Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Universality in a Neutral Evolution Model[1] DAWN KING, ADAM SCOTT, NEVENA MARIC, SONYA BAHAR, University of Missouri at Saint Louis — Agent-based models are ideal for investigating the complex problems of biodiversity and speciation because they allow for complex interactions between individuals and between individuals and the environment. Presented here is a "null" model that investigates three mating types – assortative, bacterial, and random – in phenotype space, as a function of the percentage of random death δ. Previous work has shown phase transition behavior in an assortative mating model with variable fitness landscapes as the maximum mutation size (μ) was varied (Dees and Bahar, 2010). Similarly, this behavior was recently presented in the work of Scott et al. (submitted), on a completely neutral landscape, for bacterial-like fission as well as for assortative mating. Here, in order to achieve an appropriate "null" hypothesis, the random death process was changed so each individual, in each generation, has the same probability of death. Results show a continuous nonequilibrium phase transition for the order parameters of the population size and the number of clusters (analogue of species) as δ is varied for three different mutation sizes of the system. The system shows increasing robustness as μ increases. Universality classes and percolation properties of this system are also explored.

[1]This research was supported by funding from: University of Missouri Research Board and James S. McDonnell Foundation

Dawn King
University of Missouri at Saint Louis

Date submitted: 23 Oct 2012 Electronic form version 1.4