

MICROMANIA

JUNE 2007



THE UNIVERSITY
OF ADELAIDE
AUSTRALIA

FROM THE DIRECTOR- IN THE WAKE OF NCRIS

INTRODUCTION

Adelaide Microscopy is about to become part of a node of the Australian Microscopy and Microanalysis Research Facility (AMMRF). The impact this will have on Adelaide Microscopy, and on the research community Adelaide Microscopy serves, is potentially the most important change in the provision of advanced microscopy and microanalysis for Adelaide in the past 15 years.

BACKGROUND

NCRIS (the National Collaborative Research Infrastructure Strategy) set out in 2005 to identify the needs in research infrastructure in Australia, and, with a budget of \$550M, devise a plan to maximise the investment to ensure Australia was well placed into the next decade. Sixteen Capabilities were identified and Characterisation was one of them to be funded in the first round. Capability 6.3 (characterisation) consists of three parts, 1) Neutron Scattering, 2) X-ray Techniques, and 3) Advanced Microscopy and Microanalysis. The first two are basically the OPAL project at ANSTO and the Australian Synchrotron. For Advanced Microscopy and Microanalysis it was envisaged that a network of nodes in each major capital city would be formed so that there would be "a full, modern suite of instruments, building on existing investments, together with sufficient skilled staff to ensure that the potential of the techniques is fully realised and the facilities operate at a high level of productivity".

It has been recognised that Advanced Microscopy and Microanalysis are enabling technologies that have a major impact on the fields of Medicine, Geology, Manufacturing, Environment, Nano-Technologies and many others that will affect the daily lives of people into the next decades. Many of the problems facing man will continue to be resolved at the micro/nano scale.

THE ADELAIDE NODE

The Adelaide Node of the AMMRF is based on the bid put forward by the South Australian Regional Facility for Microscopy and Microanalysis. This informal grouping of people from within the three Universities in Adelaide, was initially brought together by Professor Margaret Sedgley in 1996, to put collaborative bids forward to funding bodies for large (expensive) infrastructure in Microscopy and Microanalysis. It has had major success over the years with LIEF bids to the ARC and to the Premiers Science and Research Fund. The outcomes of this success have focused on Adelaide Microscopy (UA), SCOPES/ FMAIF (Flinders) and the Ian Wark Research Institute (UniSA).

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The AMMRF will provide funding for a State of the Art Duo-Beam* Instrument to be housed in Adelaide Microscopy, a new Time of Flight Secondary Ion Mass Spectrometer (ToF-SIMS) to be housed at the Ian Wark. It also provides salaries for three Engineers/Senior Technicians to operate the above instruments and in Flinders case operate the Scanned Probe Microscopy facilities they have developed. In all this represents a \$6.5M investment over the next 5 years. Apart from the Flagship Instruments, and just as importantly, the Adelaide Node will provide a portal through which Adelaide Based researchers will have access to all of the other Flagship Instruments in the other nodes around Australia at an agreed minimal fee. The AMMRF will also develop links with other overseas facilities providing mutual access to their equipment and expertise.

BUILDING ON SUCCESS

The aim of the AMMRF was not to provide the basic set of tools for Advance Microscopy or Microanalysis. Instead it aimed to build on the existing infrastructure by integrating new technologies that were either lacking in Australia or where existing capacity was being exceeded.

Adelaide Microscopy was well placed with its Electron Beam Instruments, Confocal Microscopy, X-ray Imagers and Micro Analytical Instruments and its expertise in all of these fields to be the foundation upon which to build such a facility.

Getting new instrumentation and a staff person to run it is good. However it does not solve two ongoing issues that Adelaide Microscopy faces. One is the lack of space to house the ever expanding range and number of instruments we have in our repertoire and the other is the replacement strategy we have not developed for the replacement of our aging suite of instrumentation. Most of the Electron Beam instruments are now 13 years old and while they are still maintained in excellent working order their age means that they are becoming more difficult to integrate into modern computer networks and when failure of electronic systems occur, it is becoming harder to source components to carry out repairs. The 100kV TEM, 200kV TEM, the SEM, the FEGSEM and the Microprobe are all critically used instruments and provide the backbone of our instrumentation.

Access to similar instruments will be available through the National Network, but these instruments would be considered workhorse instru-

ments and the need to have them available locally is not only desirable but critical to the teaching and training of post graduate students.

