The Abdus Salam
International Centre for Theoretical Physics

United Nations Educational, Scientific and Cultural Organization

IAEA International Atomic Energy Agency

WINTER COLLEGE on OPTICS in IMAGING SCIENCE

31 January - 11 February 2011

Miramare - Trieste, Italy

Co-Sponsored by:

The Abdus Salam International Centre for Theoretical Physics (ICTP), in collaboration with the International Commission for Optics (ICO), the Optical Society of America (OSA), the International Society for Optics and Photonics (SPIE), the European Optical Society (EOS), the Società Italiana di Ottica e Fotonica (SIOF), the US National Academy of Science (NAS), the Photonics Society (IEEE) and the Central European Initiative (CEI) will organize a **Winter College on Optics in Imaging Science**, which will be held at ICTP, Trieste, Italy, from **31 January** to **11 February, 2011**.

DIRECTORS: **Prof. William T. Rhodes** (Florida Atlantic University, USA)
Prof. Jorge Ojeda-Castañeda (Universidad de Guanajuato, Mexico)
Prof. Gianluca Valentini (Politecnico di Milano, Italy)

LOCAL ORGANIZERS: **Joe Niemela** (ICTP, Italy), **M. Danailov** (Elettra, Trieste)

Optical imaging science has seen enormous advances during the past two decades. Nonlinear (e.g., two-photon) methods are yielding resolutions in microscopy that are well beyond the normal diffraction limit. Digital holographic microscopy, facilitated by the availability of inexpensive digital cameras, is promoting the development of novel techniques in the imaging of biological specimens. The mobile phone industry is funding research on amazing "computational" imaging techniques that rely on an array of tiny cameras to perform the function of a much larger single camera—and more. Earth-based telescopes are producing images comparable to those obtained by the Hubble telescope because of new methods for imaging through atmospheric turbulence. The 2011 Winter College on Optics will bring together a group of outstanding researchers who will lecture on these and other important areas of development in imaging science.

MAIN TOPICS

- New developments in ultra-high-resolution microscopy
- 3-D imaging: sensors, methods, measurements, and physical limitations
- Imaging and numerical modeling, analysis, and processing
- Recent developments in the use of diffractive optical elements in imaging systems
- Computational imaging: A new paradigm in imaging
- Combining pre- and post-detection processing to improve imaging system performance
- Imaging through turbulence: lucky imaging, aperture masking, Fourier telescopy
- Adaptive components in imaging systems

An ICTP **PREPARATORY SCHOOL** will be organized the week before the College (from **24** to **28 January 2011**) for a limited number of selected participants. The Preparatory School will provide background tutorials and exercises in the areas of geometrical optics and Fourier optics, along with an introduction to Wigner optics, all subjects that are relevant to the subsequent College lectures.

The **LAMP** (Laser, Atomic and Molecular Physics) program is intended for presentations by the participants. All participants are encouraged to present their own research, either in poster form or as an oral presentation, and the program will be finalized sufficiently prior to the start of the College.

PARTICIPATION

Scientists and students from all countries that are members of the United Nations, UNESCO or IAEA may attend the Workshop. As it 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 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. Such support is available only for those who attend the entire activity. There is no registration fee.

HOW TO APPLY

The application form can be accessed at the activity website: **http://cdsagenda5.ictp.trieste.it/full_display.php?ida=a10126**
Once in the website, comprehensive instructions will guide you step-by-step, on how to fill out and submit the application form.

Secretariat: *e-mail: smr2223@ictp.it; phone: +39-040-2240-544; fax: +39-040-2240-575*

College's web page: **http://cdsagenda5.ictp.trieste.it/full_display.php?ida=a10126** *ICTP Home Page: www.ictp.it*

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International Commission for Optics
Commission Internationale d'Optique

OSA Optical Society of America

SPIE

EOS European Optical Society — Coherence for Europe ®

SIOF Società Italiana di Ottica e Fotonica

National Academy of Sciences
The National Academies

IEEE photonics Society

CEI Central European Initiative

DEADLINE for Requesting Funds
1 October 2010