

SUPPORT UNITS & COLLABORATIVE CENTRES

NATIONAL INSTITUTE OF BIOSCIENCE

Convenor: Prof. Jonathan Stone

Executive Officer: Jerry Skinner

The National Institute of Bioscience (NIB) is a network with over 600 members representing many parts of ANU and beyond. All that is needed to become a member is to have some interest in the biosciences.

Now in its fourth year, the NIB has established programmes that promote cross-disciplinary and cross-campus collaboration in the biosciences and build a sense of disciplinary collegiality. Our other aim is to raise the profile of ANU bioscience research and teaching through fostering outreach activities such as National Science Week events, school activities and public lectures. Much of the NIB's work is undertaken by the ANU College of Science.

MOLECULAR BIOLOGY FACILITY

Facility Manager: Dr Julie Christie.

The RSBS Molecular Biology Facility was established in 2002 to give ANU researchers access to the newest techniques in molecular biology. The Facility offers training, expert advice and access to the latest equipment. The Facility supports spotted microarray technology, 2D gel proteomics, real-time PCR and in 2005 we saw the arrival of laser capture microdissection. Key items of equipment include:

- PALM laser capture microscope (joint-hosted with the Electron Microscopy Unit)
- Corbett Rotorgene real time thermalcyclers
- Affymetrix array scanner
- 2D electrophoresis apparatus
- Protein fractionator.

The Facility offers access to general molecular biology equipment including a biological safety cabinet and a chilled multi-rotor centrifuge.

The Facility also runs regular workshops in conjunction with the Mass Spectrometry Facility, the Electron Microscopy Unit and the National Institute of Bioscience. www.rsbs.anu.edu.au/Products&Services/MolecularBiologyFacility/index.asp.

ARC CENTRE OF EXCELLENCE FOR INTEGRATIVE LEGUME RESEARCH

The ARC Centre of Excellence for Integrative Legume Research (CILR) is a partnership that brings together leading plant research scientists located at the University of Queensland, Australian National University, University of Melbourne and the University of Newcastle.

Three of the ANU Chief Investigators are located within the Genomic Interactions Group, RSBS; Prof. Barry Rolfe, Dr Georg Weiller and Dr Michael Djordjevic. Research in the Centre is providing critical insights into mechanisms of meristem and organ differentiation and intercellular communication, utilising comparative genomics on the internationally recognised model legumes *Lotus japonicus* (Lj) and *Medicago truncatula* (Mt). Studies also focus on two major crop legumes – pea and soybean. New knowledge of plant growth processes through mechanistic analysis of organ induction will provide the tools to optimise the legumes' productivity, quality, and environmental adaptation. This in turn will have a direct impact on agricultural sustainability, environmental quality and potential value-added products for human health. In April the Centre was reviewed and received an excellent report on its work.

www.cilr.uq.edu.au/our-centre.



The new laser cell capture microscope. Julie Christie prepares to "cut and paste" material with microscopic precision.

CIMMYT CENTRE FOR IMPROVEMENT OF CEREAL CROPS

The international effort to create cereals that are able to retain hybrid vigour by producing fertile seed entirely derived from the mother plant has a node located in the Plant Cell Biology Group. The essential objective is to modify ovule development in cereals and initiate the process of apomixis. We draw support from a consortium of European and USA companies and public good organisations, including the ARC. This has allowed the assembly of a team of top international scientists, including Drs Anna Marie Sorensen and Dean Rouse. A notable feature of the collaboration is the secondment to Australia of CIMMYT's premier apomixis scientist Dr Enrico Perotti. ANU is the only university worldwide to have this coordinating role, which is testament to the value of science at RSBS. www.cimmyt.org.

COOPERATIVE RESEARCH CENTRE FOR GREENHOUSE ACCOUNTING

The Cooperative Research Centre for Greenhouse Accounting head office is located within RSBS.

The Centre is a national collaboration of scientists leading research, informing policy, and advising industry in:

- measuring, forecasting and accounting for carbon pools in wood, soil and biomass
- systems and practices to minimise greenhouse gas emissions while maximising productivity in agriculture
- plant responses to climate change, higher concentrations of carbon dioxide, nutrient availability and stress
- the ecological and hydrological impacts of climate change
- the risks to the carbon cycle posed by climate variability and change.

