LCI course 2015

16.03			**Introduction, cameras and detectors**
09:00-09:45	Sylvie Le Guyader		
09:45-10:20	Sylvie Le Guyader	P	Types of light microscope systems
10:20-10:30			*coffee and fruits break*
10:30-12:00	Mats Hede	P	Camera and PMT properties
		P	How to select the correct camera for your application
12:00-13:00			*lunch*
13:00-14:00			Student presentations: imaging challenge (group 1 and 2)
14:15-15:15			workshops
15:15-15:30			*coffee and buns break*
15:30-16:30			workshops
16:30-17:00	working in groups of 4		answer exam questions
17.03			**Sample preparation and avoiding bleedthrough**
9:00-10:00	Dusan Raicevik	P	The different types of carriers by Corning
		P	the different types of mounting media (hardware autofocus)
10:00-10:20	Sylvie Le Guyader	P	how to seed cells to get even distribution
			How to clean the objectives and the samples. Objective coatings are fragile
		P	how to fix, stain. DAPI and Hoechst
10:20-10:30			*coffee and fruits break*
10:30-12:00	Sylvie Le Guyader	P	Matching fluorophores and filters spectra
		P	how to identify and avoid bleedthrough
		P	Sequential vs simultaneous imaging vs Spectral detectors. virtual filters and unmixing
12:00-13:00			*lunch*
13:00-14:00			Student presentations: imaging challenge (group 3 and 4)
14:15-15:15			workshops
15:15-15:30			*coffee and buns break*
15:30-16:30			workshops
16:30-17:00	working in groups of 4		answer exam questions
18.03			**Objectives, resolution and contrast**
09:00-09:50	Sylvie Le Guyader	P	Specifications of objectives: magnification. WD. NA. ring. immersion. brightness. xyz resolution. depth of focus
		P	What is the objective resolution? What is the camera resolution?
		P	Which objective for which application?
		P	How to care for the objectives?
			comments about exam questions from previous days
09:50-10:00			*coffee and fruits break*
10:00-12:00	Kjell Carlsson	P	Resolution and contrast
		P	Aberrations and diffraction
		P	Point Spread Function
		P	Confocal aperture size
		P	Airy unit. Rayleigh criterion. Abbe's limit and MTF curves
		P	What is the Nyquist sampling theory and how to use it. scanning density
12:00-13:00			*lunch*
13:00-14:00	Victoria Menendez Benito	P	High throughput yeast imaging
14:15-15:15			workshops
15:15-15:30			*coffee and buns break*
15:30-16:30			workshops
homework			answer exam questions about objectives, resolution and contrast
19.03			**Confocal settings and Fluorophores**
9:00-10:20	Sylvie Le Guyader	**P**	spherical aberrations
		P	typical workflow of how to set a confocal: question, objective, sequential or simultaneous, scan area, pixel density, laser power, scan speed, averaging, pinhole size, detector gain, offset
		P	When do we care about resolution?
		P	Saturation, underexposure, bit depth and fluorophore saturation. show tomas figure to demo wrong offfset
		P	comments about exam questions from previous days
10:20-10:30			*coffee and fruits break*
10:30-12:00	Vladana Vukojevic	P	What is light?
		P	What is fluorescence: excitation. emission and lifetime?
