1077-60-1191 **John K McSweeney*** (john.mcsweeney80@gmail.com), 1414 Inglis ave, Columbus, OH 43212, and **Lea Popovic**. *Effects of cell division on stochastic intracelluar chemical reaction systems.*

The classical theory of chemical reactions involves setting up systems of (deterministic) ODEs to describe the dynamics of the interacting species, an approach warranted by the fact that the number of molecules involved is typically very large. However, for certain biochemical processes such as gene expression, the numbers are small enough that the randomness inherent in chemical reaction processes can no longer be ignored. Randomness also arises during cell division due to the potentially unbalanced distribution of elements to each daughter cell. In this paper we set up a toy stochastic model to show how the reaction kinetics can interact with the division process to achieve stochastic bistable behavior - where the cell will, at random times, switch abruptly between two states where one chemical species or another is dominant. We exhibit two bistable behaviors that macroscopically loook similar, but have very different causes - one that is driven purely by noise, and the other by small amounts of bias present in the reactions. (Received September 19, 2011)