

# Monash Micro Imaging

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## Instrumentation & Capabilities List 2007

### Optical Microscopy

1. Olympus Provis Ax70 microscope for brightfield, darkfield, fluorescence and polarisation microscopy. With B/w and colour digital cameras (Sis FVII and Olympus DP70), and SiS AnalySis software.



#### Capabilities

- Contrast modes: DIC / Fluorescence / BF (colour): 10x – 100x
- Fluorescence filter sets: DAPI, CFP, FITC/GFP, TRITC, Cy5, single filters, or DAPI/FITC/TRITC or CFP/GFP/Texas Red triple dichroics
- Some polarisation work
- Some darkfield imaging
- Fluorescence screening
- General imaging
- Image capture for analysis

2. Olympus BX60 microscope with Colour camera (Sis CVII), for transmitted light, reflected light, reflected polarisation and fluorescence.



#### Capabilities

- Fluorescence: DAPI, FITC, TRITC
- Reflection contrast, for immuno gold/silver
- XZY stage (Autoscan): Biomapping stage, for large area imaging
- 3D imaging (topography, deconvolution)
- Image capture for analysis (colour and bright fluorescence)

3. dotSlide workstation, for biomapping, large area imaging and whole slide imaging. Based on BX51 Microscope with motorised stage and inserts for 4 regular slides or single large format slide. Lenses from 2-60x for brightfield and fluorescence (U-MNIBA3, U-WIG3, U-MWU2), Peltier-cooled high sensitivity camera (colour) for BF and FI, and dotSlide software for analysis, and telemicroscopy.



4. Leica AF6000LX Live Cell Imaging workstation, fully motorised with CO<sub>2</sub> incubator, good range of lenses, stage adaptors for all types of chambers and microplates, software for 3D and multidimensional microscopy, FRET, all kinetic imaging, cell tracking and deconvolution. Independent offline workstation with full software included.



#### Capabilities

- All kinds of multi dimensional imaging, 3D, 4D etc
- Time lapse
- Multiwell plates (96, 24 etc) for high content imaging
- Fluorescence (300-700nm excitation via monochromator system)
- Brightfield

5. A variety of other microscopes:



#### Capabilities

- **Upright:** fluorescence and DIC, polarisation microscope.
- General observation, phase, DIC
- Unlimited use (timewise), possible to borrow for extended periods



- **Stereo dissecting** microscope with digital camera
- On site use only for macroscopic work

## Confocal Microscopy

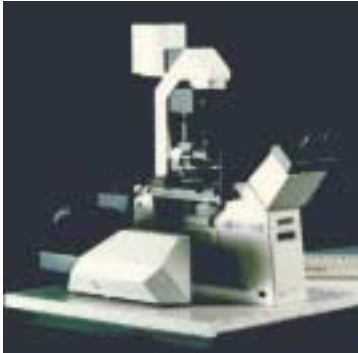
6. Leica TCS NT (upright microscope), 3 channel fluorescence imaging, plus transmitted light.



#### Capabilities

- 3 channel fluorescence confocal (visible range, eg 488, 568 and 647nm excitation)
- 2D colocalisation (2 -3 channels)
- 3D imaging
- AOTF allows FRAP, rapid bleaching etc
- Biomapping stage for large area imaging
- Generally not live cells, but we have occasional 4D long term imaging (small stage incubator available)

7. Leica TCS NT (invert microscope), 3 channel fluorescence imaging, plus transmitted light, live cell imaging.



#### **Capabilities**

- 3 channel fluorescence confocal (visible range, eg 488, 568 and 647nm excitation)
- 2D colocalisation (2 -3 channels)
- 3D imaging
- 4D time lapse, 37°C incubator around entire microscope
- Biomapping stage, allows biomapping and “mark & find” (multiposition) imaging
- Note: this system is not very sensitive, but ok for bright fluorescence

8. Yokogawa spinning-disc confocal with Andor Ixon EMCCD camera and IQ software for live cell imaging. Full range of high NA lenses, objective focuser, temperature controlled observation chamber, and analysis software.



