



## **Models for collective behavior in animal groups**

Groups of organisms generate behaviors that seem to be vastly more than the sum of their parts. From ant colonies to flocks of birds to human societies, we would like to understand the emergence of these collective behaviors, their relation to the underlying mechanisms of individual behavior, and their evolutionary significance. These issues have been approached by scientists from many different disciplines, each asking different questions. For biologists, the mechanistic and evolutionary questions are paramount. For physicists, it is natural to ask if the emergence of collective animal behaviors is like the emergence of fluid flow from the microscopic interactions among molecules, or like emergence of order in a magnet. For engineers, interest centers on the minimal level of communication among the individuals required to achieve coordinate action, and the nature of the algorithms used in processing this information. As part of a six week program on emergent phenomena in biological systems, we will have an informal discussion in which all these points of view are represented.

**Tuesday, 15 February 2011**  
**Starting at 9:30 AM in Room 4412**

Participants will include

Andrea Cavagna, CNR & Faculty of Physics, Sapienza, Università di Roma  
Iain Couzin, Department of Ecology and Evolutionary Biology, Princeton University  
Irene Giardina, CNR & Faculty of Physics, Sapienza, Università di Roma  
Naomi Leonard, Department of Mechanical and Aerospace Engineering, Princeton University  
Guy Theraulaz, CNRS Center for Research in Animal Cognition, Toulouse  
John Toner, Department of Physics, University of Oregon  
Sebastian Weitz, LAPLACE, Université Paul Sabatier, Toulouse

We hope that others will join in as the day progresses. To encourage informality, we will start in a small venue with only a blackboard, and move as needed to accommodate the participants.

In addition to this informal discussion, on Friday, 18 February, John Toner will give a seminar intended for a more general physics audience: Hydrodynamic models of flocking and schooling, 10:30 AM - noon in the Science Center (4102).

Events are free and open to the scientific community, but we ask that you register by sending an email to [its@gc.cuny.edu](mailto:its@gc.cuny.edu). We particularly encourage participation by students and postdoctoral fellows, and some funds are available to help with travel and lodging. The Graduate Center of the City University of New York is located at 365 Fifth Ave., between 34th and 35th Streets, in Manhattan. For more information about ITS programs, see <http://web.gc.cuny.edu/its/>. Program supported in part by the Burroughs Wellcome Fund.