



Lightspeed

Australian Synchrotron News
February 2009

Diary note

The Australian Synchrotron is proud to host
SRI2009 27 SEPTEMBER TO 2 OCTOBER 2009
The 10th International Conference on Synchrotron Radiation Instrumentation
AT THE MELBOURNE EXHIBITION AND CONVENTION CENTRE

Australian Synchrotron 

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FROM THE DIRECTOR: FOR THOSE OF YOU WHO CAME IN LATE



Prof. Robert Lamb


It's traditional in many cultures to start the New Year by reflecting on past achievements and planning for the future.

For me, the highlights of 2008 would have to be our very successful Asia-Oceania Week Conference and associated meetings, and the fact that the Australian Synchrotron now has eight operating beamlines. The last of our initial set of beamlines, imaging and medical therapy, is in commissioning, with the enthusiastic assistance of expert users keen to test and extend its fledgling capabilities.

Looking to the future, we are about to start developing 'Science Case II', the case for building the next set of beamlines and enhancing the synchrotron in general to meet the needs of our users.

I should explain that the purpose of the new science case, like the original science case published in 2003, is to present the user community's priorities for specific beamlines and modifications to the synchrotron light source. We now have a lot more experience than in the early days.

We will begin the process of developing the new science case by talking to users and potential users about their requirements – and wish lists – for synchrotron techniques to assist their research and development work. The process will be managed by our new head of science, Professor Ian Gentle.

You can expect to hear from us shortly! 

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UP TO SPEED

This month our short interview features Mark Tobin, who heads the infrared beamline team at the Australian Synchrotron.



Mark Tobin

Describe your job in 25 words or less.

I lead the development of the IR beamline and IR science at the synchrotron, ensuring the requirements of the Australian research community are met.

ART WORLD TURNS TO SYNCHROTRON FOR ENLIGHTENMENT

Paintings are often attributed to particular artists on the basis of expert assessment of styles and materials, particularly when the work is unsigned.

Now Australian scientists and paintings conservators are using synchrotron techniques to shed new light on the composition of artists' pigments. Their efforts are helping to establish a library of pigment 'fingerprints' that will help curators, conservators and collectors answer questions about who painted a particular art work or when it was painted.

Paintings conservator Linda Waters is working with Deborah Lau and Natasha Wright from CSIRO Materials Science and Engineering and other CSIRO scientists. Their interest was sparked several years ago by an unusual sample of cobalt blue that defied easy analysis.

Synchrotrons provide information not accessible by other laboratory-based methods and their brilliant, highly-focussed x-ray beams can analyse the smallest of samples – an essential consideration when it comes to taking pigment samples from precious works of art.

In August 2008, Natasha and her colleagues used the powder diffraction beamline at the Australian Synchrotron to analyse several samples of cobalt blue. Their results showed some clear differences between cobalt blue from different sources.

The researchers also plan to use the x-ray fluorescence microprobe to examine layers of pigments, and the x-ray absorption spectroscopy beamline to obtain information to complement their powder diffraction studies.



Not all cobalt blue pigments are the same

(Photo: CSIRO Materials Science and Engineering)

ROCKS IN THEIR HEADS

Australian scientists have helped resolve a geological controversy surrounding a rare type of ancient volcanic rock, leading to valuable new insights into the Earth's early geological processes.

Working with UK and US researchers, Professors Hugh O'Neill (Australian National University) and Leonid Danyushevsky (ARC Centre of Excellence in Ore Deposits, University of Tasmania) developed a powerful new synchrotron technique and used it to study 2.7 billion-year-old samples of komatiite, an ancient volcanic lava from Zimbabwe.

Komatiite's unusual chemical composition means it must have formed from much higher degrees of melting of the Earth's mantle than modern lavas. Until the new synchrotron studies, it was unclear whether this meant temperatures up to 500 degrees hotter than the present mantle ('hot-melting'), or less extreme temperatures in the presence of water ('wet-melting').

Using a beamline at the Advanced Photon Source (APS) in Chicago, the team

Best aspect of your job?

Working with a great team who have helped develop the IR beamline into a world-leading facility.

Worst aspect of your job?

Balancing my personal life with the 24-hour nature of synchrotron operations.

What have you learnt about

Australian scientists as a result of your involvement with the Australian Synchrotron?