#### **Capabilities**

- 2 channel fluorescence confocal (visible range ie 488 and 568 nm excitation)
- 2D colocalisation (2 channel)
- 3D imaging with rapid Z positioning
- 4D time lapse, 37°C cell chamber
- Low photobleaching, ideal for fluorescent protein work

9. Olympus FV1000 spectral confocal microscope, with full range of lenses, and temperature controlled observation chamber for live cell imaging.



#### **Capabilities**

- 4 channel fluorescence confocal (405, 488, 543, 633nm excitation)
- Fluorescence analysis and colocalisation
- 3D imaging
- 4D time lapse, 37°C cell chamber
- Sensitivity and high resolution ... does everything

10. Leica SP Multiphoton Microscope (based on DMI6000 Invert microscope), with Spectraphysics MaiTaiHP (3W TiSa pulsed laser) for live cell and tissue imaging.

#### Capabilities



- 3 channel fluorescence confocal (458, 488, 543, 633nm excitation) with 3 internal detectors
- Fluorescence analysis
- MP imaging with 4 external detectors
- Cell and tissue imaging – cell chamber
- Small animal imaging, for animal models with imaging from below
- MP laser: excitation in MP mode from 705-1020nm

11. Leica SP Multiphoton Microscope (based on DM6000 upright fixed stage microscope), with Spectraphysics MaiTaiHP (3W TiSa pulsed laser), for live animal imaging, to be housed at animal house at Monash Health Research Precinct.

## Electron Microscopy

### Transmission EM



1. **Hitachi H7500 TEM**, 120 KV Microscope with High contrast and High resolution imaging capabilities, includes digital camera (Gatan) – Building 13C
2. **200EX Jeol 200KV TEM** (Building 17, Rm. B23)
3. **2 x Jeol 100S 100KV TEM's** with large format photographic imaging for general imaging.
4. **Cryo tissue preparation equipment** including Leica slam and plunger tissue freezing unit, 2x Leica freeze substitution units and 2x Leica cryo ultra-microtomes (Building 13C)
5. **Ultramicrotomy: 5x ultra microtomes** (Building 13C and 17) – various ages.

### Scanning EM



1. **Hitachi S570 SEM (B16)** - With high resolution in-lens secondary electron detector, back scatter detector, cathodoluminescence detector & digital imaging.
2. **Emscope SP2000 (B16)** -For cryo-preparation and cryo-SEM of delicate samples or those significantly affected by conventional preparation techniques

### 3. Ancillary specimen preparation equipment:

- Balzers SCD005 Sputter coater, for gold coating of SEM samples.
- Dynavac Evaporative Coater (B23) - For carbon coating of SEM samples.
- Balzers CPD003 Critical Point Dryer (B21) - For routine preparation of SEM samples
- Dynavac FDC/H Freeze Dryer (B21) - For preparation of SEM samples

## Other Support Equipment and Labs

1. **General tissue processing laboratories:** two fully equipped tissue-processing laboratories (in Building 13C and Building 17).

### 2. Photographic systems:

- **darkrooms** for negative processing
- **high resolution film scanner:** Imacon Flextight Precision III, with Speed up to 20 Mb per min, Resolution 6300 dpi, true 14 bit colour-4.2
- **photo printer:** Tetrionix Phaser A4 and A3 high-resolution colour and b/w

### 3. Digital imaging/analysis lab

#### Computers:

- Image server with RAID storage (TB online storage)
- Several high end PCs with 2-4GB MB RAM
- 2 Dedicated Leica analysis workstation running LAS for live cell analysis.
- 64Bit Image workstations coming soon

#### Software ..... for quantitative imaging and image presentation

- AnalySis (Olympus Soft Imaging) software for EM, LM, fluorescence, confocal and multidimensional analysis.
- 3D Imaging: 3D-doctor, Eikona 3D, Voxblast, Imaris.
- Offline processing of confocal data: Leica LASAF (for SP5 and LX data), Analysis (for Fluoview and other data), IQ (for spinning disk data), etc
- Photoshop – graphic processing
- Image viewers available for all microscopy formats (Olympus, Leica, SiS, Zeiss).