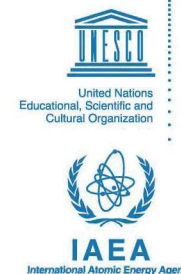




The Abdus Salam  
International Centre for Theoretical Physics



## Advanced School on Complexity, Adaptation and Emergence in Marine Ecosystems

18 - 27 October 2010

(Miramare - Trieste, Italy)

The Abdus Salam International Centre for Theoretical Physics is organizing an *Advanced School on Complexity, Adaptation and Emergence in Marine Ecosystems* to be held at ICTP, Trieste, Italy from 18 to 27 October 2010.

Marine ecosystems are currently under considerable stress from a number of factors including climate change, invasive species, and exploitation. These factors are potentially able to alter the structure, functioning and stability of ecosystems. The response of ecosystems to increasing pressures is difficult to predict because of the high non-linearity and adaptive capabilities of ecosystems.

The advanced school focuses on concepts and techniques from the studies of complexity, dynamic systems, and stochastic calculus together with game theory, behavioural and evolutionary ecology in order to take into account adaptation and evolutionary constraints at the level of individual organisms. The aim of this approach is to understand the emergent properties of marine ecosystems (their productivity, biodiversity, stability, resilience, susceptibility to regime shifts) in the face of changing physical and biotic environmental factors which affect individual behavior. Plankton is taken as key species since it is at the base of all marine food webs and it is among the most studied marine organisms by both experimentalists and modelers. Plankton communities also offer a straightforward conceptual framework for understanding trophic interactions in complex food webs.

The course will be organized along the following main scientific subjects:

1. Individual based ecology of plankton
  - 1.1. Mechanistic interactions
  - 1.2. Fitness and rational behaviour
  - 1.3. Game theory
2. Scaling up to ecosystems
  - 2.1. Dynamic systems with adaptive behaviour
  - 2.2. Stochastic processes
  - 2.3. Trait based models
  - 2.4. Ecosystems and complexity

Scientific subjects will be organized in 1) tutorial and introductory lectures, 2) working-groups session, with laboratory activities on numerical models and 3) open discussion session, to identify specific applications on related topics. A final session will report on the progress of working groups on specific projects.

### Participation

Applicants from all countries that are members of the United Nations, UNESCO or IAEA may attend. As the School will be conducted in English, participants should have an adequate working knowledge of this 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.

As a rule, travel and subsistence expenses of the participants should be borne by their home institutions. 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 to those attending the entire activity. *There is no registration fee.*

### HOW TO APPLY FOR PARTICIPATION

The Online Application can be accessed at the activity website: <http://agenda.ictp.it/smr.php?2170>. Comprehensive instructions will guide you step-by-step on how to fill out and submit the application form. Kindly send all file attachments in Word or Acrobat format.

*Secretariat: Ms. Rosa del Rio (smr 2170)*

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Co-sponsored by



### Organizers

*Andre Visser (DTU-Aqua)*  
*Cosimo Solidoro (OGS)*  
*Uffe Thygesen (DTU-Aqua)*  
*Patrizio Mariani (DTU-Aqua)*

### Local Organizer

*Matteo Marsili (ICTP)*

### Lecturers include

*Ken Andersen (DTU-Aqua)*  
*Jorn Bruggeman (St John's College)*  
*Øyvind Fiksen (Univ. Bergen)*  
*Volker Grimm (UFZ)*  
*Daniel Grünbaum (Univ. Washington)*  
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*Andre Visser (DTU-Aqua)*

Application  
**DEADLINE**

**31 May 2010**