1145-92-309 **Keisha Cook*** (kjcook3@crimson.ua.edu), 380 14th Place East, Apt 738, Tuscaloosa, AL 35401.

Estimating the Extinction Time of infection in a spatial stochastic SIR model. Preliminary report.

We model spatial stochastic simulation using the classic SIR model applied to a 2D lattice. This model consists of susceptible, infected, and resistant cells. To analyze the dynamics of the system, we can alter the reaction rates, boundary conditions, height, and length of the lattice. We investigate the following questions: 1) What is the time of the extinction of the infected cells, 2) How many infected cells are needed to carry information to a specific point along the lattice, and 3) What is the minimum length of the lattice required to have all of one type of cell. The computational time increases as the length of the lattice and number of cells increases. We use parallel processing to speed up the algorithm which searches a 2D lattice of cells for chemical reactions. Once a reaction is found, the search is repeated and continues until all infected cells are extinct. The boundary conditions are periodic, representative of a horizontal cylinder. The results show that the time of extinction and number of infected cells increases as the height of the lattice and a reaction rate increases. The narrower the reactor, the less cells needed to send the signal over some distance. The propagating front involves less molecules and the front will fail to propagate sooner. (Received August 30, 2018)