

HAPPY NEW YEAR 2009!

As the New Year 2009 gets underway, let's not forget the events and successes of 2008 within the Bosch Institute Advanced Microscopy Facility (AMF). Here is a brief summary of the highlights in the AMF in 2008 as well as an update on new developments and events in 2009.

PC2 Laboratory, Rm S445, Anderson Stuart Building, Bosch Institute



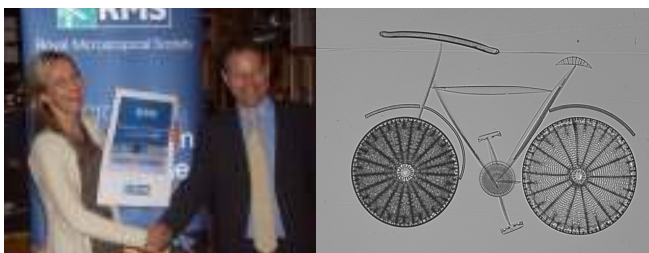
Rm S445, AS Building

This small laboratory was renovated in 2008 to PC2 standard and currently houses the old Single-Cell imaging system, previously located in Rm 231, Blackburn Building and both the Leica DMRBE upright (pictured) and DMIRBE inverted microscopes that formed part of the old Leica TCSNT confocal system. The Leica DMRBE scope is to be upgraded with a motorised XYZ microscope stage and stereology software in 2009. Both the PC2 laboratory and the microscopes will be fully up and running early in 2009.

Microscience 2008 – Royal Microscopical Society UK conference, London, June 2008

Many of our Bosch Young Investigators (BYI) have been gathering superb images and data, from the microscopes used within the Facility, investigating various areas of medical science. Some of this data was presented recently in a poster by Dr Louise Cole, Microscopy Officer, at the Royal Microscopical Society (RMS) UK conference, Microscience 2008 in London ExCel, 23-26 June and also more locally at the 1st Advanced Bioimaging Workshop at the University of Western Sydney in September 2008. The research data presented investigated aspects of Duchenne Muscular Dystrophy, neurobiology of the aging retina, nerve to muscle interactions, causes of skin cancer, to name but a few.

Louise won a prize in the Light Microscopy category of the RMS Micrograph competition at Microscience 2008. The prize was awarded for her bright-field image (taken on the Zeiss deconvolution microscope) of a prepared slide of selected diatoms arranged carefully by Klaus Kemp on a microscope slide to form the shape of bicycle (no more than .1 mm long!).



Left: Dr Louise Cole accepting her Micrograph award from the RMS President, Prof. M. Rainworth. Right: Award winning image

Live Cell Imaging Workshop July 2008, Anderson Stuart Building, University of Sydney



Left: Dr Stephen Cody (Ludwig Institute for Cancer Research, Melbourne) talks about theoretical and practical aspects of confocal microscopy. Right: Mark Richardson (Olympus Australia) demonstrates the CellR microscope.

In July 2008, the AMF hosted the first one-day Bosch Institute Live Cell Imaging Workshop that was held in the Anderson Stuart Building. The workshop was attended by over 60 registrants that included seven invited speakers and over fourteen trade representatives from a total of eight company sponsors. The workshop consisted of introductory talks on confocal imaging, spinning disk systems and trouble-shooting tips on live cell imaging techniques. Three Bosch members, Dr Othon Gervasio (Physiology), Dr Sabine Wimmer-Kleikamp (Pathology) and Dr Margot Day (Physiology) gave presentations on live cell imaging applications. Practical sessions involved imaging live cells by wide-field and confocal fluorescence microscopy, photobleaching and fluorescence resonance energy transfer (FRET) experiments and demonstrations of 3-D image analysis software.



Live-Cell Imaging Workshop attendees gathered in the courtyard of the Anderson Stuart Building

Successful Grant applications in 2008 for AMF equipment

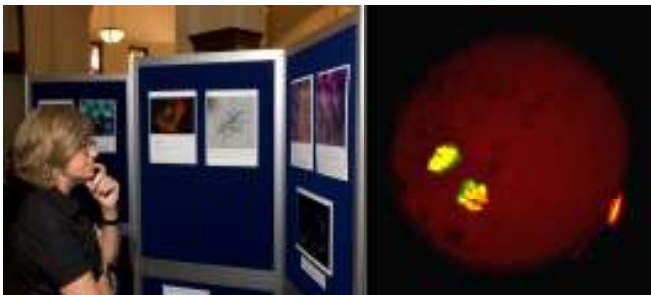
Many thanks to all Bosch academics that have written and/or supported the successful grant applications for AMF equipment in 2008. Please note only CIA is listed here.

- NH&MRC Equipment Grant 2007/2008, \$17,386 (T. Chan-Ling) and Rebecca L. Cooper Medical Foundation Grant 2008, \$20,000 (H. Allbutt) for funds towards a motorised XYZ microscope stage and stereology software.
- Clive & Vera Ramaciotti Foundation Equipment Grant 2008, \$30,000 (R. Mason) and NH&MRC Equipment Grant 2009, \$50,000 (G. Halliday) for a laser microdissection microscope.

