

Workshop and Conference on Recent Trends in Nonlinear Variational Problems

22 April – 9 May 2003
Miramare, Trieste, Italy

The Abdus Salam International Centre for Theoretical Physics (ICTP) is organizing a **Workshop and Conference on Recent Trends in Nonlinear Variational Problems** from 22 April to 9 May 2003. It will be directed by A. Ambrosetti (SISSA, Trieste, Italy), H. Brézis (Université Paris 6, France/Rutgers, U.S.A.) and S.Y.A. Chang (Princeton University, U.S.A.).

In the last ten years there have been great advances in nonlinear variational problems. In particular, very important achievements have been obtained in fields like semilinear and fully nonlinear equations arising in conformal geometry, biharmonic maps, nonlinear Schrödinger equations and their semiclassical limits, Ginzburg-Landau vortex theory, concentration phenomena, topology and Sobolev spaces, variational problems with lack of compactness.

These topics have strong inter-connections and the purpose of this activity is to present them in a unified frame.

The first two weeks will be devoted to several courses and mini-courses.

In the former the following 5-hour courses will be delivered:

- **Critical Point Theory**
Mountain pass and linking theorems
Lack of compactness and the concentration compactness method
Critical exponents, blow up analysis
- **Topology and Sobolev spaces**
Degree theory for VMO-maps
Lifting of S^1 -valued maps
Topological structure of spaces of Sobolev maps between manifolds
- **Selected topics in Differential Geometry**
Introduction to Riemannian Geometry
Sobolev spaces on manifolds
Scalar curvature and the Yamabe problem

The meeting is addressed to people who are currently engaged in research in these topics. However, the first 3 courses will be of an introductory nature and are intended to provide the participants with a common background.

In the second week there will be several 3-hour **mini-courses**. The following topics will be covered:

- *Fully nonlinear equations in conformal geometry; Ricci curvature.*
- *Biharmonic maps: regularity and existence results.*
- *Higher order equations arising in differential geometry, Q-curvatures, Kleinian groups.*
- *Nonlinear Schrödinger equations: bound states and semiclassical limits.*
- *Concentrating solutions in nonlinear elliptic problems.*
- *Ginzburg-Landau theory: Vorticity and critical fields.*
- *Homotopy and Sobolev spaces.*

The scope of these mini-courses is to present the state-of-the-art of the above topics bringing the participants to the core of the current research.

All the lecturers will be outstanding experts who are known world-wide as leaders in the research on the above topics.

The final **third week** will be devoted to a top-level **Conference** where current research and the latest achievements in the above theories will be discussed. The invited speakers will include some of the best experts in the field as well as brilliant young researchers. They will provide the participants with the most recent and most interesting perspectives for future research.

Mathematicians from all countries that are members of the United Nations, UNESCO or IAEA may attend the activity. Although the main purpose of the ICTP is to help researchers from developing nations through a programme of training activities within a framework of international cooperation, scientists from developed countries are also encouraged to attend. As the activity will be conducted in English, participants must have a good working knowledge of that language. Participants should have completed some years of study after a first degree.

As a rule, travel and subsistence expenses of the participants are borne by the home institution. However, limited funds are available for some participants from, and working in, developing countries, to be selected by the organizers. Such financial support is available only for those who attend the entire activity. Every effort should be made by candidates to secure support for their fare (or at least half of their fare) from their home country. There is no registration fee for participation in the activity.

The **closing date** for submitting requests for participation is **15 November 2002**. The decision of the organizers will be communicated to all candidates as soon as possible thereafter.

The **Application Form** is obtainable from the address below, or via the ICTP WWW server: <http://agenda.ictp.trieste.it/smr.php?1486>. It should be completed, signed and mailed to:

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DEADLINE

15 November 2002