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Sonya Bahar* (bahars@ums1.edu), Dept of Physics and Astronomy, UMSL, One University Blvd, 503 Benton Hall, St. Louis, MO 63121. *Non-Equilibrium Phase Transitions in Evolutionary Dynamics*.

The statistical physics of non-equilibrium phase transitions has recently been applied to models of evolutionary dynamics. I will review recent results showing a transition of the directed percolation universality class in a model where organisms exist on a continuous, two-dimensional phenotype space, undergoing birth and death processes comparable to branching and coalescing random walks. A non-equilibrium transition from a state of extinction to survival occurs as a mutation parameter is varied. Importantly for the biological implications of the model, the transition occurs even on a "neutral" phenotype space, where all organisms have the same probability of reproducing. This corresponds to a control condition in which natural selection is absent. Concurrent with the extinction-to-survival transition, the clustering structure of the organisms in the phenotype space changes as well. An ordinary percolation transition takes place as the clusters of organisms fill the space. Perhaps most interestingly, the centroids of the clusters of organisms also undergo a transition in their clustering dynamics, a result which has implications for the biologically important problem of multi-level selection. (Received August 27, 2013)