

# NATO ADVANCED STUDY INSTITUTE

Skills for Success



## PHOTON-BASED NANOSCIENCE & TECHNOLOGY *From Atomic Level Manipulation to Materials Synthesis & Nanobiodevice Manufacturing*

*September 19-29, 2005, Auberge Estrimont, Orford, QC, Canada*

### OBJECTIVES

**BUILD** a creative advanced research learning environment by bringing together world experts, researchers, Ph.D. students and postdoctoral fellows from industry, academia and government research organizations

**EXPLORE** various aspects of fundamental research on existing and emerging photon-based technologies for atomic level manipulation and nanomaterials synthesis

**EXAMINE** the feasibility and the need for developing the next generation of nano-biodevices for biodiagnostic, therapeutic, environmental and biodefense applications

**PROVIDE** an opportunity for the next generation of scientists to become familiar with the international achievements of nanoscience research and development efforts, which in turn, will allow for further advancement of their research communities' knowledge skills and motivation

### MOTIVATION

Photon-based technologies, coupled with advanced materials sciences, bio and nanotechnology, can meet many of the health, environment and defense related challenges faced by human society today. This is an interdisciplinary field that comprises physics, chemistry, applied sciences and engineering, biology, and biomedical technology. The multidisciplinary nature of photon-based nanosciences and technology and the broad variety of challenges that can be potentially addressed, require a significant increase in the number of knowledgeable researchers and trained personnel in this field. This need can be met by providing a multidisciplinary training for a future generation of researchers at both graduate and postgraduate levels, world-wide.

### DIRECTORS OF THE ASI

#### JAN J. DUBOWSKI, PH.D.

Professor, Université de Sherbrooke, Canada  
Department of Electrical & Computer Engineering  
Canada Research Chair in Quantum Semiconductors  
Head, Nanotechnology of Photon Processing & Quantum Semiconductors Laboratory

#### AARON PELED, PH.D.

Professor, Holon Academic Institute of Technology  
Department of Electrical & Electronics Engineering  
Head, Photonics Processing Laboratory, Israel

## LECTURERS & TOPICS - TENTATIVE LIST

\*\*program available online at [www.vitesse.ca](http://www.vitesse.ca)

<p><b>J. C. POLANYI, PH.D.</b>, Professor University of Toronto, Canada <i>Photochemistry of adsorbates: toward maskless nanopatterning</i></p>	<p><b>P. PRASAD, PH.D.</b>, Professor University of Buffalo, USA <i>Fundamentals of nanobiophotonics</i></p>	<p><b>T. DICKINSON, PH.D.</b>, Professor University of Washington, USA <i>Laser interactions with inorganic materials</i></p>
<p><b>H. HELVAJIAN, PH.D.</b>, Senior Scientist Aerospace Corporation, USA <i>Photophysical processes that activate selective changes in photostructurable glass ceramic material properties</i> <i>Photostructurable glass-ceramic materials and variable dose direct-write laser patterning</i></p>	<p><b>W. MARINE, PH.D.</b>, Professor University of Marseille, France <i>Laser synthesis of solid nanoclusters</i> <i>Liquid phase laser synthesis of nanoparticles and nanohybrid materials for biopapplications</i></p>	<p><b>F. TRAEGER, PH.D.</b>, Professor Kassel University, Germany <i>Laser and self-organized synthesis of inorganic materials</i> <i>Laser manipulation and probing of nanoparticles</i></p>
<p><b>K. SUGIOKA, PH.D.</b>, Research Scientist RIKEN, Japan <i>Fs laser processes for precise nanostructuring and nanomachining</i> <i>Three-dimensional micro and nanochips for biomedical applications</i></p>	<p><b>M. STUKE, PH.D.</b>, Professor Max Planck Institute, Germany <i>Processing of nanoparticles by UV laser irradiation in a field cage</i> <i>Laser-made and laser-driven nanorobots</i></p>	<p><b>D. COHN, PH.D.</b>, Professor Casali Institute of Applied Chemistry The Hebrew University of Jerusalem, Israel <i>Thermo-responsive nanosized polymeric systems</i> <i>Tailoring biomedical polymeric surfaces</i></p>
<p><b>M. ELBAUM, PH.D.</b>, Senior Scientist Weizmann Institute of Science, Israel <i>Optical methods in cell biology and biophysics</i> <i>The nuclear pore: analytical chemist and thermodynamic engine in the cell</i></p>	<p><b>P. WISEMAN, PH.D.</b>, Assistant Professor McGill University, Canada <i>Application of bio-conjugated quantum dot labels for dynamic ICS measurements in living cells</i></p>	<p><b>D. GEOHEGAN, PH.D.</b>, Senior Scientist Oak Ridge National Laboratory, USA <i>Laser-based synthesis, diagnostics and control of single-walled carbon nanotubes and nanohorns for composites and biological nanovectors</i></p>
<p><b>T. LIPPERT, PH.D.</b>, Senior Scientist Paul Scherrer Institute, Switzerland <i>Molecular design of polymers for laser structuring</i> <i>Thin films produced by PLD as a model system for electrochemical applications</i></p>	<p><b>H. OUACHA, PH.D.</b> Professor Université Moulay Ismail, Morocco <i>Optical gas sensing properties of laser-shaped nanoparticles</i></p>	<p><b>R. HAGLUND, PH.D.</b>, Professor Vanderbilt University, USA <i>Free electron lasers: biomedical applications</i> <i>Surface plasmon resonance: fundamentals and applications</i> <i>Nanocrystals of vanadium dioxide for biodiagnostics applications</i></p>
<p><b>V. KONOV, PH.D.</b>, Senior Scientist General Physics Institute, Russia <i>Optical, electronic and biomedical applications of CVD diamond films</i> <i>Micro and nonocrystalline CVD diamond</i></p>	<p><b>B. WILSON, PH.D.</b>, Professor Ontario Cancer Institute, Canada <i>Biophotonics and Nanobiophotonics for treatment, diagnostics and research in oncology</i></p>	<p><b>N. PETERSEN, PH.D.</b>, Director General National Institute for Nanotechnology National Research Council Canada <i>Photonic approaches to studying intermolecular interactions in biological membranes</i></p>
<p><b>E. MARCOTTE, PH.D.</b>, Team Leader Canadian Institutes of Health Research (CIHR) <i>Nanomedicine R&amp;D in Canada - the CIHR vision</i> <i>Opportunities and challenges in nanomedicine research funding</i></p>	<p><b>K. SOKOLOV, PH.D.</b>, Professor Department of Imaging Physics M.D. Anderson Cancer Center, USA <i>Nanoparticles for cancer imaging</i></p>	<p><b>P. GRUTTER, PH.D.</b>, Professor McGill University, Canada <i>AFM techniques applied to nanobio and sensing</i></p>
<p><b>I. GANNOT, PH.D.</b>, Professor Tel-Aviv University, Israel <i>Optical imaging based on nanoparticles and fluorescent probes</i></p>	<p><b>A. BANDRAUK, PH.D.</b>, Professor Sherbrooke University, Canada <i>Attosecond science</i></p>	

## CONTACT TO APPLY

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