1056-14-2079 **Andrew Sommese*** (sommese@nd.edu), Department of Mathematics, University of Notre Dame, Notre Dame, IN 46556-4618. *Zebra Fish, Tumor Growth, and Algebraic Geometry.*

Problems of central importance in engineering and science often lead to systems of partial differential equations, for which the only hope of solution is to compute numerical solutions. Often the systems are intrinsically nonlinear with several solutions corresponding to the same set of physical conditions. Discretizations of such systems of differential equations often lead to large systems of polynomial equations whose solutions correspond to potential solutions of the system of differential equations. These naturally arising polynomial systems are well beyond the pale of systems previously investigated in numerical algebraic geometry.

This talk will describe some of the recent work of Wenrui Hao, Jonathan Hauenstein, Bei Hu, Yuan Liu, Yong-Tao Zhang, and myself in successfully solving such systems arising in pattern formation and tumor growth. (Received September 23, 2009)