1096-92-911 **Heather A. Harrington***, Mathematical Institute, Radcliffe Observatory, Woodstock Road, Oxford, OX2 6GG, United Kingdom, and **Kenneth L. Ho**, **Nicolette Meshkat**, **Paul Kirk**, **Thomas Thorne** and **Michael P.H. Stumpf**. *A parameter-free framework for model discrimination using algebraic geometry, differential algebra, statistics and data.*

In many branches of science, one is often interested in the problem of model selection: given observed data and a set of candidate models for the process generating the data, which is the best? In this talk, I will present a procedure for deciding when a special class of polynomial dynamical systems (mass-action) is incompatible with observed data and may be useful for discarding a model framework that is not capable of producing observed behavior.

The key idea uses ideas from algebraic geometry to construct a transformation of the model variables such that any set of steady states of the model under that transformation lies on a common plane, irrespective of the values of the model parameters. This method is based only on model structure and is independent of kinetic parameter values, hence parameter-free. We demonstrate our method by applying it to protein signaling.

Finally, we present preliminary work that extends our method to include dynamics (i.e. time-course data), which relies on differential algebra elimination and Gaussian processes. This general framework complements conventional statistical methods in certain classes of problems, and furthermore, coplanarity can serve as a fast preprocessor for models before optimization. (Received September 11, 2013)