They are always ready to try something new or to try a different approach if the original plan did not work.

Best things about living in Melbourne and why?

Great countryside and beaches close by. Mornington Peninsula and the Yarra Valley are favourite destinations for a day out. And the fish and chips are better than in England!

Your favourite overseas destination and why?

It's difficult to choose, but probably France. Great food and wine, very relaxed, superb trains and interesting cars.

What kinds of user projects would you like to see more of?

More research into the behaviour of materials in extreme environments. The Australian Government has awarded us a grant to enable IR beamline team members to travel to an overseas synchrotron - in France coincidentally - to gain experience in high pressure techniques for IR microscopy.



BEAMTIME APPLICATIONS NOW OPEN

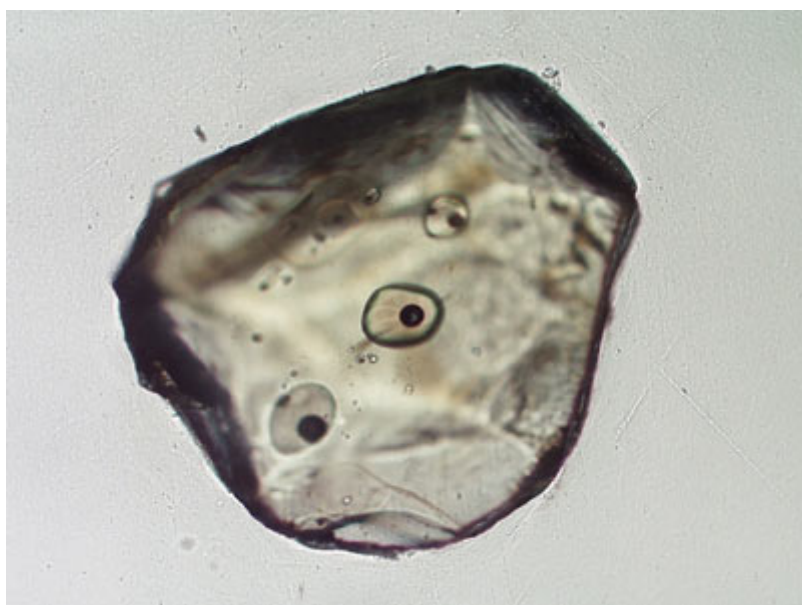
Beamtime submissions opened for the 2009/2 round on 28 January 2009 (not 11 February 2009 as previously advised) for beamtime between May and August 2009.

- IR (infra red microscope and high res far-IR): email IR@synchrotron.org.au
- PX (protein crystallography): email PXContact@synchrotron.org.au
- PD (powder diffraction): email powder.diffraction@synchrotron.org.au

focused on tiny drops of komatiite volcanic glass trapped inside crystals. They found the glass had not oxidised, indicating that the small amount of water in the glass was probably all there was when the rocks originally formed. The researchers concluded that the hot-melting theory was correct, implying that the Earth's mantle was much hotter billions of years ago than it is now, which helps explain why some valuable mineral deposits are only found in ancient rocks. The work was published in *Nature* in October 2008.

Hugh is off to the APS again in March 2009 to apply the same method to other glass inclusions from Leonid's extensive collection. The water contents in these inclusions were analysed by Leonid on the Australian Synchrotron's infrared beamline in October 2008. Because the method only requires tiny amounts of glass, it can be used on rare samples, like the komatiite drops, that cannot be analysed by other methods.

More: http://www.synchrotron.org.au/content.asp?Document_ID=5563



Olivine grain (0.35 mm diameter) from Belingwe komatiite with melt inclusions

(Photo: Leonid Danyushevsky)

NEW EDUCATION OUTREACH OFFICER

The Australian Synchrotron has appointed an outreach officer, Jonathan de Booy, to create greater links with the science education community and to provide support to teachers through professional development sessions and workshops, web-based materials and tours of the facility.

Jonathan is keen to show the potential of synchrotron science as a study that involves many disciplines of science and to devise ways of teaching this as an extension of the current syllabus.

“Over time we hope to develop an educational experience here for students aimed at inspiring and exciting students in science and technology, and encouraging them to consider a career in science,” Jonathan told *Lightspeed*.



