

## EQUIPEMENTS AND SERVICES

### CELL IMAGING

#### EQUIPEMENTS

Equipment	Manufacturer	Model	Equipment Self-service	Equipment with service
Upright Multi-Photon Confocal Microscope	Olympus	FV1000MPE/BK61WF	no	yes
Inverted Microscope – Containment level 3	Zeiss	AxioObserver Z1 Spinning disk/TIRF	yes	yes
Inverted Confocal Microscope TCS SP5	Leica Microsystems	TCS SP5	yes	yes
Inverted Multi-Photon Confocal Microscope TCS SP5 MP	Leica Microsystems	TCS SP5 MP	yes	yes
Inverted Fluorescence Microscope	Olympus	IX71	yes	yes
Widefield Microscope	Leica Microsystems	DM4000B	yes	yes
Image Analysis Workstation	Bitplane	Imaris 7.5.2	yes	yes
	MediaCybernetics	ImageProPlus	yes	yes

#### Confocal microscope Olympus FV1000MPE

Upright point scanner confocal microscope with multi-photon laser and incubation chamber.

The system is equipped with 3 regular PMTs and 2 non-descanned detectors (NDD) for multi-photon. The multi-photon laser is a tunable Ti:Saf laser 800-1300nm. The motorized stage of the microscope can be removed to put a fixed stage adjustable in height for intra-vital imaging.

Objectives available: 4X/0.16, 10X/0.4, 20X/0.75, 40X/0.95, 63X/1.35Oil, 20X/1.00 Water Dipping lens and 60X/1.2 Water Dipping lens.

Excitation laser lines available: 405, 458, 488, 515, 543 and 635nm.

Particularity: system with a black XL-Unit incubation chamber; the temperature can be controlled for intra-vital imaging studies.

Applications: ZStacks, 2D and 3D projections, FRET, FRAP, colocalization, sequential multi-dimensional acquisitions, tiling, multi-position acquisitions and spectral imaging.

The microscope has a multiphoton laser allowing imaging of thick samples and that can be configured for intravital imaging.

### **Spinning-Disc Confocal/TIRF microscope Zeiss Observer (SDC/TIRF)**

Spinning-disc inverted confocal microscope with TIRF module, small incubation chamber, Definite Focus module and Piezo Z-Focus Drive.

The system is equipped with a Yokogawa CSU-X1 spinning-disc linked to a highly sensitive EMCCD Evolve 512 Photometrics camera.

The motorized stage can accommodate a small incubation chamber with temperature and CO<sub>2</sub> control from Tokai Hit. The system is also equipped with a lens heater.

The system is associated to a synchronised unit to do ultra-fast Z stacks with a Piezo Z-focus Drive.

Objectives available: 10X/0.3, 40X/1.3Oil DICIII and 100X/1.46Oil DICIII.

Excitation laser lines available: 405, 488, 561 and 639nm.

Particularity: this microscope is especially equipped for fast live imaging. It's located in the containment level 3 area, so it can be used to image infected cells by viruses such as HIV or hepatitis.

Applications: Widefield microscopy, Optical sectioning, TIRF, live cell imaging (short and long term), Zstacks, 2D/3D projections, DIC.

### **Confocal microscope Leica TCS SP5**

Inverted point scanner confocal microscope with 3 spectral PMTs and a TLD module for brightfield or Ph acquisitions.

With this microscope, all wavelengths from 300 to 800nm can be detected, with a precision of 3nm and a 5nm minimal band width. It's of great interest when the spectral resolution is critical.

Objectives available: 10X/0.3, 20X/0.5, 40X/1.4Oil, 63X/1.4Oil and 100X/1.4Oil.

Excitation laser lines available: 458, 476, 488, 514, 561 and 633nm.

Applications: optical sectioning, ZStacks, 2D and 3D projections, lambda stacks, spectral deconvolution, FRET, FRAP, colocalization, sequential multi-dimensional acquisitions.

### **Confocal microscope Leica TCS SP5 MP**

Inverted point resonant scanner confocal microscope with multiphoton laser, Z-galvo and incubation chamber.

The system has 3 spectral PMTs, a TLD module for brightfield, Ph or DIC acquisitions, 2 non-descanned detectors (NDDs) for multiphoton mode and a 8kHz resonant scanner for fast live imaging. The multiphoton laser is a Ti:Saf 800-1300 tunable.

