

**Meeting:** 1003, Atlanta, Georgia, SS 18A, AMS-SIAM Special Session on Recent Advances in Mathematical Ecology, I

1003-92-1412      **Priyanga Amarasekare\*** (amarasek@uchicago.edu), Department of Ecology and Evolution,  
University of Chicago, 1101 East 57th Street, Chicago, IL 60637. *Spatial coexistence mechanisms:  
a comparative analysis.*

I present a mathematical framework for spatial competitive coexistence that allows for comparative analysis multiple mechanisms. The basis for comparison is mechanisms that operate in spatially homogeneous competitive environments (e.g., life history trade-offs) vs. mechanisms that operate in spatially heterogeneous competitive environments (e.g., source sink dynamics). This comparative approach leads to several new insights about spatial coexistence. First, spatial variation in the expression of a life history trade-off leads to a unique regional pattern that cannot be predicted by considering trade-offs or source-sink dynamics alone. This result represents an instance where spatial heterogeneity constrains rather than promotes coexistence, and illustrates the kind of counterintuitive emergent properties that arise due to interactions between different classes of mechanisms. Second, the analysis distinguishes between situations where dispersal mortality is not necessary for coexistence and those where such mortality is essential for coexistence because it preserves spatial variation in the strength of competition. (Received October 05, 2004)