1056-92-1524 **Reinhard Laubenbacher*** (reinhard@vbi.vt.edu), Washington St. (0477), Blacksburg, VA 24061, and **David Murragarra**, Virginia Bioinformatics Institute, Washington St. (0477), Blacksburg, VA 24061. *Nested canalyzing polynomial dynamical systems.* Preliminary report.

Discrete models of biological networks are being used increasingly in the life sciences, in particular Boolean networks. Networks constructed using certain families of Boolean functions have played a special role, in particular so-called nested canalyzing functions. It has been shown that the class of these functions is an algebraic variety parametrized by binomials. It has been shown further that this class of functions is identical to the class of unate cascade functions, which have the property that they lead to binary decision diagrams with shortest average path length. This talk presents a generalization of the concept of nested canalyzing Boolean function to polynomials over arbitrary finite fields. It is shown that the class of nested canalyzing polynomials also forms a toric variety. Furthermore, experimental evidence is presented that dynamical systems constructed from nested canalyzing polynomials have very special dynamic properties. (Received September 22, 2009)