KI-Net: Kinetic description of emerging challenges in multiscale problems of natural sciences
An NSF Research Network in Mathematical Sciences

Kinetic Descriptions of Chemical and Biological Systems: Models, Analysis and Numerics
March 23-25, 2017

Department of Mathematics, Iowa State University, Ames, IA

Organizers

James W. Evans	Iowa State University
Hailiang Liu	Iowa State University

Confirmed Participants

Aletheo Barbaro	Case Western Reserve University
Eli Ben-Naim	Los Alamos National Laboratory
Pierre Degond	Imperial College London
Seung-Yeal Ha	Seoul National University
Michael Herty	RWTH Aachen
Raymond Kapral	University of Toronto
Markos Katsoulakis	University of Massachusetts-Amherst
Yongki Lee	University of California, Riverside
Bo Li	University of California, San Diego
Jian-Guo Liu	Duke University
Robert Pego	Carnegie Mellon University
Christian Ringhofer	Arizona State University
Zhongming Wang	Florida International University
Hui Yu	RWTH Aachen

A limited number of openings are available.
To apply, complete the online application before **January 31, 2017**.

For more information and to apply:
www.ki-net.umd.edu

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Scientific Background

The scope of the conference is to review latest advances in the development of mathematical modeling approaches and numerical methods for kinetic descriptions of evolution in physical, chemical, and biological systems. Such evolution and often self-organization involves an interplay between non-linear interaction or reaction of the constituent "particles" and either convective or diffusive transport. Related phenomena include: front propagation and pattern formation in reaction-diffusion systems; phase transitions or bifurcations; competitive selection; aggregation; swarming and other non-conventional quasi-hydrodynamic behavior. There are many open issues in both mathematical analysis of those models and their numerical realization.

Goals

The aim of the conference is to provide an overview of current modeling strategies, of newly developed techniques of analysis, and of novel numerical methods to capture the complex behavior produced by the mathematical models. Some techniques used are related to classical kinetic theory and hydrodynamic treatments of fluids, and others to stochastic and non-equilibrium statistical mechanical models. The lectures aim to be accessible to graduate students, postdocs, and non-experts to familiarize them with central concepts and new directions in the field. Though the audience is expected to have a general mathematical background, knowledge of technical terminology and of recent findings is not assumed.

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