1060-37-2 **Konstantin Mischaikow*** (mischaik@math.rutgers.edu), Department of Mathematics, Rutgers, The State University of New Jersey, 110 Frelinghusen Rd, Piscataway, NJ 08854.

Computational Topology Applied to the Global Dynamics of Nonlinear Systems.

I will discuss new computational tools based on topological methods that extracts coarse, but rigorous, combinatorial descriptions of global dynamics of multiparameter nonlinear systems. These techniques are motivated by several observations which we claim can be addressed at least in part.

1. In many applications there are models for the dynamics, but specific parameters are unknown or not directly computable. To identify the parameters one needs to be able to match dynamics produced by the model against that which is observed experimentally.

2. It is well established that nonlinear dynamical systems can produce extremely complicated dynamics, e.g. chaos, that is not structurally stable. However experimental measurements are often too crude to identify such fine structure in the dynamics or to establish the parameter values to sufficient precision even at points that are structurally stable.

3. Often the models themselves are based on heuristics as opposed to being derived from first principles and thus the fine structure of the dynamics produced by the models may be of little interest for the applications in mind.

To make the above mentioned comments concrete I will describe the techniques in the context of a simple model arising in population biology. (Received March 25, 2010)