Jonathan de Booy is the synchrotron's new education outreach officer.

- SXR (soft x-ray spectroscopy): email SoftXRay@synchrotron.org.au
- SAXS (small and wide angle scattering): email SAXSWAXS@synchrotron.org.au
- XAS (x-ray absorption spectroscopy): email XAS@synchrotron.org.au
- XFM (x-ray fluorescence microscopy): email xfm@synchrotron.org.au

If you wish to use the ANBF in Tsukuba, Japan, you should apply for time through either the XAS or PD facility and include a case for why the ANBF is required (contact ANBF@synchrotron.org.au).

This call for proposals will close on 24 February 2009 and users will be notified from 1 April 2009 (or mid-March for ANBF proposals).

Key dates for 2009 beamtime submissions are listed here: http://www.synchrotron.org.au/content.asp?Document_ID=5305.

If you would like to discuss your ideas for future beamline proposals with the beamline scientists at the Australian Synchrotron, please allow plenty of time.

For more information about applying for beamtime at the Australian Synchrotron, contact the User Office: user.office@synchrotron.org.au



EVENTS DIARY EVENTS IN AUSTRALIA

CRYSTAL 26


26th Meeting of the Society of Crystallographers in Australia and New Zealand.
14-17 April 2009
Barossa Valley Novotel Resort,
Rowland's Flat, South Australia

The conference will cover all aspects of crystallography and will feature distinguished invited speakers from overseas and around Australia.

More: <http://xrsi.cmit.csiro.au/SCANZ26/>

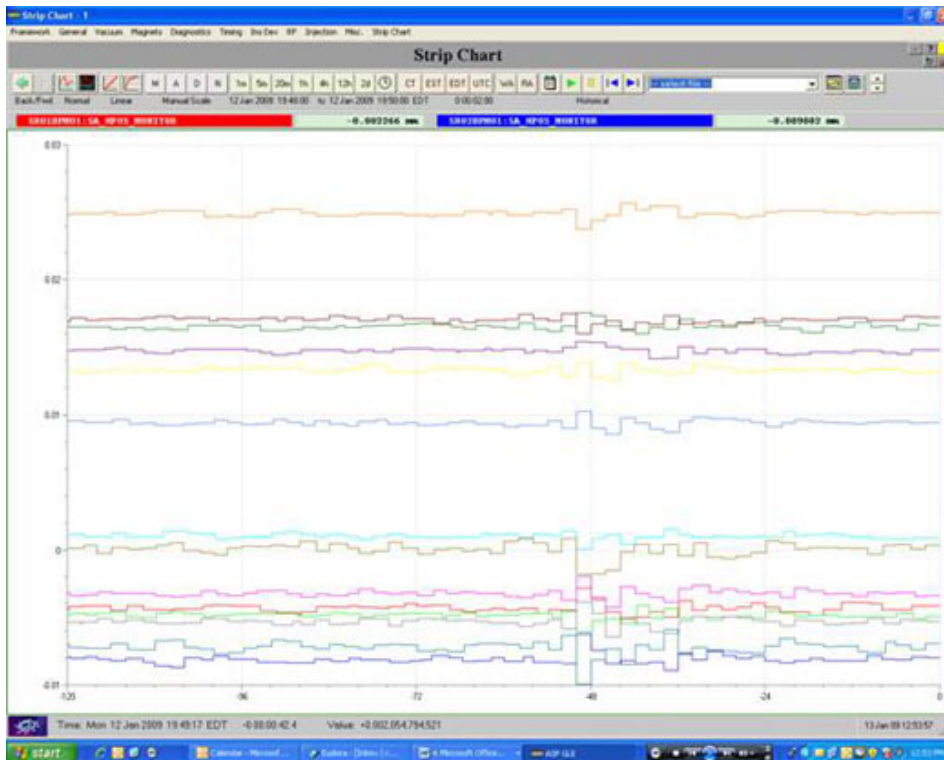
“The synchrotron is an excellent facility for this as it can relate to so many areas of study. We currently offer facility tours for schools and we hope to eventually be able to offer a larger program for people to choose from. Students of all levels are welcome.”

To enquire about educational activities and materials available through the Australian Synchrotron, email jonathan.debooy@synchrotron.org.au.

Please note that tours must be booked well in advance. 

