective component to the second species' movement, it is now well known that in this modeling context that the species with the lower diffusion rate excludes the other. However, in convex habitats the introduction of weak advection may reverse the predictions of the model, so that a species whose dispersal includes weak advection and a certain level of random diffusion can exclude a species whose dispersal is purely diffusive but slightly slower. We show that this advantage is not consistently maintained as the advective tendency becomes stronger. Rather, when advection becomes sufficiently strong, both competitors are able to increase when rare, and consequently, the two competitors coexist. Effectively, the strong advective tendency causes the second species to concentrate on the most favorable portions of the habitat leaving enough resources available to sustain the first. (Received September 05, 2009)