1014-Z1-1183 **Gretchen A. Koch*** (gretchen.koch@goucher.edu), Dept. of Mathematics and Computer Science, Goucher College, 1021 Dulaney Valley Road, Baltimore, MD 21204, and **Donald A. Drew**. *Two Models of Oscillating Polymer Chains in* E. coli. Preliminary report.

The bacteria *Escherichia coli* reproduces by dividing into two equal daughter cells. The placement of the division apparatus at midcell is accomplished through the work of the MinCDE system. Three proteins, MinC, MinD, and MinE work together to determine where the middle of the cell is. MinC and MinD combine to form polymer chains that extend from the end of the cell towards midcell, and MinE disassembles these chains. This assembly process followed by the disassembly of the chains leads to the chains oscillating between polar ends of the cell. The results of two models of this system will be presented. One is a Markov model that considers the behavior of the system in the average *E. coli* cell, and the other is a Monte Carlo model that simulates the MinCDE system in individual *E. coli* cells. The Markov model is a system of differential equations, continuous in time and discrete in space, that models how a single polymer chain changes. The Monte Carlo model simulates the growth and decay of multiple polymer chains that interact with each other. The results from both models have answered several questions, both mathematical and biological, while posing many more. (Received September 28, 2005)