



Hands-On Research in Complex Systems



Advanced Study Institute --- 17-29 June 2012

Shanghai Jiao Tong University (Shanghai, People's Republic of China)

Sponsored by *Abdus Salam International Centre for Theoretical Physics, the U.S. National Science Foundation, and Shanghai Jiao Tong University*

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This school will provide interactive experiences with hands-on research involving table-top experiments with computer data acquisition and computational modeling. The laboratory experiences, lectures, and modeling will focus on complex systems in the physical and life sciences. The faculty will be eminent scientists who have conducted frontier table-top research published in leading international scientific journals.

TOPICS AND FACULTY:

Neural Networks – mathematical modeling (D Cai, Shanghai Jiao Tong U)
Boolean Networks – network dynamics (DP Lathrop, U Maryland)
Animal Locomotion – video image analysis (DI Goldman, Georgia Tech)
Diffusion and Transport – tracking individual particles (E Weeks, Emory U)
Biological Tissue – mechanical oscillations (EM Schoetz, Princeton U)
Cell Migration – mechanisms from cell shapes (E Rericha, Vanderbilt U)
Granular Media – packing and forces (J Zhang, Shanghai Jiao Tong U)
Nonlinear Optics – dynamics and instabilities (R Roy, U Maryland)
Bifurcations & Chaos – electrical oscillators (A Sen, Inst. Plasma Res., India)
Synchronization – chemical oscillators (K Showalter, West Virginia U)
Arduino Microcontrollers – use in experiments (T Murphy, U Maryland)
Turbulence – flow analysis by imaging particles (M Schatz, Georgia Tech)
Fluid Instabilities – identification by spectral analysis (H Swinney, U Texas)
Modeling with MATLAB: dynamics and weather (BR Hunt, U Maryland)
Modeling with MATLAB: dynamics and fluid flows (B Storey, Olin College)
MATLAB and Molecular Dynamics (M Shattuck, City College of New York)

PARTICIPANTS:

The School is intended mainly for young scientists and advanced PhD students from developing countries, working in areas such as chemistry, physics, biology, mathematics, and engineering. The school will be conducted in English and will be open to scientists from all countries that are members of the United Nations, UNESCO, or IAEA

There is no registration fee, and lodging and meals will be provided for all participants. Travel support is available for participants who are nationals of developing countries and are currently working in their home country, but every effort should be made by applicants to secure travel support from their home institutions. Participants are required to take part in all aspects of the school for the entire duration. More information about the Hands-On Schools is at www.handsonresearch.org

DIRECTORS:

D Cai and HP Zhang
 (Shanghai Jiao Tong U),
 J Niemela (ICTP),
 R Roy (U Maryland),
 K Showalter (W Virginia U),
 HL Swinney (U Texas).

ASSOCIATE DIRECTORS:

M Schatz (Georgia Tech) and M Shattuck (City College--New York)

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National Organizing Committee:

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**APPLICATION
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 1 DECEMBER 2011**