International Light Sciences

June 20-24, 2016

Santander, Spain

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International School on Light Sciences and Technologies, ISLiST
June 20-24, 2016, Santander, Spain

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SUMMARY

Photonics is the science and techniques of generating, controlling, propagating, storing and detecting light waves and photons, which are particles of light. Photonics is the field of Light Sciences and Technologies.

Light plays a vital role in our daily lives and is being an imperative cross-cutting discipline of science in the 21st century. It has revolutionized medicine, opened up international communication via the internet, enabled sustainable development and provided solutions to global challenges in education, energy, environment and agriculture. It continues to be a key discipline to link cultural, economic and political aspects of the global society. Today, it is widely accepted that the present century will depend as much on photonics as the 20th century depended on electronics.

The United Nations Organization (UN) has recognized the key role of Light Sciences and Technologies to raise global awareness and proclaimed 2015 as the International Year of Light and Light-based Technologies (IYL 2015).

Aware of the key roll of Photonics in the economies and in the societies of the XXI century, the UIMP has decided to create the “International School on light Sciences and Technologies (ISLiST)”.

This school is envisioned to be a worldwide top International forum (every fourth week of June) on Light Sciences and Technologies in the framework of a “special top university” that is recognized as the “university of universities” and in a privileged environment “the Royal Magdalena Palace” in Santander, Cantabria, Spain. Each edition of this international school will have an intensification or main core in a specific application area and additional current hot topics. Light in Life Science and Health is the core of this edition.

ISLIST has been conceived as a great opportunity to review and actualize knowledge in this Key or Essential science and technology for the development of the nations and also to contribute to the education of their citizens. It is also a great opportunity to ensure that policymakers, entrepreneurs, and other key “actors” will be aware of the problem-solving potential of Photonics.

Highly renowned professors (including a Nobel Laureate) and researchers from the most prestigious institutions and, as well, presidents of the most reputed international Photonic Scientific Unions and some politicians will participate currently in the meeting.

The award ceremony of Justiniano Casas Prize for Research into Optical Imaging will be held at the end of afternoon of the second day (June 21). This prestigious award of The Spanish Optical Society Committee for Image Techniques, is sponsored by INFAIMON S.L.

In this edition, the UIMP has distinguished Prof. Russell with Its Doctor Honoris Causa. This prestigious honor will be given at a solemn ceremony to be held in the Royal Hall of the Palace of Magdalena at the end of the 23rd morning.

To be able to reach this ambitious program this International School of UIMP has been supported by several sponsors: Gobierno de Cantabria, Fundación ACS and the Optical Society of America, OSA.

It is also supported by several collaborators such as: SPIE-the International Society for Optics and Photonics, the Official College of Physicians of Cantabria, the Royal Society of Physics of Spain, RSFE; the Spanish Optical Society, SEDOPTICA, AMBAR Telecommunications, OZ Optics, Lasing, INNOVA Scientific. It is also supported by Hotel Santemar and Photonics and the Photonics Engineering Group of the University of Cantabria.

Without these Sponsors and Collaborators this top quality school and the grants for international students will not be able possible. The UIMP, the direction of the event and the scientific community using Light are grateful with the generosity of these Organizations.
Objectives

To actualize and improve the knowledge of scientists, professionals and technicians; to contribute in the education and to enhance the motivation of PhD students; to offer an ideal frame for networking. It is also a great opportunity to ensure that policymakers, politicians and the citizens in general terms will be made aware of the problem-solving potential of Photonics.

Overview

The event will be developed from Monday (June 20, 2016) to Friday (June 24, 2016). The first two and half days will be focused on key subjects concerning the light in medicine and their impacts. The rest of the week will be focused on the review of the current situation and to identify challenges and trends in several key areas where Photonics will play roles of paramount importance. Two round-tables will be considered. The first one (Wednesday morning) to analyse challenges of the light technologies on some main areas of medicine and, the second one (Friday), to analyse the needs to reach an efficient and effective transference of the created knowledge and technology for they societal and comercial exploitation.
# General Schedule

