



The Abdus Salam
International Centre for Theoretical Physics



*Advanced School on
Understanding Prediction of Earthquakes
and other Extreme Events in Complex Systems*

26 September - 8 October 2011
(Miramare - Trieste, Italy)

The Abdus Salam International Centre for Theoretical Physics (ICTP), Trieste, Italy, in collaboration with the Department of Geosciences of the University of Trieste, is organizing the "Advanced School on Understanding Prediction of Earthquakes and other Extreme Events in Complex Systems", to be held at ICTP, Trieste, from 26 September - 8 October 2011. It will be endorsed by the IUGG Commission on Geophysical Risk and Sustainability and the IASPEI.

Natural and socio-economic complex systems persistently generate rare extreme events – usually associated with critical transitions, disasters, crises etc. Predictive understanding of extreme events is regarded as one of the major unsolved problems of basic science. The School will cover a wide range of the recent developments in this field related to many complex systems such as the Earth lithosphere, the economy, a megacity, etc. and large earthquakes, economic recessions, episodes of a sharp increase in the unemployment rate, homicide surges in a megacity as extreme events. The results of these studies create new approaches to numerous applied problems, such as prediction of natural catastrophes and socio-economic crises, estimation of natural and social hazard and risk mitigation, etc. Special attention will be paid to possible ways of improving seismic hazard estimations by means of applying pattern recognition, multiscale analysis, and neodeterministic seismic hazard modelling which will implement the recommendations of the ICSU Program "Integrated Research on Disaster Risk" and resolutions of the ICSU ENHANS project on education and capacity building in developing countries in the area of extreme natural hazards.

Lectures will focus on the following specific topics.

- *Complex systems. Predictive understanding of extreme events in nature and society*
- *Physical models. Earth asymmetry and its relationship with plates motion. Effect of Earth's rotation and tidal despinning on plate tectonics*
- *Numerical models and methods. Inverse problems in modelling the Earth dynamics. Modelling of block-and-fault system dynamics*
- *Exploratory data analyses of earthquake catalogues and time series of indexes describing complex systems*
- *Pattern recognition*
- *Earthquake prediction*
- *Prediction algorithms applied to extreme events in socio-economic complex systems*

Several hours will be dedicated each day for computer exercises, which will engage students into processing real data and encourage them to use their own data. The topics of such exercises will include:

- *analysis of time series;*
- *modelling of block-and-fault structure dynamics and seismicity;*
- *application of pattern recognition algorithms for data analysis;*
- *application of earthquake prediction algorithms and algorithms for prediction of socio-economic extreme events.*

The students will be encouraged to prepare poster presentations of their recent results related to the School content.

PARTICIPATION

Scientists and students from all countries which are members of the United Nations, UNESCO or IAEA may attend. The School will be conducted in English therefore participants must have an adequate working knowledge. Although the main purpose of the Centre is to help research workers from developing countries, through a programme of training activities within a framework of international cooperation, a limited number of students and post-doctoral scientists from developed countries are also welcome to attend. A degree in Physics, Mathematics, Geophysics (theoretical or computational), Computer Science and/or similar disciplines is required.

As a rule, travel and daily subsistence expenses of participants are borne by their home institutions; limited funds are, however, available for those participants, who are nationals of, and working in a developing country, and who are not more than 45 years old – this support is available only to those attending the entire activity. Every effort should be made by candidates to secure support for their travel fare (or at least part of the fare). There is no registration fee to be paid.

REQUEST FOR PARTICIPATION

The application form can be accessed at the activity website <http://agenda.ictp.it/smr.php?2265>
Once in the website, comprehensive instructions will guide you step-by-step, on how to fill out and submit the application form before 28 May 2011.

ACTIVITY SECRETARIAT:

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Earthquake Prediction

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DEADLINE
for requesting participation

28 May 2011