DID THE EARTH MOVE FOR YOU TOO?

An earthquake hit Victoria at 7.48pm (AEDT) on Monday 12 January about 30km south of Warragul. One minute later, the beam position monitors on the synchrotron storage ring registered the earthquake. The orbit feedback mechanisms kept the disturbance on the electron beam to a few micrometers.



BEAMLINE FOCUS

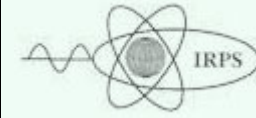
Infrared Beamline

The newest member of the IR beamline team is scientific services officer Danielle Martin, who will work for both branches of the beamline. Danielle's background is in biomedical science, forensic science and physical chemistry and she has experience working with high-vacuum systems. She submitted her PhD thesis through the Monash University Department of Chemistry in October 2008. Her PhD studies involved using UV spectroscopy and UV-UV hole-burn techniques, combined with ab initio theoretical calculations, to explore the gas phase conformations of small biomolecules.

Work has started on the coupling of the FPA microscope to the synchrotron beam. The optical layout finalised late last year allows the synchrotron beam to be redirected from either the microscope or high-resolution side to the FPA microscope for maximum flexibility of operation but required a new port to be machined in the beam-splitter tank. In late December 2008, the tank was stripped down, sent out for machining, cleaned and re-installed. Detailed design of the remainder of the branchline is now underway.

11th International Symposium on Radiation Physics (ISRP-11)

21-25 September 2009
The University of Melbourne, Australia



ISRP-11 is organised by the International Radiation Physics Society (IRPS) and is supported by DEST, the Australian Synchrotron and the Victorian Government. The meeting is devoted to current trends in radiation physics research.

More:
<http://mcmconferences.com/isrp11>

10th International Conference on Synchrotron Radiation and Instrumentation 2009 (SRI 2009)

Melbourne Convention & Exhibition Centre
28 September – 2 October 2009



The world's largest and most important forum for synchrotron radiation science and technology communities, SRI is expected to attract 800 international and Australian delegates in 2009. The conference promotes international exchange and collaboration among scientists and engineers involved in developing new concepts, techniques and instruments related to the production and utilisation of synchrotron radiation. More details are available at <http://www.sri09.org/>

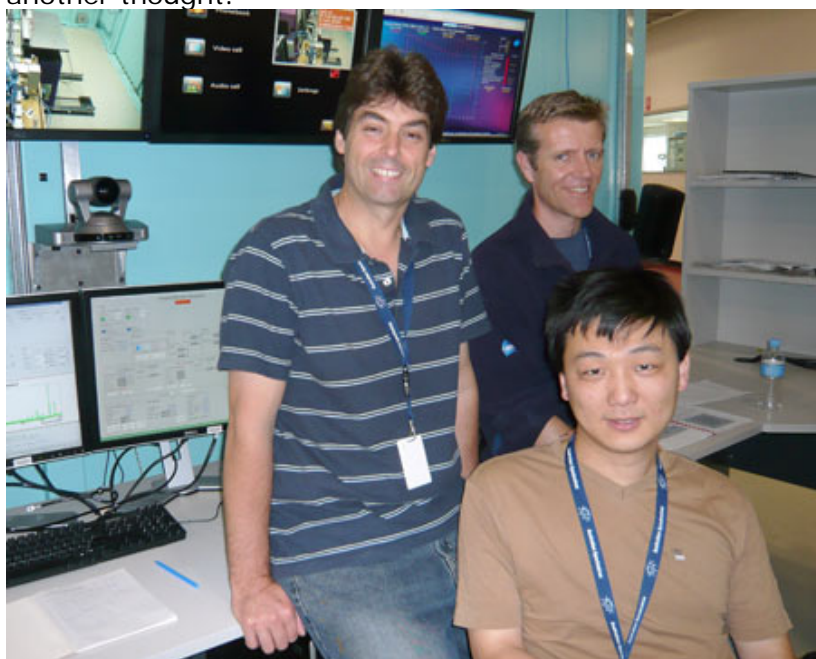


L to R: Ljiljana Puskar, senior mechanical engineer Jonathan McKinlay and Danielle Martin on the IR beamline

Ljiljana Puskar, Scientific Support Officer, Infrared Beamline

Powder Diffraction Beamline

Over the recent break from user operations, the powder diffraction team and senior controls engineer Wayne Lewis have implemented a new data processing interface. With a few mouse clicks in the right boxes, users can now have their raw data automatically processed to angle versus counts using the Mythen client interface, without reference to ROOT. Data processing is completed in real time, without another thought!