The University of Adelaide has supported Adelaide Microscopy with the staff resources to maintain a comprehensive facility for Advanced Microscopy and funding opportunities for major instruments is always being explored through ARC/NHMRC. These sources are at best a lottery and while the AMMRF will strategically place new and novel equipment around Australia it will not initially be in a position to replace workhorse instruments.

There is currently negotiation to fund 50% of a new Microprobe with a major corporate user but the other \$750K will need to be found. If one SEM and the 100kV TEM were replaced we would need to find another \$2M. I am seeking the support of all users to make representation to their own groups to see if these sums of money can be found within existing budgets or in strategic initiatives within faculties that can be shared across Microscopy and Microanalysis to insure that Adelaide University remains at the forefront of these technologies

John Terlet

Director

Adelaide Microscopy

*The Duo-Beam Instrument is a combination Focused Ion Beam (FIB) and a Field Emission Scanning Electron Microscope. This enables this instrument to image at ultimate resolution (sub nanometre) in the SEM mode and then be able to use the Ion beam to mill samples to expose features or the manufacture thin foils for examination in the TEM or to make prototype nano-components.

Imagine a machine which can section a sample, image it in many modes (Secondary Electron, Backscattered Electron, Crystal Orientation, Elemental (EDS)) and use any of these modes to reconstruct the three dimensional object with nano-metre resolution - Imagine no more!



MICROMANIA

AMAS X

The University of Adelaide under the auspices of Adelaide Microscopy have been selected to hold the tenth conference of the Australian Microbeam Analysis Society (AMAS). AMAS is the foremost micro-analytical society in Australia. The AMAS biennial conference brings together eminent microanalysts from Australia and overseas. The format of the Conference is one day of

workshops and three days of presentations. The workshops are designed to increase the skills of those working in the field of microanalysis. The range of micro-analytical equipment and staff expertise at Adelaide Microscopy couple with invited speakers will mean that the workshops can be "hands-on" and will be of particular value. The presentations are diverse and

is fertile ground for cross discipline interactions. Keep a watch on the Adelaide Microscopy website (www.adelaide.edu.au/microscopy) for information on AMAS X.

NEW IMAGES FOR THE CM200

The capabilities of the FEI CM200 transmission electron microscope have been greatly enhanced by the installation of a Gatan Orius, slow-scan digital camera. Funded by The University of Adelaide, The Ian Wark Research Institute (University of South Australia), The South Australian Museum and Adelaide Microscopy the camera produces images that are comparable (if not better) than those recorded on photographic plates

without the delays introduced by photographic processing. The camera is completely integrated with the CM200 so that instrument parameters such as magnification are automatically recorded with the captured images.

The integration of the camera and the microscope allows the camera to be used for automatic focussing, astigmatism correction and beam alignment. The software supplied

with the camera (Gatan Digital Micrograph) can be used to analyse both images and electron diffraction patterns. The fitting of the camera has not compromised any of the major functionalities of the CM200. In particular, the PEELS functionality of the microscope has been enhanced by the installation of the camera.

OH&S NEWS

Adelaide Microscopy is in the process of revising and updating its Safe Operating Procedures, Risk Assessments and New User Induction process. These documents will be available on a CD, along with a comprehensive Powerpoint introduction to the centre. This user-friendly and interactive presentation will familiarise the new user with the layout of the centre, the location of safety equipment and all of the important aspects of Adelaide Microscopy's OH&S information.

Training records are also being introduced, and will in time be updated to include all current users. For any enquiries regarding these issues, please see an AM staff member.

JUST JOKES

An atom walks into a bar and asks if anyone has seen his electron.

The bartender says no, and asks the atom if he's sure his electron is missing.

Yes, says the atom, I'm positive.

NEW STAFF MEMBER

We recently have had an addition to the AM team, Eliza Glastonbury. Eliza started at Adelaide Microscopy in March and is the new administrative assistant.

Any queries or bookings can be made through Eliza at the reception desk or over the telephone.

2007 FEE STRUCTURE

Service	U of A Student	U of A Staff	External	Corporate
All Instruments	\$20/hr	\$40/hr	\$80/hr	\$260/hr
Cryo SEM	\$66/hr	\$66/hr	\$66/hr	\$66/hr
Technical Assistance	\$45/hr	\$45/hr	\$45/hr	\$45/hr
ICPMS Gases	\$10/hr	\$10/hr	\$10/hr	\$10/hr

DIARY DATES

MONTHLY BBO	Last Friday of the month
HAPPY BIRTHDAY ELIZA	August 11th