As well as ANU, core participants of the Centre include the Australian Greenhouse Office, the Bureau of Rural Sciences, CSIRO, the Department of Conservation and Land Management (Western Australia), the Department of Natural Resources and Mines (Queensland), the Department of Primary Industries and Fisheries (Queensland), Forests NSW, the Department of Sustainability and Environment on behalf of the Victorian Government, and the University of Melbourne.

Further information about the CRC for Greenhouse Accounting is available at www.greenhouse.crc.org.au or by telephoning the Centre on +61 2 6125 4020.

COOPERATIVE RESEARCH CENTRE FOR TROPICAL PLANT PROTECTION

Research in the CRCTPP (based at the University of Queensland - www.tpp.uq.edu.au) develops sustainable technologies for protecting Australia from exotic and endemic pests, and aims to increase plant resistance to pests. The CRCTPP supports a postdoctoral fellow, Dr Dubravka Skalamera, and a PhD student, Ginny Lim, to work in the Plant Cell Biology Group on collaborative projects with other CRCTPP staff. Ginny's project aims to isolate a tomato gene that provides resistance to the fungal disease fusarium wilt. Dr Skalamera's project aims to elucidate the molecular basis of pathogenicity in *Phytophthora* zoospores.

MASS SPECTROMETRY FACILITY

The RSBS Mass Spectrometry Facility (MSF) was officially opened by Professor Peter Hoj, Head of the ARC, on 11th August. The MSF is an important new element of research infrastructure for the biological and biomedical sciences, established and maintained by RSBS. It will provide long-term support for researchers at ANU and in the wider research community of the ACT region. This year the MSF has been involved with running a "Functional Genomics Workshop: New Tools for Bioscientists" (5-7 Dec) and the following projects:

- identifying protein and peptide signals which regulate growth and development (with GIG and CILR)
- monitoring the biosynthesis of cellulose (with PCB)
- examining the metabolome of the nodulating legume to further our understanding of nitrogen fixation (with GIG and CILR)
- quantifying monosaccharides, flavonoids and other primary and secondary metabolites (with EB, GIG and BaMBi).

The following instruments are housed in the MSF:

- Thermo Polaris Q GC/MS (EI and CI)
- Thermo LCQ Deca XP Plus 2D-LC/MS (ESI, nano-ESI, and combined APCI and APPI)
- Micromass QToF2 LC/MS (ESI and nano-ESI)
- Bruker Omnistar MALDI-TOF MS
- Shimadzu LC-10 VP series HPLCs (UV/Vis diode array, fluorescence, ELSD).

The MSF is located in Room 060 in RSBS and is run by Dr Charles Hocart and Ms Carolyn McKinlay. www.rsbs.anu.edu.au/Products&Services/MSF/index.asp.

ANU ELECTRON MICROSCOPY UNIT

Facility Coordinator: Dr Sally Stowe

RSBS hosts the ANUEMU, which provides light and electron microscopy facilities to staff and students in biological and materials science across the ANU campus. The unit includes four scanning and three transmission electron microscopes, and a dual beam scanning EM/focused ion beam. Light microscopes includes a range of conventional and advanced instruments.

The unit is located within RSBS, is supported and administered by the school and provides access to the latest imaging technologies for our research. A full description can be found on the website www.anu.edu.au/EMU/index.html.

Highlights of 2005:

■ In 2005 we introduced a PALM laser cell capture microdissection system, jointly operated by the EMU and the RSBS Molecular Biology Facility. This instrument provides a "keystone" technology bridging morphological studies and powerful new techniques

in genomics and proteomics. By isolating and collecting cells and even chromosomes under precise visual control, it allows the new analytical techniques to be applied with an unprecedented level of precision and confidence. It means that a new range of open-ended questions can be posed, depending on exhaustive examination of small, well-defined tissue parts.

Lily Shen uses the digital cameras of one of the EMU's transmission electron microscopes to view sections of cells she has prepared.

