THE UNIVERSITY OF TEXAS AT ARLINGTON

Department of Mathematics

Mathematics and Statistics Colloquium

Date/Time/Room: Friday (4/3/2009) at 2:30 p.m. in Room 304 PKH

Speaker: **Dr. Iuliana Oprea**, Associate Professor
Department of Mathematics, Colorado State University

Pattern formation and dynamics in dissipative systems

Abstract: Spontaneous formation of ripples on sand dunes, of spirals in chemical reactions and cardiac activity, or hexagons and rolls in the convective motion of a fluid are clearly very different phenomena. Despite this diversity, the patterns that appear display common features indicating similarity in fundamental mechanisms, thus some kind of universal underlying structure.

In the last decades the study of pattern formation and evolution in dissipative systems has grown into a truly interdisciplinary science, with impact in areas as diverse as biology, chemistry, fluid dynamics, social sciences, as well as new technologies and processes. Experimental and theoretical investigations of patterns are aimed at understanding the mechanisms involved in the formation and selection of patterns, their stability, temporal evolution and control.

In this talk we review the basic mathematical tools in analyzing the spontaneous formation and evolution of spatiotemporal structures in extended dissipative systems, from regular patterns to spatiotemporal chaos and intermittency, with examples from instabilities in fluids and vibrating granular media.

*Refreshments are served shortly after each presentation. Colloquia talks are 50 minutes long, followed by an open-forum discussion with faculty and graduate students.