The Abdus Salam International Centre for Theoretical Physics
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United Nations Educational, Scientific and Cultural Organization

IAEA International Atomic Energy Agency

ICTS International Centre for Theoretical Sciences
TATA INSTITUTE OF FUNDAMENTAL RESEARCH

# ICTP-ICTS Programme in Biology
# Winter School on Quantitative Systems Biology
# 9 - 20 December 2013

## IISc Campus, Bangalore, India

The International Centre for Theoretical Sciences (ICTS) and the Abdus Salam International Centre for Theoretical Physics (ICTP), are organizing a Winter School on Quantitative Systems Biology from 9 to 20 December 2013, as part of the ICTP - ICTS Programme in Biology. The School will be hosted in the Indian Institute of Science (IISc) campus, as a part of the IISc-ICTS Joint Programme.

Biology is undergoing a revolution. Advances in experimental techniques are providing data of unprecedented quality and detail on the mechanisms that operate in living systems, at scales ranging from molecules and molecular networks, to organisms, populations and ecosystems. It is clear that new theoretical and mathematical approaches are required if we are to learn from this flood of data. In response to this need, a large number of researchers from mathematics, physics and engineering are increasingly interested in biological problems. Biology, however, presents high barriers to entry because of the sheer breadth of biological phenomena, the rapid progress of the field, and a language of scientific discourse that are often inaccessible to the outsider. The ICTP-ICTS Programme in Biology is meant to fill this gap. The first event organized under this banner will be the Winter School in Quantitative Systems Biology 2013. This school will build on the extremely successful Winter School in Quantitative Systems Biology hosted by the ICTP in Trieste in November 2012.

The Winter School will build on the shared experience of both ICTP and ICTS. Targeting young researchers, particularly those at the PhD and post-doctoral level with quantitative backgrounds, the School will give participants a broad introduction to open problems in modern biology, and provide pedagogical instruction on new quantitative approaches being used to address those problems. Lectures by internationally-recognized leaders in the field will be supplemented by tutorials on basic topics, and hands-on sessions designed to extend the pedagogical material.

The ICTP – ICTS Winter School will deal with Quantitative Systems Biology, defined broadly as an approach to biology that seeks to bridge the divide between molecular detail and system- and organism-level behaviour. One of the main messages of the School will be to point out the essential coherence of approaches used across Quantitative Systems Biology.

Specific topics to be discussed in 2013 include: fundamental limits of biological organization at the molecular and cellular level; spatial organization of chemistry and mechanics at the cell and organism levels. There will be special emphasis on the design of biological experiments and the relationship of theory to empirical data.

**PARTICIPATION:**
Scientists and students from all countries that are members of the United Nations, UNESCO or IAEA may attend the School. Researchers working in developing countries are particularly encouraged to apply. As it will be conducted in English, participants should have an adequate working knowledge of this language. The subsistence expenses of all selected out-station participants will be borne by the School. As a rule, travel expenses of the participants should be borne by the home institution. Every effort should be made by the candidates to secure support for their fare (or at least half-fare). However, limited funds are available for some participants. Selected participants are expected to attend the entire activity. There is no registration fee.

**HOW TO APPLY FOR PARTICIPATION**

The application form can be accessed at the ICTS activity website
http://www.icts.res.in/program/QSB2013/

Deadline for requesting participation: 15 August 2013

**Activity Secretariat**

e-mail: qsb2013@icts.res.in

ICTS Home Page: www.icts.res.in/home/
ICTP Home Page: www.ictp.it

**ORGANIZING COMMITTEE**

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**CONFIRMED LECTURERS**

**William Bialek (Princeton)**

**Edward C. Cox (Princeton)**

**Eytan Domany (Weizmann Institute)**

**Arthur Lander (University of California, Irvine)**

**Stanislas Leibler (Rockefeller)**

**Rob Phillips (Caltech)**

**Boris Shraiman (KITP Santa Barbara)**

**Massimo Vergassola (Institut Pasteur)**

**DEADLINE for requesting participation**

**15 August 2013**