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**Simeone Marino\*** (simeonem@umich.edu), 1150 West Medical Center Drive, 6730 Medical Science Building 2, Ann Arbor, MI 48108, and **Ian B Hogue, Christian J Ray** and **Denise E Kirschner**. *A Methodology For Performing Global Uncertainty And Sensitivity Analysis In Systems Biology*.

Accuracy of results from mathematical and computer models of biological systems is often complicated by the presence of uncertainties in experimental data that are used to estimate parameter values. Current mathematical modeling approaches typically use either single-parameter or local sensitivity analyses. However, these methods do not accurately assess uncertainty and sensitivity in the system as, by default they hold all other parameters fixed at baseline values. Using techniques described within we demonstrate how a multi-dimensional parameter space can be studied globally so all uncertainties can be identified. Further, uncertainty and sensitivity analysis techniques can help to identify and ultimately control uncertainties. In this work we develop methods for applying existing analytical tools to perform analyses on a variety of mathematical and computer models. We compare two specific types of global sensitivity analysis indexes that have proven to be among the most robust and efficient. Through familiar and new examples of mathematical and computer models, we provide a complete methodology for performing these analyses, both in deterministic and stochastic settings, and propose novel techniques to handle problems encountered during this type of analyses. (Received September 16, 2008)