The Abdus Salam
International Centre for Theoretical Physics

Advanced School on Non-linear Dynamics and Earthquake Prediction

28 September - 10 October 2009

(Miramare - Trieste, Italy)

The Abdus Salam International Centre for Theoretical Physics (ICTP), in collaboration with the Department of Earth Sciences of the University of Trieste, will organize an Advanced School on Non-linear Dynamics and Earthquake Prediction. The School will take place from ***28 September - 10 October 2009.*** It will be endorsed by the IUGG Commission on Geophysical Risk and Sustainability and by the IASPEI Commission on Earthquake Hazard, Risk and Strong Motion, which will be represented by their members.

The School will cover some developments of the last years in fundamental studies of the evolution and dynamics of the Earth lithosphere and its instability based on considering the Earth lithosphere as a hierarchical non-linear dissipative system. These studies create approaches to numerous applied problems, such as earthquake prediction, estimation of seismic hazard and risk mitigation, prospecting for mineral resources, etc. The School will use the experience of the Workshops organized by the Trieste Science Centres (Italy) in 1983, 1988, 1991, 1993, 1995, 1997, 1999, 2001, 2003, 2005, 2007, CERESIS (Lima, Peru, 1986), and IDEA (Caracas, Venezuela, 1991), IIEES (Tehran, Iran, 2006), and NCP (Islamabad, Pakistan, 2006).

Lectures by distinguished leaders in different disciplines will focus on the following specific topics:

- The lithosphere as a complex system. Paradigms in prediction of extreme events in complex systems. Similarity and differences in sequences of earthquakes, solar flares, and starquakes. Premonitory transformation of scaling in complex processes. Scaling laws in seismicity.
- Numerical models. Modelling of block-and-fault system dynamics: basic principles and applications. Inverse problems and data assimilation in non-linear Earth sciences.
- Analysis of seismic data. Measuring variability of an earthquake sequence. Earthquake catalogues for intermediate-term predictions and seismic hazard analysis.
- Earthquake prediction. Problem and practical solutions. Algorithms. Verification problem. Accuracy and limitations. Premonitory long-range activation of seismicity: earthquake chains. Real-time earthquake prediction experiments. Prediction of a subsequent strong earthquake. Precursory activity: a physical approach.
- Pattern recognition. Algorithms. Testing reliability of classification results. Application to earthquake prediction problems. Application to exploratory data analysis of complex systems other than the lithosphere.

Several hours will be spent every day for computer exercises, which will engage students into processing real data and encourage using their own data. The topics of such exercises will include:

- analysis of earthquake catalogues;
- modelling of block-and-fault structure dynamics and seismicity on a regional scale;
- application of pattern recognition algorithms for data analysis;
- application of earthquake prediction algorithms to earthquake catalogues for diagnosis of premonitory phenomena.

The students will be encouraged to make 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. As it will be conducted in English, participants should have an adequate working knowledge of that language. 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 subsistence expenses of the participants should be borne by the home institution. Every effort should be made by candidates to secure support for their fare (or at least half-fare). However, limited funds are available for some participants who are nationals of, and working in, a developing country, and who are not more than 45 years old. Such support is available only for those who attend the entire activity. There is no registration fee.

Request for Participation

The application form can be accessed at the activity website **http://agenda.ictp.it/smr.php?2060**
Once in the website, comprehensive instructions will guide you step-by-step, on how to fill out and submit the application form.

ACTIVITY SECRETARIAT: Telephone: +39-040-2240-355 Telefax: +39-040-2240-585

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Earthquake Prediction

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Deadline for:

requesting participation

28 May 2009