1025-37-4   **Shouhong Wang*** (`showang@indiana.edu`), Department of Mathematics, Indiana University, Bloomington, IN 47405. *Stability and Bifurcations in Nonlinear Sciences.*

I shall present in this talk a new dynamical systems theory and its applications. This theory is based on a new notion of bifurcation called attractor bifurcation, together with strategies for central manifold reductions. With this theory, many long standing bifurcation problems in science and engineering are becoming accessible. To demonstrate the main ideas, the theory is presented with simple examples and with an application to the Taylor problem, which has become over the years a paradigm of instabilities, bifurcations, structure formation, and chaotic behavior in fluid dynamics as well as in physical systems in general. Applications to other problems including superconductivity, geophysical fluid dynamics, chemistry and biology will be briefly indicated as well. This is joint work with Tian Ma. (Received January 22, 2007)