Vitesse Inter-Disciplinary Study Program

BIOLOGY for BIOPHOTONICS

February 23-27, Ottawa, Ontario

Biophotonics is defined as the interface of lightwave technology and the biological/biomedical sciences. It is a new frontier, offering tremendous prospects for optical diagnostics, light activated therapy, surgery, biosensing, agriculture, environment and defence. The advancement in the development of biophotonics technologies requires a comprehensive familiarization with biology. This two module program covers the following topics:

Module I (2 days)

Biological systems: from Molecules to Organisms

- The cell: Nuclear structure and function - DNA and RNA
- The cell: Cytoplasmic structure and function, proteins and signal transduction, enzymes and their functions
- Tissue and organ systems: introduction to disease biology

Fundamentals of Biotechnology: from DNA to Proteomics

Module II (2 days)

Optical Methods in Biomedical Sciences

- Fundamentals of photobiology
- Bioimaging: principles, techniques and applications.
- Optical biosensing: principles and applications
- Light-activated therapy: photodynamic therapy
- Bionanophotonics and biomaterials

Biophotonics Instrumentation Design Principles

Advanced topics: Nonlinear Optics Techniques

- Introduction to multiphoton phenomena and fluorescence microscopy
- Second harmonic generation imaging
- Hyper-Rayleigh and Hyper-Raman effects/imaging
- Two-photon correlation spectroscopy and photodynamic therapy

Problem Solving Based Learning Sessions (evenings)

- Detailed discussions of real-life cases from recently published articles aimed at a comprehensive reinforcement of the acquired knowledge
- Discussion of participants' raised topics

Attendee Profile

- Physicists, optical scientists, electrical and biomedical engineers, biochemists and biomedical researchers, PhD students and post-doctoral fellows
- Little or no understanding of biological systems
- Desire to expand expertise in new directions

Benefits

- A comprehensive initiation in biology and biotechnology
- Acquire knowledge of a variety of optical techniques for bio applications
- Explore the transfer of applied science concepts/techniques to biological systems
- Apply acquired knowledge to real life examples (problem based learning sessions)
- Possibility for career advancement into the fields of biology/medicine and biophotonics
- Opportunity to network, exchange knowledge and experiences with other inter-disciplinary oriented professionals

To register visit: www.vitesse.ca or contact Dr. Stoyan Tanev, Program Manager, Vitesse™ Re-Skilling Canada Inc., Tel. 613-746-3595 ext. 228, stoyan.tanev@vitesse.ca

BIOLOGY for BIOPHOTONICS: Detailed program

Time	Monday, Feb. 23	Tuesday, Feb. 24	Wed., Feb. 25	Thursday, Feb. 26	Friday, Feb. 27
8:00 am – 8:30 am		Breakfast	Breakfast	Breakfast	Breakfast
8:30 am - 12:00 am		**Module I** **Douglas Gray**, *Biological Systems: from Molecules to Organisms - II*	**Module I** **Dominic Bergeron**, *Fundamentals of Biotechnology: from DNA to Proteomics*	**Module II** **Paras Prasad**, *Optical Methods in Biomed. Sciences - II*	**Module II** **David Cramb**, *Advanced Topics: Nonlinear Optics Techniques*
12:00 am – 1:00 pm		Lunch	Lunch	Lunch	Lunch and conclusion
1:00 pm -5:00 pm	**Module I** **Douglas Gray**, *Biological Systems: from Molecules to Organisms - I*	**Module I** **Douglas Gray**, *Biological Systems: from Molecules to Organisms - III*	**Module II** **Paras Prasad**, *Optical Methods in Biomed. Sciences - I*	**Module II** **Rejean Munger**, Biophotonics Instrumentation Design Principles	
5:00 pm – 6:30 pm		**Taras Hollyer**, *Problem Based Learning Session - I*	**Stoyan Tanev**, *Problem Based Learning Session - II*	**Roundtable discussion:** *Biophotonics – a Smart Solution looking for Problems to be Solved*	

Our lecturers:

Douglas A. Gray, PhD
Associate Scientist, Cancer Therapeutics,
Ottawa Health Research Institute
Professor,
Depts. of Medicine and Biochemistry,
Microbiology and Immunology,
University of Ottawa
Senior Scientist,
Ottawa Regional Cancer Centre

David Cramb, PhD
Assistant Professor,
Department of Chemistry
Adjunct Professor,
Department of Pharmacology and Therapeutics, University of Alberta

Stoyan Tanev, PhD
Program Manager – Photonics and Biophotonics Programs
Vitesse™ Re-Skilling Canada Inc.

Paras N. Prasad, PhD
Distinguished Professor of Chemistry,
Director of the Institute for Lasers, Photonics, and Biophotonics
Department of Chemistry,
University at Buffalo, USA

Dominic Bergeron, PhD
Professor, Coordinator,
Biotechnology program
La Cité Collégiale, Ottawa

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