



Lightspeed
Australian Synchrotron News
September 2008

Come and see the brightest Light in the Southern Hemisphere.

**AUSTRALIAN SYNCHROTRON
OPEN DAY** SUNDAY
26 OCTOBER 2008
10AM TO 4PM

Entry is free but bookings are essential. For more details, visit www.synchrotron.org.au

Australian Synchrotron

FROM THE DIRECTOR: THE EARLY DAYS

The midnight shift at the Australian Synchrotron can be hard work for users and on-call beamline staff, but running the beam 24 hours a day means more people can use the great research tools we have here.



Prof. Robert Lamb


When I first used a synchrotron 20 years ago in Europe, the beam was switched off at 11 pm and our work had to wait till morning. If we were very lucky, we got a 'midnight special' and the beam was on till around 1 am.

Before the Australian Synchrotron was even a glint in the eye of the nation's scientists, Australian researchers only used synchrotrons when they were living overseas. Many kept their synchrotron connections when they returned home, but it was very much an individual effort.

That changed in the 1990s with the Australian National Beamline Facility at the

Photon Factory in Japan and its successor, the Australian Synchrotron Research Program (ASRP).

The establishment of a consolidated national effort to get Australian beamtime on overseas synchrotrons has paid dividends. We have a strong community of synchrotron scientists who use synchrotrons and now our own world-class synchrotron.

September 2008 marks the end of the ASRP, with its responsibilities passed to the Australian Synchrotron, but I know that its legacy will continue to flourish for many years. Here's to the ASRP! 

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**A-O Week
Australian
Synchrotron**
1 - 5 December 2008
Novotel, St Kilda
Melbourne, Australia
**EARLY BIRD
CLOSING SOON**

A TRIBUTE TO THE ASRP for those of you who came in late

Between 1992 and 2008, the Australian Synchrotron Research Program and its precursor (the Australian National Beamline Facility) enabled Australian researchers to achieve well over 4000 days of synchrotron beamtime at overseas facilities in the USA, Japan and Taiwan.

Without the ASRP, many of these experiments would not have been possible – and Australia would not have developed the synchrotron expertise that now plays such a vital role in supporting research and development projects across the nation.

ASRP was established in 1996 under the federal government's 1995 Major National Research Facilities (M NRF) program to provide Australian scientists with access to state-of-the-art synchrotron radiation research capabilities at overseas synchrotron light source facilities. ASRP was managed by ANSTO, Australia's national nuclear scientific research organisation. The M NRF program also funded a feasibility study for a domestic synchrotron facility, which set the basic parameters for the Australian Synchrotron.



The way we were: Garry Foran, Richard Garrett and David Cookson in Japan to install the ANBF beamline in 1992.



No, it's not Superman's alter ego. Garry Foran at first light on the ANBF beamline.

More: http://www.synchrotron.org.au/content.asp?Document_ID=5454

UP TO SPEED

This month our short interview features Ruth Plathe, scientific support officer on the Australian Synchrotron's protein crystallography beamlines.



Describe your job in 25 words or less.

We provide user support 24 hours a day. I also help install and maintain the PX beamlines

and produce documentation explaining how it all works.

Best aspect of your job?

Talking to users about a broad range of research areas and occasionally making a contribution to their projects. Can I mention the pay TV cartoons in the user lounge at morning tea time as well?

Worst aspect of your job?

Getting up at all hours of the night to fix things and then getting home at 4 a.m.



Apart from the Australian Synchrotron, what's the coolest place you've ever worked?

In 2005, I was the optical physicist at Davis Station in Antarctica.

Best thing about living in Melbourne, and why?

Definitely the café culture. For breakfast on the weekend we head for Café Have Ya Bean in Upwey. Closer to the synchrotron, Deli Grande at Pinewood Shopping Centre is pretty good for coffee and cake.

A little-known fact about the Australian Synchrotron?

The paint colour in the PX user area is 'purity'. We claim it's related to the unadulterated science contained within.