		P	The different types of fluorophores
		P	Fluorophore specifications (quantum yield, brightness...) and how to judge what a good fluorophore is
		P	Fluorophore saturation
12:00-13:00			*lunch*
13:00-14:00	Jeremy Adler	P	Colocalization
14:15-15:15			workshops
15:15-15:30			*coffee and buns break*
15:30-16:30			workshops
homework			answer exam questions about objectives, resolution and contrast
20.03			**xyz automation and fast imaging**
9:00-10:20	Sylvie Le Guyader	P	Large image/overview/tiling
		P	How to find the area of interest in a large sample with minimum bleaching
		P	Hardware versus software autofocus. focus surface
			Options for fast imaging: choice of objective, piezo z, widefield with fast camera, external filter wheels and AOTF,
			spinning disk, bidirectional imaging, resonant scanner, choose fluorophores to be able to use simultaneous imaging,
		P	JOBS to include analysis. unmixing to avoid sequential imaging
10:20-10:30			*coffee and fruits break*
10:30-11:15	Johnnie Bremholm Andersen	P	Stereology by Visiopharm
11:15-12:00			presentation of literature studies group 3 and 4
12:00-13:00			*lunch*
13:00-14:00	Florian Salomons	P	FRAP
14:15-15:15			workshops
15:15-15:30			*coffee and buns break*
15:30-16:30			workshops
23.03			**Volume imaging**
9:00-10:20	Sylvie Le Guyader	P	The problem of imaging a fluorescent volume: Refractive index matching and scale distortion
		P	introduction to 2P: Widefield vs confocal vs multiphoton including NDDs, clearing
10:20-10:30			*coffee and fruits break*
10:30-11:15	Martin Koehler	P	Two photon microscopy theory. practice. advantages and limitations. Intravital imaging. SHG. THG
11:15-12:00	Erwin Ilegems	P	In vivo imaging of pancreatic beta cell mass and function
12:00-13:00			*lunch*
13:00-14:00	Hans Thorn	P	Light sheet microscopy and Airyscan by Zeiss
14:15-15:15			workshops
15:15-15:30			*coffee and buns break*
15:30-16:30			workshops
24.03			**Special applications, trends and challenges in light microscopy**
9:00-10:20	Sylvie Le Guyader	P	Imaging live cells: how to assess the cell's health. how to prevent light toxicity
		P	Special applications: TIRF. Super resolution. Deconvolution
		P	Trends and future challenges in light microscopy
			comments about exam questions from previous days
10:20-10:30			*coffee and fruits break*
10:30-11:15	Hans Mattson	P	PLA
11:15-12:00	Arne Lindqvist	P	FRET and FLIM
12:00-13:00			*lunch*
13:00-13:15			comments about exam questions from previous days
13:15-14:00			presentation of literature studies group 1 and 2
14:15-15:15			workshops
15:15-15:30			*coffee and buns break*
15:30-16:30			workshops
25.03			**Data handling, data management, statistics**
09:00-10:00	Ulrich Berge	P	awareness about potential problems in image processing
		P	recommendations by major scientific journals about modifying images for publication
10:00-10:10			*coffee and fruits break*
10:10-12:00	Staffan Larsson	P	the different image formats
		P	clarifying or manipulating?
		P	the safe way of saving images and backing them up
		P	how to format images for publishing or poster printing
12:00-13:00			*lunch*
13:00-14:00	Ulrich Berge	P	statistics in imaging
14:15-15:15			workshops
15:15-15:30			*coffee and buns break*
15:30-16:30			workshops
26.03			**Image processing and quantitative analysis**
09:00-09:30	Sylvie Le Guyader		quick presentation of ImageJ. microscopy wiki websites. Omero
			Analysis strategy and what to think about before you start imaging
09:30-10:30	Carolina Wählby		Cell Profiler. Students work as pairs
10:30-10:40			*coffee and fruits break*
10:40-12:00	Carolina Wählby		Cell Profiler. Students work as pairs
12:00-13:00			*lunch*
13:00-15:00	Carolina Wählby		Image processing workshop for all groups. Students work as pairs
15:00-15:15			*coffee and buns break*
15:15-17:00	Carolina Wählby		Image processing workshop for all groups. Students work as pairs
27.03			**Minisymposium: Innovation through advanced microscopy- examination**
9:30-10:15	Hans Blom	P	Nobel Prize superresolved fluorescence microscopy
10:15-11:00	Jerker Widengren	P	Innovation through advanced microscopy
11:00-12:00			Examination
12:00-13:00			*lunch*
13:00-13:15			Conclusion and feedback

exam question every day