RESEARCH INTERESTS

The most part of my scientific activity is devoted to the study of infinite-dimensional dissipative dynamical systems generated by partial differential equations of mathematical physics. The area of my scientific interests can be described as follows:

I) General theory:

1) dissipative dynamics in large and unbounded domains:

a) Quanitative and qualitative description of the complexity of spatio-temporal structure of trajectories;

b) pattern formation, spatial complexity and spatial chaos;

c) temporal evolution of spatially chaotic patterns and space-time chaos

d) Kolmogorov's entropy, multi-dimensional Bernouli schemes and relations with statistics and information theory.

2) Finite-dimensional reduction, invariant manifolds and estimates of the number of effective degrees of freedom.

3) Dynamics in spatially non-homogeneous media: homogenization and patterning.

4) Solitary waves, pulses, traveling fronts and other localized structures. Weak interaction in multi-pulse structures (see the research plan).

II) Applications:

1) reaction-diffusion and reaction-diffusion-drift problems in large domains;

2) phase-transition: various generalizations of Cahn-Hilliard and phase-field models, boundary and memory effects;

3) Porous-media equations and other degenerate problems;

4) Wave equations and nonlinear optics;

5) Hydrodynamics in large and unbounded domains.