CHEIRON SYNCHROTRON SCHOOL

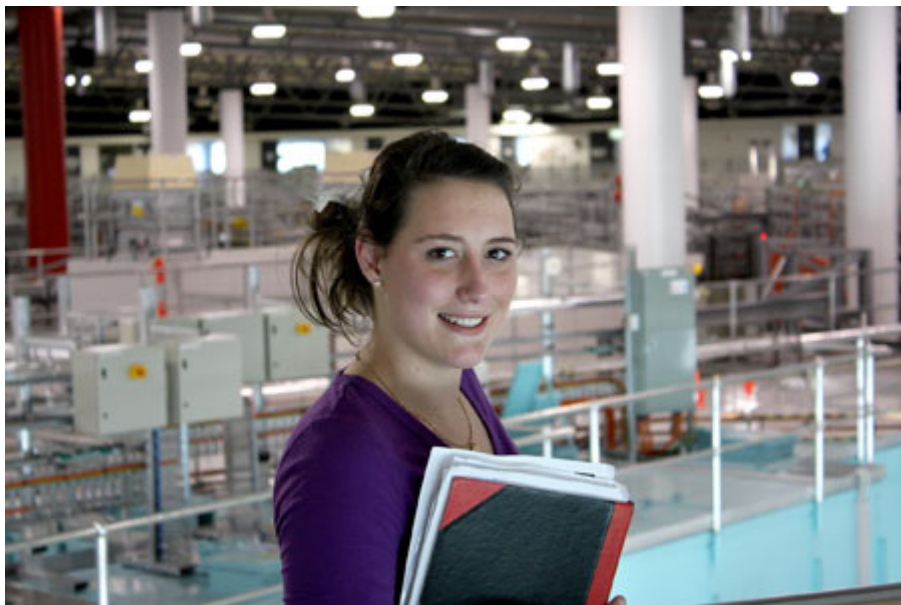
The Australian Synchrotron is funding five young Australian scientists to attend the Cheiron Synchrotron School, which will be held at SPring-8, Hyogo, Japan, for 10 days from 29 September 2008.

The Cheiron School's main aim is to provide useful and basic knowledge and perspectives on synchrotron radiation science and technology for PhD students, young scientists and engineers who wish to pursue careers involving synchrotron radiation in the Asia-Oceania region. The comprehensive curriculum will include lectures by leading scientists and engineers in the field of synchrotron radiation science and technology, hands-on practical training and tutorial sessions.

The Australian Synchrotron-funded participants are Anand Chandra (University of South Australia), Alex Duan (University of Melbourne), Daryl Howard (Australian Synchrotron), Josh Brown (Macquarie University) and Romina Belli (Newcastle University).

A further five participants are funded by the Japanese organisers. The Japanese-funded participants are Patryck Allen (University of Sydney), Ailar Hajimohammadi (University of Melbourne), Julian Tang (St Vincent's Institute), Hailey Reynolds (RMIT University) and Radha Maganti (Monash University).

The school is held annually under the auspices of the Asia-Oceania Forum for Synchrotron Radiation Research (AOFSTR).



RMIT student Hailey Reynolds (pictured at the Australian Synchrotron) is one of 10 Australian students selected for the Cheiron Synchrotron School.



MORE THAN REMOTELY INTERESTING

In August 2008, Prof. Jenny Martin from the University of Queensland became the Australian Synchrotron's first remote access user. An experienced user, Jenny turned what would have been a straightforward trip to the protein crystallography beamline into a combined structure determination and training exercise for seven Queensland researchers.

Part of the work was an investigation into how an enzyme called phenylethanolamine N-methyl transferase (PNMT) catalyses adrenaline synthesis (see Martin et al. 2001 Structure 9:977-85). On this occasion Jenny's team wanted to use the synchrotron to determine the structures of several substrate-bound complexes.

This document is online at: http://www.synchrotron.org.au/content.asp?Document_ID=5452

EVENTS DIARY

EVENTS IN AUSTRALIA

ARC Centre of Excellence for Coherent X-ray Science 3rd Annual Workshop
Physicists and Biologists Working Together

17 – 19 September 2008
Bio21 Institute, Melbourne, Australia



This workshop will focus on high resolution imaging of biological samples using synchrotron and laser X-ray sources, as well as pioneering electron and light microscopy techniques and protein structure determination techniques.

Top international speakers will present their work in the areas of:

- advanced microscopy
- cellular and subcellular imaging
- coherent diffractive imaging
- membrane protein structure determination
- optics and imaging
- sources and detectors.

Additional features include a site tour of the Australian Synchrotron, poster & oral presentations and a workshop dinner.

More:
<http://www.coecxs.org/workshop2008>

Western Australian X-Ray Users Conference and Schools *X-rays from industry to academia*

The Australian X-ray Analytical Association WA and the Royal Australian Chemical Institute (RACI) Analytical Chemistry Group have announced the dates for the Western Australian X-Ray Users Conference and Schools.

X-ray Diffraction School: Friday 10 October 2008
X-ray Users Conference: Saturday 11 and Sunday 12 October 2008
X-Ray Fluorescence School: Monday 13 October 2008.

The group set up a meeting room as a 'virtual' hutch and connected the laptop to the projector so that everyone could see what was happening. They screened all 60 crystals in the allotted 16 hours and measured 13 full data sets.

"We were very happy with the outcome. We lost connection once but this was resolved quickly and Tom Caradoc-Davies provided terrific support throughout the night," Jenny said. "We apologise profusely for waking him up early in the morning!"

