

Technical Support and Research Services

The capacity of the School to undertake leading-edge research is underpinned by highly skilled technical staff, whose skills and expertise complement those of the academic staff.

Technical Support

The output of experimental groups in the RSC is supported by technical staff attached to individual groups. Their broad technical expertise is enhanced by additional specialist knowledge and skills in areas of direct relevance to the research group. Technical staff provide continuity within particular groups, but their expertise is also made available to other groups. The technical staff contribute to the research projects of their groups and this is acknowledged by co-authorship of publications. In addition, the technical staff assist the Laboratory Manager in implementing and monitoring safety policy within the groups.

ANU Microanalytical Services Unit

During 2002, the Unit completed a total of 2360 analyses on 1901 samples submitted by 192 individuals, most of which (80%) were CHN analyses. The largest increase was in the request for sulphur and halogen analyses. Universities were the major users of the non-ANU category (36.5%) and included those of Newcastle, New South Wales, Sydney, New England, Western Australia, Wollongong, Western Sydney Macarthur Campus, James Cook Townsville Campus, Deakin and Griffith, as well as University of Technology, Sydney, Australian Defence Forces Academy, and Sydney Grammar School.

During the year Viki Withers and Sasha Melnitchenko attended a two-day course on graphite furnace AAS. Reet Bergman remains a member of the RSC Advisory Committee on Safety. (*S.-R. Bergman, V.L. Withers[⊕], A. Melnitchenko*)

⊕ Part-time [relates to hours worked in a unit]

Computer Unit

The computer unit provides support for the diverse range of software and hardware used in the School. The School has 45 Unix workstations (HP, Linux, IBM, SGI and Sun), which are the main computational units, and 120 Apple Macintosh computers, which are the desktop systems for most staff and students. In addition, 65 IBM PCs and 2 Digital Vax stations (running VMS) are used for controlling experimental equipment and data collection. Printing services are provided by twenty laser printers and three Fuji-Xerox colour thermal wax printers. A Sun is employed as the main e-mail, file and web server.

The major hardware acquisitions this year have been of Apple Macintosh emac, iMac, iBook and G4 systems as well as one Sun Workstation, three SGI Workstations and approximately sixteen new PCs running either or both of Linux and various versions of Microsoft Windows.

We have also moved to keeping a "mirror" copy of the file systems on the School's main servers as well as a tape backup of these file systems.

In April Matt Gray joined us for three months from the UK and in July Rado Faletic joined the Unit.

The School's web page is administered by Chris Blake, and can be found at: <http://www.rsc.anu.edu.au>. (P.R. Cohen, C.D. Delfs, R. Faletic, M.J. Gray, G.A. Lindsell)

Single Crystal X-ray Diffraction Unit

The unit performs crystal structure analyses on samples provided by various groups within the RSC. X-ray diffraction data sets are collected on a Nonius Kappa-CCD area-detector diffractometer equipped with IFG capillary X-ray-focusing collimators and an Oxford Cryosystems crystal cooling device. The equipment has been used constantly for the last 3 years, but this year several components required repairs, which halted data collection for significant periods of time. Diffraction data can be used to determine the locations of all atoms within the unit cell of the crystal, and in this way the atom types, connectivity, and distances and angles within the constituent molecules are established. These computations are performed using maXus, Crystals and Raels software packages. Several structures needed to be refined in non-standard ways to allow for twinning, stacking faults and composite space groups and were solved in collaboration with Professor David Rae.

In total, 167 data sets were collected and 137 final reports produced for the year. External work was performed for the Australian Defence Force Academy, University of Adelaide, RMIT University and South Australian Museum. (A.J. Edwards, A.C. Willis)

Group	Data Sets Collected	Reports Completed
RSC	133	106
Others (ANU)	25	24
Others (External)	9	7
TOTAL	167	137

Mass Spectrometry Service

In total, 5305 samples were analysed by the MS unit staff during 2002. This figure represents a decrease of 10% on the previous year. The Banwell group (23%, 1241 samples) and the GSK group (25%, 1317 samples) continue to be the heaviest users of MS services. The remainder of RSC accounts for an additional 28%. External use decreased markedly and income derived from external analyses was \$9,000 (down from \$23,800 in 2001).

Ms Jenny Rothschild resigned after seventeen years of exemplary service to the unit. The year ahead will be one of rebuilding following her retirement and the pending departure of Dr Phil Jackson. Mr Gordon Lockhart will continue training to work in the facility; it is expected that a replacement for Dr Jackson will be employed by mid-year; and it is anticipated that another part-time position will also be established and filled. Installation of the Fourier Transform Ion Cyclotron Resonance (FTICR) mass spectrometer, the funding for which was secured by an ANU-USyd-ADFA consortium through the LIEF program, will be completed. The addition of this instrument, complete with four ionisation techniques (EI/CI, ESI, LSIMS, MALDI), will give the MS unit a greater capability and research focus.

