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NATO
ADVANCED STUDY INSTITUTE
International Summer School

Саратовский государственный университет
Saratov State University
OBP International Institute of Optics & Biophotonics

University of Toronto
Ontario Cancer Institute
University Health Network

BIOPHOTONICS:
From Fundamental Principles to Health, Environment, Security and Defence Applications

September 29-October 10, 2004, Ottawa, Ontario, Canada

Organized by: **Vitesse Re-Skilling ä Canada Inc.**
Ontario Cancer Institute / University of Toronto, Canada
Saratov State University, Saratov, Russia

Objective: The objective of the proposed Advanced Study Institute (ASI) is to build a creative advanced biophotonics research and learning environment by bringing together world experts, researchers, PhD students and postdoctoral fellows from both industry and university research organizations; to explore various practical implications of biophotonics research and technology in disease therapy, environmental practice and security, agriculture and defence.

Major topics: ***Medicine and Health, Biosciences, Environment, Security and Defence***

Lecturers: The NATO ASI in biophotonics will bring together world-renowned experts in the biophotonics field as well as experts working on the interface of medicine, biology, physics, photonics and biomedical engineering:

Dr. Brian Wilson, Professor
Ontario Cancer Institute, Toronto, Canada

Dr. Rejean Munger, Professor
University of Ottawa Eye Institute, ON, Canada

Dr. Fred Milanovich, Group Leader
Lawrence Livermore National Laboratory, USA

Dr. Theodore Papazoglou, Group Leader
I.E.S.L. & F.O.R.T.H., Greece

Dr. Paras Prasad, Professor, Director
Institute for Lasers, Photonics and Biophotonics
University of Buffalo, USA

Dr. Alexander Priezzhev, Professor
Moscow State University, Russia

Dr. Claude Boccara, Professor
Ecole Supérieure de Physique et de chimie industrielles
Paris, France

Dr. Valery Tuchin, Professor
Saratov State University, Saratov, Russia

Dr. Stoyan Tanev, Program Manager
Vitesse Re-Skilling™ Canada Inc., Ottawa, Canada

Dr. Yves de Koninck, Professor
Centre de recherche Université Laval Robert-Giffard, QC, Canada

Dr. Israel Gannot, I., Professor
Tel Aviv University, Israel

Dr. Dennis Matthews, Professor, Director
Center for Biophotonics Science and Technology
University of California, Davis, USA

Dr. Gerald Lucassen, Research Scientist,
Philips Research, Eindhoven, The Netherlands

Dr. Varban Savov, Professor, Head
Medical Physics Group, Faculty of Physics
Sofia University, Bulgaria

Dr. Herbert Schneckenburger, Professor
Fachhochschule Aalen, Biophotonics Group
Institute of Applied Research, Aalen Germany

Dr. Tuan Vo-Dinh, Director,
Advanced Biomedical Science and Technology Group
Center for Advanced Biomedical Photonics, Oakridge, USA

Dr. Tony Wilson, Professor
Department of Engineering Science, University of Oxford, USA

Directors of the ASI:

Dr. Brian Wilson
Professor of Medical Biophysics
Department of Medical Biophysics
Ontario Cancer Institute
Princess Margaret Hospital
University of Toronto, Canada

Dr. Valery Tuchin
Professor
Head of Optics Chair
Department of Physics
Saratov State University
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Dr. Stoyan Tanev
Program Manager
Photonics & Biophotonics Programs
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For more information visit www.vitesse.ca

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MOTIVATION

The application of optical and photonics methods in medicine, agriculture, environmental practice and public health is emerging as one of the new technological paradigms in today's economy. This biological-photonics convergence is due to the recent significant advancement of photonics and biotechnologies worldwide and is significantly driven by the various health, environment and defence related challenges faced by human society at the beginning of 21st century. Biophotonics is capable of yielding the critical information bridging molecular structure and physiological function, which is the most important process in understanding, treatment and prevention of disease and pathology in general. The collective effects of these advancements are influencing qualities of human life and behaviour in ways never before imagined.

However, along with the positive aspects of this revolution, come potential negative aspects. They include, to name a few, an increased potential for human plagues caused by the increased rates of human contact and resistance to antibiotics, agricultural plagues exacerbated by extensive use of single-genetic-strain crops and livestock, and purposely induced plagues of human or agricultural pathogens - bio- and agro-terrorism. Much of the work done by international medical and agricultural research industries is directed to the development of pathogen detection and identification systems that are lower in cost, more biochemically specific, more accurate, faster, smaller, less demanding of infrastructure, and more accessible to more people than ever before.

The role of biophotonics in the above areas is significant. In view of this, the importance of biophotonics has never been greater. This determines the need and timeliness of the ASI.

LECTURE TITLES

Brian Wilson: Photodynamic Therapy: Photophysics, Photobiology, Bioengineering and Clinical Aspects

Rejean Munger: Eye Optics – Fundamentals, Instrumentation and Applications

Fred Milanovich: Biophotonics – an Emerging Technology Paradigm in the Defence Against Bio-Terrorism

Theodore Papazoglou: Laser Based Diagnostic Techniques in Medicine & Biology

Paras Prasad: Introduction to Biophotonics

Alexander Priezzhev: Optics of Blood – Methods and Applications

Claude Boccara: Advances in Biophotonics Multi-Sensor Instrumentation

Valery Tuchin: Tissue and Blood Optical Properties Control by Immersion of Chemical Agents

Yves de Koninck: NeuroPhysics: a New Frontier in Neuroscience with Material Sciences and Photonics

Israel Gannot: Biophotonics Light Delivery Systems

Dennis Matthews: Application of Biophotonics to the Needs of Biosciences, Medicine and Biosecurity

Gerald Lucassen: Infrared and Raman Spectroscopy – Fundamentals and Applications

Varban Savov: Bioluminescence and Chemiluminescence – Environment and Food Safety Applications

Herbert Schneckenburger: Time-Resolved Fluorescence Spectroscopy

Tuan Vo-Dinh: Biochip and Nano-Technologies for Health, Environment and Defense Applications

Tony Wilson: Biophotonics Microscopic Imaging

Stoyan Tanev: Biophotonics Simulations: FDTD Modelling of Light Scattering from Bio-Cells

LOCATION

The NATO Advanced Study Institute will be held at the Crowne Plaza Hotel in Canada's National Capital, Ottawa. Ottawa's museums, heritage buildings, parks, and monuments paint an exciting picture of Canada's colourful past while also allowing a glimpse of its future.

PARTICIPANTS COST: 1200.00 EURO

To apply, contact Dr. Stoyan Tanev at (613) 746-3595 ext. 228 or stoyan.tanev@vitesse.ca
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