Although the process of downloading the data from the synchrotron site took some time, Jenny believes that these issues will be overcome very quickly.

"We are very keen to use remote access again at the Australian Synchrotron," Jenny told *Lightspeed*. "We also hope to take advantage of new Blu-Ice developments, including automated crystal centring, screening and queuing, and automated multi-site exposure of single crystals."



Jenny Martin, pictured in her Queensland office, is the Australian Synchrotron's first remote user.



PhD student Kevin Chen, a new synchrotron user, used remote access to obtain protein crystallography data.

The conference will be held at the Event Centre at Technology Park. The schools will be held at Curtin University and/or the University of Western Australia.

More information is available from Geoffrey Carter at Curtin University of Technology

g.carter@exchange.curtin.edu.au

COMMUNITY OPEN DAY 26 October 2008, Australian Synchrotron

The Australian Synchrotron open day is a once-a-year opportunity to see inside the synchrotron. Entry and parking are free, but participants will need to register. More details available soon.

A-O Week of the Australian Synchrotron

1-5 December 2008



Australia plays host to researchers from the Asia-Oceania region at The A-O Week of the Australian

Synchrotron from 1 to 5 December. The week features a series of important events beginning with a meeting of the Science Advisory Committee (SAC) planned for 1 December. This is followed by the Australian Synchrotron Users Meeting on 2-3 December and the third Asia-Oceania Forum for Synchrotron Radiation Research (AOFSSR) on 4-5 December. Satellite activities include the Next Generation Science Workshop on 4 December.

Early bird (discount) registration: 19 September 2008

Oral abstract submission deadline: 19 September 2008

Poster only abstract submission deadline: 24 October 2008

Discount available for student registrations

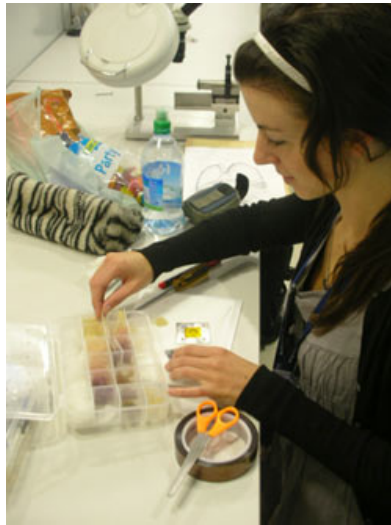
More details available at <http://www.asnevents.com.au/synchrotron08/>.

KIWI QUEST FOR SYNCHROTRON SILVER

New Zealand researchers are creating a new high-fashion fibre that combines the special properties of gold and silver nanoparticles with the feel of merino wool. And they're using the Australian Synchrotron to help them.

PhD student Fern Kelly and her colleagues from Victoria University of Wellington have produced merino-silver nanoparticle composites in a range of colours, including yellow, pink, purple and green. The dyeing process is less polluting than conventional methods, the colours don't fade in sunlight, and the nanoparticles are toxic to microorganisms but benign to human cells.


In August 2008, Fern used the powder diffraction beamline at the Australian Synchrotron to examine samples of merino wool treated with silver.



Fern Kelly prepares wool-silver nanoparticle composites for powder diffractometry.

"It was excellent to obtain results to confirm the phases of silver present," Fern said. "While further questions still remain about the bonding between the silver nanoparticles and the wool, and the mechanism of formation, I believe that synchrotron radiation characterisation methods are the key to determining the answers.

"I was very impressed with the Australian Synchrotron. We had no problems with the beam and the processing interface was relatively friendly. The users lounge is very comfortable and the coffee was great – and definitely required for the 19-hour overnight stint I did.

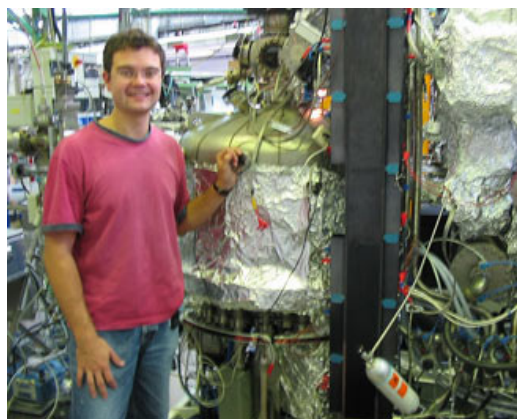
"I look forward to more crazy hours at the facility." 

BLOOD, SWEAT AND TOROIDAL ANALYSERS

After seven years of hard work in Australia and overseas, synchrotron scientist Anton Tadich has completed his physics PhD.