Powder diffraction beamline team members Justin Kimpton (LH) and Qinfen Gu (front) with controls engineer Wayne Lewis.

Kia Wallwork, Principal Scientist, Powder Diffraction 

**BSR/MASR 2010
con-joint meetings
Biology and Synchrotron Radiation
Medical Applications of Synchrotron
Radiation**
15-18 February 2010
Melbourne Convention and Exhibition
Centre

BSR 2010 session themes include protein structure and function, biomaterials, spectroscopic techniques and non-crystalline diffraction.

More: www.bsr2010.org

MASR 2010 session themes include x-ray imaging, radiology, dosimetry and radiation biology, oncology, and pathology and diagnostics.

More: www.masr2010.org

Early bird and abstract deadline is 27 November 2009. Sponsored by Monash University Centre for Synchrotron Science and CSIRO.

EVENTS OUTSIDE AUSTRALIA

For additional information and listings, see

www.lightsources.org/cms/?pid=1000068

2009 Particle Accelerator Conference (PAC09)

4-8 May 2009

Vancouver, British Columbia, Canada

This well-established conference series is of particular significance to accelerator scientists, engineers, students and industrial vendors interested in all aspects of particle accelerator technology.

Early registration deadline is 3 April 2009.

More: www.triumf.info/hosted/PAC09

RADSYNCH 2009

21-23 May 2009

Trieste, Italy

The 5th International Workshop on RADiation safety at SYNCHrotron radiation sources will enable radiation physicists, radiation safety professionals and other interested parties to share experiences and exchange information about radiological issues involved in design,

USER ADVISORY COMMITTEE

Following the election of members to the User Advisory Committee (UAC) in late November 2008, the inaugural meeting of the Committee was held on Wednesday 3 December 2008.

The User Advisory Committee (UAC) comprises seven elected members as well as the chairs of the seven synchrotron proposal committees:

Steven Best – Melbourne University
Helen Blanchard – Griffith University
Roland De Marco (chair) – Curtin University
Hugh Harris – University of Adelaide
Bridget Ingham – Industrial Research Ltd
Peter Kappen – La Trobe University
Brendan Kennedy – University of Sydney
Rob Knott – ANSTO
Mike Lawrence – Walter and Eliza Hall Institute
Don McNaughton – Monash University
Jamie Quinton – Flinders University.
Mark Ridgway – ANU
Bill Skinner – University of SA
Matthew Wilce – Monash University

The UAC's first official decision was to elect Roland De Marco as committee chair.

The committee will meet four times in 2009 so that members can quickly familiarise themselves with important issues and report to management as soon as possible. To enable the committee to deal with process issues in a timely fashion, three of these meetings will coincide with deadlines for beamtime applications. Key points from UAC meetings will be tabled at Australian Synchrotron board meetings to ensure effective implementation of UAC recommendations.

A high priority will be to investigate the development of software and hardware for remote data collection at the Australian Synchrotron.

Other key outcomes from the UAC meeting included a recommendation that detailed and meaningful feedback be given to unsuccessful applicants for beamtime to enable them to develop improved applications in the future.

The UAC requested that online user survey information be forwarded to the committee for review and action. It was noted that users will no longer be required to wear radiation badges from April 2009 onwards.

Committee members also considered several of the nicknames suggested for the Australian Synchrotron – Oz-e tron, Ozitron, Ausitro, Aussy and Aurora – and decided that their preferred nickname was Aurora. A final decision on the nickname will be made by the Australian Synchrotron board.

commissioning, operation and decommissioning of synchrotron facilities and free electron lasers around the world.