Internal Management

The MS service has a website (http://www.rsc.anu.edu.au/mass_spec). Useful information concerning the services provided and instrument specifications can be found using the links on this site, and sample submission forms can be downloaded.

University NMR Centre

The University NMR Centre is equipped with Varian INOVA 600, INOVA 500, INOVA 300, Mercury 300, Gemini 300, and XL 200 spectrometers. The Centre is able to cater for a wide variety of NMR experiments including solid-state NMR, spectra of low frequency nuclei, multidimensional NMR, dynamic NMR. The NMR Centre, in partnership with the University of Sydney, the University of Wollongong, the University of Newcastle and the University of New South Wales, has been granted ARC funds to purchase an 800 MHz NMR spectrometer with a cryoprobe primarily for advanced biomolecular NMR.

During the year the University NMR Centre catered for 150 users from RSC, RSPHYS, RSBS, JCSMR, The Faculties, the Australian Defence Force Academy and The University of Wollongong. Applications include *in vivo* NMR, nucleotide and protein structure determination, analysis of natural products and synthetic intermediates, NMR of organometallic compounds and variable temperature NMR. The RSC was the largest user consuming 71% of the time followed by The Faculties (14%) and JCSMR (11%). (M.A. Keniry, C.J. Blake, P.T. Culnane, P.M. Simmonds)

Research Services

Staff of this section provided expert advice on the design, manufacture, maintenance, and refurbishment of equipment to the academic and research staff of the School, the ANU, and the broader community. The primary focus of this section is the support of RSC research and teaching programmes.

Carpentry and Paint Workshops

These workshops are well equipped with carpentry and joinery machinery and spray painting facilities, and provide outstanding custom furniture and fittings for the School's laboratories and offices, in addition to specialised scientific apparatus and specialised surface finishes to engineering materials of all workshop sections. Major projects for this year included the fitting of chemical resistant laminates to laboratory benches, fabrication of numerous custom computer desks, and refurbishment of furniture in several office suites. (I.J. Clarke, R.J. O'Brien, A. Reardon)

Cryogenics Unit

This unit provides cryogenics, liquid nitrogen and helium, to the School and the wider ANU community (Department of Chemistry, The Faculties, RSAA (Stromlo Observatory), RSES, and CSIRO). (P. Devitt, R.J. O'Brien, A. Reardon)

Electrical Unit

The unit provides services in electrical wiring and modifications, new equipment verification and installation, maintenance of electrical research and plant equipment, and day-to-day organisation and coordination of building maintenance contractors. The mandatory electrical safety checking of appliances throughout the School is co-ordinated by staff in this unit. (M. Bush, R.J. O'Brien, A. Reardon)

Electronics Unit

This unit is equipped with design, development, and construction facilities, including specialised services for computer-aided design and PCB manufacture. In addition electronic repair services are provided for the research groups within the School and the instrumentation service units, such as the *Mass Spectrometry Unit*, in preference to using external service engineers. (R.T. Koehne, H. Lawatsch, D. Lu, L.E. Waldron)

Glassblowing Unit

Staff in this unit provide expertise and resources for the design, construction and repair of glass apparatus, together with advice on any aspect of construction, materials, or safety. Throughout 2002 the unit continued to provide an impeccable service to research programs within the RSC and the wider ANU community, as well as undertaking work for external clients. (P. Siu, C.J. Tomkins)

Mechanical Workshops

This main workshop is equipped with precision engineering capabilities for instrument development (e.g., precision milling, turning, and welding), mechanical maintenance and repair, and the design and manufacture of prototype apparatus in metal or plastic.

In support of all laboratory research programmes, extensive maintenance, repair and fabrication services were provided by the workshop. Installation of services (gas, water, vacuum, equipment racks) associated with fume-cupboard and laboratory upgrades continued, together with support of the environmental program to convert instrument cooling systems reliant on mains water to recirculating chilled water systems. The workshop also continued to provide support to the wider ANU community, such as the Facilities and Services Division zone-3 maintenance section.

The mechanical prototype workshop provides mechanical engineering services, prototypes of advanced scientific instrumentation, high vacuum, cryostat, and helium leak detection services to the School. (P. Devitt, R. Filardo, M.J. Hill, K.L. Jackman, R.J. O'Brien, D.C. Pepper, A. Reardon)