IMAGING AND FLOW CYTOMETRY CORE

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Imaging and Flow Cytometry Core

High resolution imaging and high throughput flow cytometry are both cutting edge research technology platforms extensively used in modern biomedicine research. Imaging and Flow Cytometry Core serves as a training and development center for advanced imaging and cell sorting technologies. It promotes and facilitates multi-disciplinary research studies and collaboration among researchers.

ONLINE BOOKING SYSTEM

Apply training | Book instruments

Steps

1. Fill in the account creation request form in PPMS system.

2. Email fmbcores.cpos@hku.hk and cc your PI for the group joining consensus.

3. Upon receiving the approval reply from PI, CPOS staff will process the account creation.
EXPERIMENT

ACCOUNT REGISTRATION
Submit the account creation request in PPMS system. After receiving PI’s approval, your PPMS account will be created accordingly.

SUBMIT TRAINING REQUEST
Fill in the training form in PPMS system. After submission of the training request, our staff will contact you in 3 working days.

ATTEND TRAINING SESSION
Training will be organized monthly and first-come first-served basis. Upon completion of training, attendees will be classified as NOVICE user of the equipment.

BOOK EQUIPMENT
User can book the instrument in PPMS system. Earliest booking is available 2 weeks in advance. User can request technical support during usage.

TRANSFER DATA
User can register to access the Data Transfer Server. After data acquisition, user can transfer the data to the server and download it to their own computer.
**Imaging Equipment**

**Applications**

**Confocal Microscopes**
- Time-lapse confocal microscopy
- XY 2D / Z-stack 3D imaging, DIC/Phase contrast; Spot/line Scan
- Fast biological processes tracking
- Live cell imaging

**High-Content Imaging**
- Multiplexing imaging
- Multispectral imaging
- High through-put imaging

**Super Resolution Microscope**
- High-speed super-resolution imaging (e.g. mitochondrial, chromosome, etc.)

**Other Imaging Systems**
- Track and trap object
- Micropatterning, microfabrication, hydrogel polymerization
- Intravital imaging of living, whole mount, thickly sliced specimens or small animals
IMAGING EQUIPMENT

Applications

CONFOCAL MICROSCOPES
SUPER RESOLUTION MICROSCOPE
HIGH-CONTENT IMAGING SYSTEMS
OTHER IMAGING SYSTEMS

Confocal
2D imaging for fixed or live sample imaging

Airyscan

Z-stack 3D imaging

Small animal imaging

Track and trap object
LSM980 with Airyscan 2

*Lasers equipped: 7*

Airyscan 2 expands the excitation laser spot, enabling multiplex modes of SR-8Y, SR-4Y, and CO-8Y for high-speed imaging without sacrificing sensitivity or resolution.

LSM880 with Airyscan 1

*Lasers equipped: 7*

Achieve a 1.7× higher resolution in all spatial dimensions, with 120 nm laterally and 350 nm axially, allowing for fast biological processes with minimal phototoxicity.

LSM900 with Airyscan 2

*Lasers equipped: 4*

Airyscan 2 provides sub-diffraction resolution of 120 nm laterally and 350 nm axially, and enables the acquisition of up to four image lines with a high signal-to-noise ratio in a single sweep.

LSM900 Upright

*Lasers equipped: 4*

Enables the multi-dimensional (multi-channel, multi-position, time-lapse) imaging and big tissue tile scanning. ZEN software modules, including “Sample Navigator” and “Zen Connect” will simplify the imaging setup procedure.
LSM900 Inverted

*Lasers equipped: 4*

Enable the multi-dimensional (multi-channel, multi-position) imaging and large tissue tile scanning.

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LSM800 Airyscan 1

*Lasers equipped: 4*

Airyscan 1 detector for sub-diffraction resolution to 120 nm laterally and 350 nm axially.

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LSM780 with 2-Photon

*Lasers equipped: 7*

The GaASP detector allows the detection of weak signals and spectral imaging with unmixing. The photo-bleaching module enables the multi-dimensional live cell imaging, photon-manipulation and large tissue tile scanning.

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UltraVIEW VoX Spinning Disk Confocal

*Lasers equipped: 6*

Yokogawa CSU-X1 spinning disk unit enables to image with very low laser power to minimize effect of phototoxicity during long-term live cell experiments.
HIGH-CONTENT IMAGING

**Vectra Polaris**

*LED equipped: 9*

Fully automated system provides high speed whole-slide scanning at 10x to 40x in bright field or fluorescence for up to 80 slides in a run.

**MACSima Imaging System**

*LED equipped: 6*

Uses the principle of cyclic staining with different fluorochrome-conjugated antibodies to acquire multiplex imaging in a single tissue section or cells.

**IN Cell Analyzer 6500HS**

*Lasers equipped: 4*

Laser-based line scanning high-content imaging system for high speed fixed or live cell imaging.

SUPER RESOLUTION

**Live-SR Super-resolution/TIRF Microscope**

*Lasers equipped: 5*

Live-SR Super-resolution Unit for super-resolution (105nm laterally) imaging at high speed with low photo-toxicity. iLAS3 Ring-TIRF/FRAP/Ablation Unit allows the observation of membrane-associated processes and enables ablation for applications like DNA damage and axotomy.
OTHER IMAGING SYSTEMS

Primo Micropatterning / Color Imaging System

*LED equipped: 4*

Specifically designed for micropatterning applications, allowing for precise creating complex patterns and structures with high accuracy. The system is also equipped with a high-speed color camera that enables whole tissue color imaging.