- ARC LIEF Grant 2008 \$500,000 for funds towards multi-photon microscope for in vivo imaging (S. Solomon)
- Rebecca L. Cooper Medical Foundation Grant 2009, \$20,000 towards Imaris 3-D analysis software (M. Weible).

Bosch Institute Micrograph of the Year Competition 2008

Almost 60 entries were submitted to the Bosch Institute Advanced Microscopy Facility Micrograph of the Year competition in November 2008. Assoc. Prof Cedric Shorey judged the competition and the Top 20 images were on display in the Anderson Stuart Common Room during the week of the BYI Symposium (mid-December). Congratulations to the five winners: Yan Li (Human Reproduction Unit, Royal North Shore Hospital), Nick Whitehead (Physiology), Andrea Markus (Basic & Clinical Genomics Lab, Physiology), Erica Jeong (Anatomy) and Hyunchul Lee (Physiology). Thanks also to the event sponsors: Bosch Institute, Carl Zeiss Australia, Olympus Australia, Nikon Instruments and Coherent Scientific and Perkin Elmer.



Left: Dr Andrea Markus (a prize winner) views the Top 20 images on display. Right: Micrograph of the Year 2008 taken by Yan Li showing the time of fertilisation when a sperm first attaches to the oocyte surface. This triggers the second meiotic division. Image shows a mouse 1-cell embryo double-stained for nuclear DNA (red) and methylated 5-cytidine (green).

New Developments in the Advanced Microscopy Facility

In 2008, the Nikon Eclipse E800 Macro-imaging microscope was fitted with its own Leica DFS colour CCD camera and LAS image acquisition software. This microscope is unique in the AMF since it is equipped with three condensers that support 0.5x, 2-5x and 10-100x objectives and thereby allows both macro- and micro-imaging of samples by bright field and fluorescence microscopy. This instrument is currently located in Rm 663a, Blackburn Building.



Caudal cortex of a *ten_m3KO* mouse, including somatosensory barrel cortex and visual cortex, reacted with an antibody for *c-fos*, an immediate early-gene transcription factor, following both behavioural testing in a spatial memory task and acute visual deprivation. Left: Using x4 objective. Right: Using x40 objective. Images taken by M. Bourke (Physiology) using Nikon E800 macro-imaging microscope.

New accessories for the Zeiss LSM 510 Meta confocal microscope for live cell imaging

Two items, the AquaStop II and a mounting frame for glass coverslip-bottomed Multi-well culture plates, have been purchased recently (using RIBG funding) to improve live-cell imaging capabilities on the Zeiss LSM 510 Meta confocal microscope. The AquaStop II protects the objectives and microscope stand, as well as more sensitive components, such as filter sets, analyzers and the beam path, from fluid spills and dirt. It consists of transparent silicon sealings that fit on each objective and a sealing that covers the entire objective (see below). In the latter, there is a groove where liquid spills collect and drain away from the microscope to a tubing and collection tube. The mounting frame, on the other hand, allows Multi-well glass coverslip-bottomed culture plates to be placed directly on the microscope stage and for live cells to be imaged directly with minimal disturbance.



Left: AquaStop II (Carl Zeiss) in place on Zeiss Meta confocal microscope. Right: 12-well glass coverslip-bottomed plate for culturing and imaging live cells (MatTek Corp.).

Upcoming Microscope Group Training Workshops 2009

Group training workshops on all Microscopes in the AMF have now been scheduled for the first half of 2009. The Group training sessions are designed to give you a general overview of the instrument and its range of applications rather than focus on one specific application that you might have. So they are a good starting point if you want to know more about a particular instrument especially if you are just thinking about experiments that you would like to do. Numbers are limited so please be sure to book early. The dates are as follows;

Zeiss Deconvolution Microscope Workshop: Friday Mar 6, 2-5 pm. Rm S443 Anderson Stuart Building.

Zeiss LSM 510 Meta Confocal Microscope Workshop I:

Thursday Mar 12, 2-5 pm, Rm S443 Anderson Stuart Building.

Zeiss LSM 510 Meta Confocal Microscope Workshop II:

Thursday Mar 19, 2-5 pm, Rm S443 Anderson Stuart Building.

Zeiss LSM 510 Meta Confocal Microscope Workshop III:

Thursday Apr 2, 2-5 pm, Rm S443 Anderson Stuart Building

Nikon E800 Eclipse Macro-imaging Microscope Workshop:

Thursday May 7, 2-5 pm. Rm 663a, Blackburn Building.

Bosch Olympus Microscope Workshop: Thursday May 21, 2-5 pm, Rm 205 Bosch Building (Pharmacology).

Laser Capture Microdissection Microscope Workshop:

Thursday June 4, 2-5 pm, Rm 663a Blackburn Building.

Reminder: All group training workshops are open to registered users of the Bosch Institute Advanced Microscopy Facility ONLY. For further information on how to register for the Facility and about the workshops, please contact the Microscopy Officer, Dr Louise Cole by telephone (02-93512520 or 0403-072516) or by email (louise.cole@bosch.org.au).