ADMISSION AND ACCOMMODATION

Applicants must contact CISM Secretariat at least one month before the beginning of the course. Application forms should be sent on-line through our web site: http://www.cism.it or by post.

A message of confirmation will be sent to accepted participants. If you need assistance for registration please contact our secretariat.

The 700.00 Euro registration fee includes a complimentary bag, four fixed menu buffet lunches (Friday not included), hot beverages, on-line/downloadable lecture notes and wi-fi internet access.

A limited number of participants from universities and research centres who are not supported by their own institutions can be offered board and/or lodging in a reasonably priced hotel. Requests should be sent to CISM Secretariat by May 9, 2012 along with the applicant’s curriculum and a letter of recommendation by the head of the department or a supervisor confirming that the institute cannot provide funding. Preference will be given to applicants from countries that sponsor CISM.

Information about travel and accommodation is available on our web site, or can be mailed upon request.

For further information please contact:

CISM
Palazzo del Torso
Piazza Garibaldi 18
33100 Udine (Italy)
tel. +39 0432 248511 (6 lines)
fax +39 0432 248550
e-mail: cism@cism.it
ANALYSIS, MODELLING AND SIMULATION OF COLLECTIVE DYNAMICS FROM BACTERIA TO CROWDS

The collective motion of individuals (correlated motion of ants or migration of bacteria, flocks of birds, just to mention a few) is a fascinating phenomenon capturing our attention. Besides the aesthetic aspects induced by such an expression of collective behavior, there are many crucial aspects of practical nature that attracted the interest of various scientific communities ranging from logistics, theoretical biology, and ecology to statistical physics and mathematics. On one hand, we wish to better understand, for instance, the formation of swimming patterns in large communities of fish to improve large scale fishing strategies. On the other hand, in congested flows, pedestrians display significantly different behaviors from those typical to situations when they are walking in free conditions. If panic situations occur, then small microscopic (individual-level) interactions can lead to disastrous macroscopic patterns (e.g. shock-like waves) leading to the jamming of a desired evacuation option or even to losses of human lives.

The aim of this school is to present, by means of 6 mini-courses, the state-of-the-art of the theoretical (statistical mechanics and mathematics) understanding of collective motions of crowds. The topics we include here are:

- Kinetic models for self-organized collective motion.
- Discrete and continuum dynamics of reacting and interacting individuals.
- Finite-speed propagation models of chemotactic movements.
- Modeling with measures: (i) Multiscale modeling of pedestrian motions by time-evolving measures; (ii) Motions and interactions in heterogeneous domains.
- Handling contacts in pedestrian dynamics: On the concept of pressure.
- Multiscale models in social (networks) applications, eventually combining mean-field and kinetic equations with either microscopic or macroscopic objects, are approaches of strongly increasing importance and high potential for future quantitative research. Typically, individual-based models need to be intelligently coarse-grained to translate the relevant microstructure information to a mesoscopic (Boltzmann-level) or to a macroscopic (continuum) level.

Relevant questions include: What is the natural scaling for the averaging? How much microstructure information needs to be kept to capture the specific individual-level interaction responsible for the formation and propagation of the macroscopically-observed pattern (for instance, lane formation in pedestrian counterflow). What are the main microscopic interactions responsible for the macroscopic cross-diffusion transport mechanism sometimes arising in pedestrian’s motion?

Within the frame of this school, we emphasize on one hand the rigorous mean-field derivation of chemo-tactic movements, e.g. Numerical simulations of generic collective motions as well as experimental findings and simulations of pedestrian flows hosting macroscopic patterns will be pointed out. The target audience of this summer school are graduate students, PhD candidates and young faculty members in mathematics, applied theoretical physics and biology, as well as (chemical, transportation, mechanical, ...) engineering having a strong research interest in understanding the multiscale complexity of the collective motion behavior. The participants are expected to have a good mathematical background. We hope that everybody will be willing to actively participate in both discussion and poster sessions.

PRELIMINARY SUGGESTED READINGS


Lectures

All lectures will be given in English. Lecture notes can be downloaded from CISM web site, instructions will be sent to accepted participants.

INVITED LECTURERS

José Antonio Carrillo de la Plata - Universitat Autònoma de Barcelona, Bellaterra, Spain
8 lectures on: Kinetic models for self-organized collective motion.

Charles R. Doering - University of Michigan, MI, USA
7 lectures on: Discrete and continuum dynamics of reacting and interacting individuals.

Adrian Muntean - Eindhoven University of Technology, The Netherlands
6 lectures on: Multiscale modeling of pedestrian motions by time-evolving measures.

Bertrand Maury - Université Paris Sud, France
6 lectures on: Handling congestion in population dynamics.

Roberto Natalini - IAC-CNR, Università di Roma "Tor Vergata", Italy
4 lectures on: Finite speed propagation models of chemotactic movements.
Application Form
(Please print or type)

Surname _________________________________________
Name  ___________________________________________
Affiliation ________________________________________
Address __________________________________________
_______________________________________________

E-mail __________________________________________
Phone ___________________ Fax______________________

Method of payment upon receipt of confirmation (Please check the box)

The fee of Euro 700,00 includes IVA/VAT tax and excludes bank charges

❏ I shall send a check of Euro _________________________________________

❏ Payment will be made to CISM - Bank Account N° 094570210900, VENETO BANCA - Udine (CAB 12300 - ABI 05035 - SWIFT/BIC VEBHIT2M - IBAN CODE IT46 N 05035 12300 09457 0210900).
   Copy of the receipt should be sent to the secretariat

❏ I shall pay at the registration counter with check, cash or VISA
   Credit Card (Mastercard/Eurocard, Visa, CartaSu)

IMPORTANT: CISM is obliged to present an invoice for the above sum. Please indicate to whom the invoice should be addressed.

Name ______________________________________________________________________________________________________
Address __________________________________________________________________________________________________
________________________________________________________________________________________________________________________________
________________________________________________________________________________________________________________________________
C.F.* ______________________________________________________________________________________________________
VAT/IVA* No. ______________________________________________________________________________________________

(*) Only for EU residents or foreigners with a permanent business activity in Italy.

Only for Italian Public Companies

❏ I ask for IVA exemption (ex law n. 537/1993 - art. 14 comma 10).

Privacy policy: I understand that data received via this form will be used only to provide information about CISM and its activities, within the limits set by the Italian legislative decree no. 196/2003 and subsequent amendments.
Complete information on CISM’s privacy policy is available at http://www.cism.it/courses/privacy_statement/

I have read the "Admission and Accommodation" terms and conditions and agree.

Date ___________________ Signature ___________________