With this microscope, all wavelengths from 300 to 800nm can be detected, with a precision of 3nm and a 5nm minimal band width. It's of great interest when the spectral resolution is critical.

Objectives available: 10X/0.3, 20X/0.7 Imm (Oil,Glyc), 63X/1.4Oil, 63X/1.4Glycerol and 100X/1.4Oil.

The system is equipped with a motorized encoded stage. The Z-Galvo allows precise and fast stack imaging.

Excitation laser lines available: 405, 458, 476, 488, 514, 561 and 633nm.

Particularity: XL-Unit incubation chamber with temperature and CO<sub>2</sub> controlled.

Applications: optical sectioning, ZStacks, 2D and 3D projections, lambda stacks, spectral deconvolution, FRET, FRAP, colocalization, sequential multi-dimensional acquisitions, tiling and multi-positioning. Fast imaging for live video-microscopy (resonant scanner and Z-Galvo). The multiphoton mode can achieve deep samples.

### **Olympus IX71 Microscope**

Widefield inverted microscope for brightfield and/or fluorescence acquisitions on slides, multiwell plates or dishes.

Objectives available: 10X/0.4, 20X/0.75, 40X/0.95 and 60X/1.3Water.

3 filter cubes available: blue (DAPI, Hoesch, Alexa405), green (GFP, FITC, Alexa488) and red (TxRed, mCherry, Alexa594).

#### **Scientific core facilities of the CRCHUM**

Cell imaging

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#### **Technical supervisor**

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#### **Scientific director**

Greg Fitzharris, Ph. D.

June 17, 2016

Applications: imaging in 3 colors on petri dishes or plates. The camera is a dual camera and can acquire in monochrome mode or color mode.

### **Leica DM4000B microscope**

Upright widefield microscope for transmitted light acquisition on slides.

TL modes available: BF and PH.

Objectives available: Fluotar 10X/0.3, 20X/0.5, 40X/0.75 and 100X/1.3Oil

Applications: transmitted light acquisition (BF or Ph), white balance and gamma adjustable with the software.

### **Image analysis workstation**

Imaris 7.5.2: Standard Imaris, Imaris MeasurementPro, Imaris InPress.

Interactive processing and visualization software for 3D and 4D microscopic images.

Operates on 8, 16 and 32 bit multi-channel images.

Includes slicer, sections, gallery, shadow projection ray tracer, realtime volume visualization. Automatic generation of isosurfaces from a 3D image by thresholding. Identification of individual closed surfaces as objects (counting and grouping features).

Ideal for quantification of labeled components.

Simultaneous visualization of surfaces created from one or multiple channels with sections or volume rendered 3D or 4D data.

Powerful scene editor with multiple clipping planes, multiple light sources, calibration grid, and advanced surface property editor.

Specific readers for Biorad, DeltaVision, ICS/IDS, Leica, Olympus, Universal Imaging, Tiff series, TILLVisION, OME, and Zeiss image formats.

Interactive distance measurement in 3D on OrthoSlicers and Surfaces.

Statistical analysis of voxels enclosed by isosurface objects.

4D extension for interactive image processing and visualization of time series. Time slider in views allow real-time inspection of 4D data sets even larger than RAM. Automatic movie generation.

Text and statistics annotation in 2D, 3D, or 4D. Users interactively attach annotations to a 3D location in either the 3D view or in any of the 2D views. Choices for color, transparency, fonts and styles are available for the text, text box, and pointer.

InPress exports to html.

ImageProPlus Analyzer: 2D and 3D deconvolution, 3D analysis, cell counting, etc.

## **SERVICES**

### **Microscopy technical service**

The technical supervisor can perform turnkey projects for the researchers and their team.

### **Digital image analysis service**

The technical supervisor can extract quantitative on digital images, according to the research questions.

### **Methodology development**

We offer tailored services for research development for new technics of sample preparation, for numeric image acquisition and new analysis technics.

### **Consultation and technical assistance**

We offer tailored services for sample preparation, image acquisition and analysis.

### **Training**

Training on general microscopy, sample preparation, digital image acquisition and digital image analysis