Neurophotonics Summer School 2009
Preliminary program

Arrival Sunday PM
17:00-19:00: Welcome reception and overview of Summer School (Yves De Koninck)

	Monday 01	Tuesday 02	Wednesday 03	Thursday 04	Friday 05	Saturday 06
9:00-10:30	**Daniel Côté:** Lasers and imaging	**Robert Campbell** TBD	**Lisa Topolnik:** Functional calcium imaging : principles, advantages and pitfalls	**Denis Boudreau:** Fluorescence, FRET and Lifetime	**Francisco Bezanilla** TBD	No activities
10:30-11:00	Coffee break	Coffee break	Coffee break	Coffee break	Coffee break	
11:00-12:30	**Richard Robitaille:** Calcium imaging to study glial-neuron interactions	**Thomas Kuner** Clomeleon	**Brian Pogue:** Multimodal imaging (clinical applications)	**Alan Fine:** Monitoring synaptic plasticity at single synapses in brain slices	**Maxime Dahan:** QDs, etc…	
12:30-13:30	LUNCH	LUNCH	LUNCH	LUNCH	LUNCH	
13:30-14:30	Experiment preview	Experiment preview	Experiment preview	Experiment preview	Experiment preview	
14:30-18 :30	Hands-on Lab experiments	Hands-on Lab experiments	Hands-on Lab experiments	Hands-on Lab experiments	Hands-on Lab experiments	
18:30-19:30	Dinner	Dinner	Group dinner	Dinner	Dinner	
19:30-22:00	Data analysis	Data analysis		Data analysis	Data analysis	

	Sunday 07	Monday 08	Tuesday 09	Wednesday 10
9:00-10:30	**Gang Zheng** TBD	**Paul De Koninck** TBD	**Yasumori Hayashi** TBD	**Students Presentations and debriefing**
10:30-11:00	Coffee break	Coffee break	Coffee break	
11:00-12:30	Experiments	Experiments	Experiments	
12:30-13:30	LUNCH	LUNCH	LUNCH	LUNCH
13:30-18:30	Experiments	Experiments	Experiments	**Students Presentations and debriefing**
18:30-19:30	Dinner	Dinner	Dinner	
19:30-22:00	Data analysis?	Data analysis?	Data analysis?	

Hands-on sessions (Monday 01 to Friday 05):

Afternoons will be dedicated to hands-on experiments in the different labs (in teams of 3 trainees). Each team will perform a different experiment every day under the guidance of tutors. Topics covered include:

FRET-FLIM: -Different approaches for FRET: spectral, acceptor photobleaching method and Fluorescence Lifetime Imaging Microscopy (FLIM) -Applied to the protein-protein interactions and ion fluctuations in different subcellular compartments of a neuron	**Video-rate wide-field imaging of single molecule dynamics** -Tracking of single membrane receptors on cultured neurons with Quantum dots as fluorescent tags. -Monitoring of synaptic receptor lateral movement on the membrane in and out of synapses. -Quantification of receptor mobility, area covered, dwell time inside synapse, etc.
Cell tracking in live tissue: -Tracking live cells migration and differentiation in live tissue using different labeling strategies (retroviral infections, single cell electroporation, etc.) and imaging modalities	**Linear and non-linear video-rate microcopy in live animals** - Animal preparation, optical tool, video-rate hardware, movement correction **CARS Microscopy** -Myelin imaging in nerves and spinal cord using Coherent Raman
Live imaging of GFP-tagged protein translocation in cultured neurons -Time lapse imaging of the dynamic translocation of GFP-tagged intracellular proteins in live neurons. -Measurements of movement dynamics with FRAP approaches and photo-stimulation of proteins tagged with photo-inducible GFP.	**Two-photon calcium imaging in neuron dendrites in acute hippocampal brain slices** - Imaging Ca2+ transients evoked by action potentials and synaptic stimulation - Quantitative analysis of Ca2+ transients: intracellular concentration, fluctuations and endogenous buffering capacity, transients with dual indicators. **Optical mapping of synaptic connectivity between inhibitory interneurons in acute hippocampal slices:** - Two-photon photostimulation of hippocampal interneurons by glutamate uncaging; Mapping synaptic connectivity with two-photon photostimulation.

All trainees will go through the experiments above between Monday 01 and Friday 05. They will then be given the choice to "specialize" themselves in a given technique between Sunday 07 and Wednesday 10.