More:

www.elettra.trieste.it/radsynch09/

XAFS 14 Conference

26-31 July 2009

University of Camerino, Italy

The International Conference on X-ray Absorption Fine Structure (XAFS) is a triennial event. XAFS 14 will cover a wide range of topics, including EXAFS, NEXAFS, XANES, DAFS, SEXAFS, EELFS, XMCD and Auger spectroscopies, microspectroscopy and spectro-microscopy, resonant photoemission, resonant and non-resonant inelastic x-ray scattering, time-resolved XAFS and diffraction. Specific symposiums are planned on hot topics such as ultra-fast time-resolved spectroscopy, slicing schemes and free electron lasers in the x-ray and UV/XUV domains.

Early registration and student discounts available. Early registration deadline is 15 May 2009.

More: <http://www.xafs14.it/>

X-RAY SCIENCE, GORDON RESEARCH CONFERENCE MEETING

2-7 August 2009

Colby College, Waterville, Maine, USA

Topics currently under consideration for this meeting include:

- science frontiers using new x-ray sources
- x-ray scattering /spectroscopy under extreme conditions
- use of coherent x-rays for imaging and studies of dynamics
- x-rays in biology, life, energy and environment science
- dynamics by pump and probe technique
- inelastic x-ray scattering
- new techniques / optics, detectors and others.

The Conference Chairman is Jun'ichiro Mizuki (mizuki@spring8.or.jp), Deputy Director General, Quantum Beam Science Directorate, Japan Atomic Energy Agency (JAEA).

The Vice Chair is Brian Stephenson (stephenson@anl.gov), ANL.



Back (L to R): Bill Skinner, Brendan Kennedy, Helen Blanchard, Bridget Ingham, Stephen Best
Front (L to R): Matthew Wilce, Peter Kappen, Mike Lawrence, Robert Knott, Arie van Riessen (acting chair)



SYNCHROTRON CELEBRITY BEARS ALL

In the interests of international scientific advancement, synchrotron celebrity X-ray Ted recently hared some of his most valuable professional secrets in an exclusive Lightspeed interview obtained through his manager Dr Nicola Scarlett from CSIRO Minerals in Clayton.

Lightspeed: What can you tell us about your research achievements to date and your impact on the international synchrotron community?

Dr X-ray Ted: My impact on the international community has been gentle – I am a 'soft' toy after all. I think it is safe to say, though, that I left my mark on Daresbury in particular. However, since my little trip to the vet I don't have these urges anymore so the Aussietron should be safe.

L: What is your current research focus?

Dr X: Continued characterisation of the novel deuterated compound: tellurium-D dysprosium barium sulphate (TeDDy Baryte). There has been a hiatus in this work due to theft of equipment on a recent field trip. That was the day the Teddy Bear had his pick nicked.

L: Who is your favourite synchrotron scientist and why?

Dr X: Powder diffraction beamline scientist Kia Wallwork. I think we shared a few special moments at the Swiss Light Source two years ago. However, what happens at the synchrotron STAYS at the synchrotron...

L: What do you like most about visiting the Australian Synchrotron?

Dr X: Kia Wallwork (sigh).

L: What advice would you like to offer less-experienced synchrotron users?

More: http://www.synchrotron.org.au/content.asp?Document_ID=5564

WIRMS 2009

Banff, Alberta, Canada
13-17 September 2009

The 5th International Workshop on Infrared Microscopy and Spectroscopy with Accelerator Based Sources will bring scientists and synchrotron users together to discuss the latest developments and trends, future directions and promising applications. Experts will introduce young researchers and graduate students to this rapidly advancing field.

Abstract submission deadline is 12 June 2009.

More: www.lightsource.ca/wirms2009



READER FEEDBACK

Lightspeed welcomes your comments and suggestions. Please send these to: info@synchrotron.org.au with 'Lightspeed comments' in the subject line.



CAREERS AT THE AUSTRALIAN SYNCHROTRON

The Australian Synchrotron offers a unique working environment for a wide range of specialists.

More information on job postings: http://www.synchrotron.org.au/content.asp?Document_ID=14.



X-ray Ted's Top Synchrotron Tips for New Users



Get yourself a good conditioner - the air con in these buildings plays hell with your fur



Don't be afraid to show your emotions in the face of experimental difficulty



Don't be afraid to immerse yourself in the experiment



Always consult the beamline scientist



And finally try and fit in a bit of pole dancing to while away the wee small hours


MORE INFORMATION

A list of Australian Synchrotron personnel can be found here: http://www.synchrotron.org.au/content.asp?Document_ID=129.


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