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<td>9:30</td>
<td>Prof. Ntziachristos</td>
<td>Dr. Nadal</td>
<td>Prof. Andre Geim</td>
<td>Dr. Lieberman</td>
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<td>11:00</td>
<td>Prof. Russel</td>
<td>Prof. Pogue</td>
<td>Round Table I</td>
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<td>12:10</td>
<td>Prof. López-Higuera</td>
<td>Prof. Popp</td>
<td>12:00 Prof. Philip Russell</td>
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<td>Prof. Ozcan</td>
<td>Prof. Durduran</td>
<td>Prof. Bañares</td>
<td>Prof. Palleschi</td>
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<td>UCLA USA</td>
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<td>16:40</td>
<td>Prof. Seok-Hyun</td>
<td>Prof. Marcos</td>
<td>Prof. Poumellec</td>
<td>Prof. Andrés</td>
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<td>Harvard University USA</td>
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<td>17:55</td>
<td>Justiniano Casas Prize</td>
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<td>21:00</td>
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<td>Flamenco Show (Tentative)</td>
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Monday, 20

Why light matters for medicine and health?

10:15 H
Opening Ceremony

10:40 H: Break

11:00 H / Opening Talk
The Multi-Faceted World of Photonic Crystal Fibres
Prof. Philip Russell,
OSA Past President, Director of Max Planck Institute for the Science of Light, University Erlangen-Nuremberg, Germany

11:30 H / Opening Talk
Light in Life Sciences and Health
Prof. José Miguel López-Higuera,
Head of Photonic Engineering Group, Universidad de Cantabria, Porto, Portugal.

13:30-15:00 / Lunch Time

Evening
15:30 H / Keynote
Democratization of Next-Generation Imaging, Sensing and Diagnostics Tools through Computational Photonics
Prof. Aydogan Ozcan,
Director Bio&Nano-Photonics Laboratory, Chancellor’s Professor, of California, Los Angeles, USA.

16:40 H / Keynote
Biological and Intracellular microlasers and their applications in medicine
Prof. Seok-Hyun,
Director of The Bio-Optics Lab. Harvard Medical School and faculty member at MIT, MA, Boston, USA.
Tuesday, 21

Morning: **Light in medicine and health care**

9:30 H / Keynote

**Clinical Optoacoustic and Fluorescent Imaging**
Prof. Vasilis Ntziachristos,
Director of Institute for Biological and Medical Imaging at the Helmholtz Zentrum München, Munich, Germany.

10:40 H: Break

11:00 H / Keynote

**Light in cancer management: Surgery, Medicine & Radiation Oncology**
Prof. Brian Pogue
Director of Center for Integrating Innovations in Imaging for Intervention (I4) Medicine, Dartmouth, USA.

12:10 H / Keynote

**Biophotonics – a powerful tool for clinical diagnostics**
Prof. Jürgen Popp
Director of Leibniz Institute of Photonic Technology; Institute of Physical Chemistry & Abbe-Center of Photonics, Friedrich Schiller University, Jena, Germany.

13:30-15:00 / Lunch Time

Evening: **Light in medicine and health care**

15:30 H

**Using diffuse light and speckle statistics to non-invasively measure blood flow; from theoretical foundations to clinical applications**
Prof. Turgut Durduran,
Head of the Medical Optics Group, Instituto de Ciencias Fotónicas, ICFO, Barcelona, Spain.

16:40 H

**Understanding, diagnosis and corrections of the eye using Light**
Prof. Susana Marcos
Director of Visual Optics and Biophotonics Lab, Instituto de Optica, Professor of Research, CSIC, Madrid, Spain.

17:55H Special Event

**Justiniano Casas Prize Ceremony**
The prize tries to stimulate research activity from its origins, in the framework of doctorate studies, and to foster the incorporation of new researchers in this field. This Prize of the Spanish Optical Society Committee for Image Techniques is Sponsored by INFAIMON SL.
Wednesday, 22

Morning: Light in medicine and health care

9:30 H
And the blind went back to see the light!
Dr. Jerónimo Nadal,
Director of Department of Vitreo-Retina and Macula unit of the Barraquer Ophthalmology Centre, Barcelona, Spain.