FVMPE-RS Hybrid Multiphoton System

*2-Photon Lasers equipped: 2*

Allows fluorescence imaging deep into specimens at depths of hundreds of micrometers in living cells and tissues. It is dedicated to intravital imaging of living, whole mount, thickly sliced specimens or small animals.

Optical Tweezers/TIRF System

*Lasers equipped: 5*

Enables users to control, manipulate and observe samples in real time with nanometer precision and femtoNewton resolution. The NanoTracker™ 2 optical tweezers module enables trapping and tracking samples from several µm down to 30nm by using a highly focused 1064nm laser beam for sensitive manipulation, force, and tracking experiments.
**OTHER IMAGING SYSTEMS**

- **Nikon Ti2-E Inverted Fluorescence Microscope**
  
  *LED equipped: 6*
  
  Advanced imaging applications at high speed and high sensitivity.

- **AxioZoom.V16**
  
  *LED equipped: 1*
  
  Enables visualization of specimen ranging from large field-of-view to single cell observation.

- **Color Imaging Microscope**
  
  *LED equipped: 3*
  
  Capable of bright field color imaging and widefield fluorescence imaging.
Hermes High-content Imaging system
*LED equipped: 7*
Automated imaging system for high content screening which can accommodate a variety of multi-well plates and sample formats (slides, dishes, etc.) and offers environmental control for live cell assays.

LIT Lightsheet Microscope
*Laser equipped: 4*
Enables fast live-sampling image acquisition at over 500 sections per second, with stunning 3D resolution including over 270nm lateral resolution and 350nm axial resolution, and ultra-low phototoxicity.

Zeiss Lattice Lightsheet
*Laser equipped: 3*
Available for live cell imaging at subcellular resolution – while also allowing the use of standard sample carriers. With this automated, easy-to-use system, volumetric imaging of subcellular structures and dynamics over hours and days with best protection from photo damage becomes available to users.
Applications

FLOW CYTOMETRY

APPLICATIONS ON SORTERS:
- Multi-color Cell Sorting (up to 18 colors)
- Rare Population Cell Sorting
- Index Sorting
- Single Cell Sorting

APPLICATIONS ON ANALYZERS:
- Annexin V assay
- Cell Cycle Analysis
- Cell Proliferation Assay
- Multiplex Bead Assay for Cytokines
- Immunophenotyping
- High Parameters Immunophenotyping
- Small Particle Detection
- Bacterial Detection
SORTER

BD FACSaria Fusion

Laser equipped: 4  
Fluorochromes detected: 16

Ideal for sorting Biosafety Level 2 samples in BSC; A gel coupled quartz cuvette flow cell; 70/85/100 µm nozzles available; Index sorting

BD FACSaria SORP

Laser equipped: 5  
Fluorochromes detected: 18

UV laser available; A gel coupled quartz cuvette flow cell; 70/85/100/130 µm nozzles available; Ideal for sorting Biosafety Level 1 samples

Influx with BSC

Laser equipped: 4  
Fluorochromes detected: 14

Jet-in-air system; High frequencies with low pressures; Ideal for sorting Biosafety Level 2 samples in BSC; 70/86/100/140/200 µm nozzles available; Index sorting

Influx w/o BSC

Laser equipped: 4  
Fluorochromes detected: 16

Jet-in-air system; High frequencies with low pressures; Ideal for sorting Biosafety Level 1 samples; 70/86/100/140 µm nozzles available; Index sorting
Agilent NovoCyte Quanteon

*Laser equipped: 4*
*Fluorochromes detected: 25*

SiPM with excellent sensitivity and stability; 7.2 log dynamic range; NovoSampler Q for flow tubes or plates automatical loading; NovoExpress® Software from the NovoCyte® workstation; Small particle and bacterial detection

Agilent NovoCyte Advanteon BVR

*Laser equipped: 3*
*Fluorochromes detected: 19*

SiPM with excellent sensitivity and stability; 7.2 log dynamic range; NovoSampler Q for flow tubes or plates automatical loading; NovoExpress® Software from the NovoCyte® workstation; Small particle and bacterial detection

Agilent NovoCyte Advanteon BVYG

*Laser equipped: 3*
*Fluorochromes detected: 15*

SiPM with excellent sensitivity and stability; 7.2 log dynamic range; NovoExpress® Software from the NovoCyte® workstation; Small particle and bacterial detection

BD LSRFortessa

*Laser equipped: 4*
*Fluorochromes detected: 17*

Gel-coupled flow cell combined with trigon and octagon detection systems increased sensitivity and resolution; Identify cells with especially dim expression or quantitate rare cell populations

BD FACSymphony A5 SE

*Laser equipped: 5*
*Fluorochromes detected: 48*

Gel-coupled flow cell combined with Cascade array of square PMT detection systems provide increased sensitivity. Spectral flow cytometry for high parameters immunophenotyping