KI-Net: Kinetic description of emerging challenges in multiscale problems of natural sciences

An NSF Research Network in Mathematical Sciences

Collective dynamics in Biological and Social Systems

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Department of Mathematics
Duke University

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Scientific Background

The emergence of collective dynamics is a fascinating phenomenon which arises in different contexts of biological and social systems. Many such systems are modeled by transport equations such as Keller-Segel-based models for chemotactic phenomenon and Cucker-Smale model for flocking. Due to the complexity of these phenomena, transport equations might contain new mathematical difficulties (e.g non-conservative system, non-hypberbolic PDE) with many open questions for both numerical and analytical studies. Moreover, many of these systems are multiscale phenomenon (e.g. from individual cells to functional organs) leading to both microscopic and macroscopic descriptions. Kinetic equations play a key role in linking these scales.

Goals

This workshop is a followup of the meeting held at NCSU in 2013. It aims at bringing together researchers with diverse expertise on collective dynamics in biological and social systems, from experimentalists to applied mathematicians. Our goal is to stimulate interdisciplinary discussions on new developments, with a particular focus on comparing models, experimental data and numerical studies. A second line of discussions focuses on the new mathematical challenges raised by these models, e.g. link between micro and macro descriptions, complex traffic and network optimization and pattern formation.

A limited number of openings are available.
To apply, complete the online application before **September 15, 2015**.

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

KI-Net Hubs

Partial funding is also provided by: **Duke University**