10:40 H: Break

11:00H

Round Table I: Light on Life Sciences and Health Challenges

- Prof. Aydogan Ozcan, Director Bio&Nano-Photonics Laboratory, Chancellor’s Professor University of California, Los Angeles, USA
  Challenges on photonics based telemedicine technologies toward next generation smart global health systems

- Prof. Vasilis Ntziachristos, Director Institute for Biological and Medical Imaging at the Helmholtz Zentrum München, Munich, Germany
  Challenges on Drug-Based Optical Agents: Infiltrating Clinics at Lower Risk

- Prof. Brian Pogue, Director of Center for Integrating Innovations in Imaging for Intervention (I4) Medicine, Dartmouth, USA
  Challenges on Light in neuro surgery and Photodynamic therapy to go to the real world

- Prof. Jürgen Popp, Director Leibniz Institute of Photonic Technology; Inst. of Physical Chemistry, Friedrich Schiller University, Jena, Germany
  Challenges on Endoscopic techniques for efficient and safe use into the clinical environment

13:30-15:00 / Lunch Time

Evening: Light in chemistry and materials processing

15:30 H
Dynamic Monitoring of the Chemical Bond using Ultrafast Lasers
Prof. Luis Bañares
Director of Center for Ultrafast Lasers University Complutense of Madrid, Spain

16:40 H
Three Dimensional Writing and Material Functionalization by laser: Science and Technology
Prof. Bertrand Poumellec
Director of Research ICMMO, University Paris-sud in University Paris-Saclay, France.
Thursday, 23

Morning: Light in Advanced Materials

9:30 H Keynote

Graphene, other atomically thin crystals and beyond
Prof. Andre Geim,
2010 Nobel Prize Regius and Royal Society Research Professor, Centre for Mesoscience and Nanotechnology, University of Manchester, UK.

10:35 H: Break

10:50 H

Plastic Optical Fibers in Medicine and Communications: New generation and trends
Prof. Yasuhiro Koike,
Director of Keio Photonics Research Institute, Keio University, Japan.

12:00 H: Exceptional Event

Doctor Honoris Causa Solemn Ceremony
UIMP will confer the Doctor Honoris Causa distinction to Prof. Philip Russell by unanimous agreement of its Governing Council, who wanted to recognize his relevant contributions to the Sciences and Technologies of Light.

13:30-15:00 / Lunch Time

Evening: Light in integrated optics and Cultural Heritage

15:30 H

Light in Cultural Heritage
Prof. Vicenzo Palleschi,
Head of the Laboratory of Applied and Laser Spectroscopy of the Institute of Chemistry of Organometallic Compounds, National Research Council and Professor at University of Pisa, Italy

16:40 H

Imaging through turbid media by single-pixel detection.
Prof. Pedro Andrés
Head of the Imaging and Photonics Group, Universidad de Valencia, Spain.
Friday, 24

Evening: Knowledge Transference

9:30 H
The National Photonics Initiative
Dr. R. Lieberman,
2016 SPIE President President of Lumoptics LLC, California, USA

10:00 H
The Miracle of the Start-up Nation
Dra. Shirley Kutner,
Founder of BioJerusalem, Senior Strategic Consultant, Biotech/Biomed, Israel.

10:30 H: Break

10:45 H:
Round Table II: Knowledge and Technique Transference

Prof. Andre Geim, 2010 Nobel Prize, Regius and Royal Society Research Professor, University of Manchester, UK.
From the groundbreaking works to the real world applications

Dr. R. Lieberman, 2016 SPIE President, President of Lumoptics LLC, California, United States
SPIE actions to promote and to the Transference and exploitation of Knowledge & Technology

Prof. Yasuhiro Koike, Director, Keio Photonics Research Institute, Keio University, Japan
Insights for the success gained from Koike start-ups.

Prof. Javier Martí, Director, Nanophotonic Technology Centre, Universidad Politécnica de Valencia, Spain.
Key topics for commercialization of Integrated optics based devices and systems

Dr. Shirley Kutner, Founder of BioJerusalem, Senior Strategic Consultant, Biotech/Biomed, Israel.
Insights from the success gained from BioJerusalem adventure

Prof. JM López-Higuera, Director ISLiST, Moderator

12:45 H
Diplomas Presentation

13:00 H
Closing Remarks