Now a member of the Australian Synchrotron's soft x-ray beamline team, Anton undertook his PhD studies at La Trobe University under the guidance of synchrotron veterans Professors Robert Leckey and John Riley.

The work involved designing constructing and characterising a novel toroidal-type electron energy analyser. For those of you who are scratching your heads over that one, this is an instrument that can accurately measure the energy and angle distribution of electrons emitted from a sample that has been



No, it's not Dr Who. Anton Tadich and his toroidal analyser in soft focus.

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

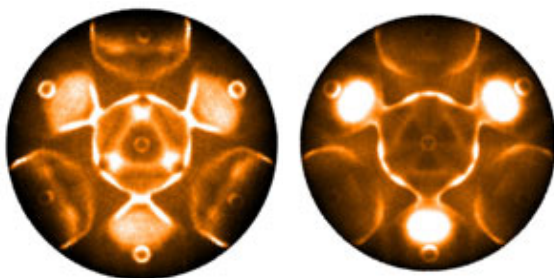


The world's largest and most important forum for synchrotron radiation science and technology communities, SRI is expected to attract 800 international and Australian delegates in 2009. The conference promotes international exchange and collaboration among scientists and engineers involved in developing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

exposed to synchrotron radiation. Called 'angle resolved photoelectron spectroscopy' (or ARPES to its friends), the technique is very useful for confirming fundamental theories of how electrons behave in crystalline solids.

Anton's analyser was installed at BESSY2, the German synchrotron in Berlin, and commissioned on a bending magnet vacuum ultra violet (VUV) beamline. The analyser can achieve a full ARPES data set in a fraction of the time taken by other instruments, due to its unique electron optical design. A second version of the instrument is under construction, and will eventually be commissioned on the soft x-ray beamline at the Australian Synchrotron.

In a world-first series of experiments, Anton and his colleagues used the analyser to measure signatures of intrinsic electron scattering effects in so-called 'Fermi surface' data sets obtained for copper. The Fermi surface plays a key role in controlling many properties of crystalline materials, such as magnetism, electrical and thermal transport, and phase transitions.




Synchrotron radiation Fermi scans have shed new light on copper's electronic properties 

NOT SO RISKY BUSINESS

The Australian Synchrotron has been awarded Gold Medal status for its attitude to risk management, following a recent independent survey of onsite risks at the synchrotron.

The onsite survey was conducted in June 2008 by the Victorian Managed Insurance Authority (VMIA). The detailed survey report concluded that: "Site management should be commended on their excellent attitude toward risk management, which is reflected by the facility achieving Gold Medal status based on the VMIA Site Risk Survey ranking structure".

The survey report also made several recommendations for further enhancing onsite risk management, which are now being addressed by the relevant synchrotron staff.

More information is available from George Borg, Head of Technical Services at the Australian Synchrotron. 

BEAMLINE FOCUS

Imaging and Medical Therapy Beamline

August saw the completion of the bulk of the long beamline construction: the beam transfer tunnel (made up of 30 culverts, each weighing 11 tonnes), the optics enclosure, the measurement bunker, the concrete roof slab – designed to support the addition of a second floor at a later date – and the roof support structure. From the beginning of September, fitting-out work has been progressing at fast pace with up to 25 tradespeople onsite on any one day.



Last delivery of culverts under

EVENTS OUTSIDE AUSTRALIA

For additional information and listings, see

<http://www.lightsources.org/cms/?pid=1000068>

14th NSRRC Users' Meeting & Workshop on X-ray Crystallography / Spectroscopy

8-9 October 2008,
Hsinchu, Taiwan

The NSRRC workshop on 9 October will highlight synchrotron applications in the cutting-edge research of X-ray crystallography and spectroscopy.

More:

<http://usersmtn.nsrcc.org.tw/eng/>

BioCARS Workshop on Time-resolved Macromolecular Crystallography

20-22 November 2008, APS, Chicago, US

This workshop will provide hands-on training in designing and conducting time-resolved experiments and in Laue data processing and analysis.

Participants will also learn about recent upgrades to BioCARS insertion device beamline 14-ID X-ray and laser facilities.

More:

<http://cars.uchicago.edu/biocars>

Further information:

Vukica Srajer

(v-srajer@uchicago.edu) or

Jane Andrew

(andrew@cars.uchicago.edu)

High Pressure Molecular Biophysics Conference (HPMB2008)

10-12 December 2008

SOLEIL, Saint Aubin, France



Jointly organised by SOLEIL, Centre de Biophysique Moléculaire (CBM, Orléans) and Institut de Biologie Structurale (IBS, Grenoble), this multidisciplinary conference will highlight:

On the instrument side, the finite element analysis of all the high heat load components has been completed and the preliminary design report signed-off.



Then and now: excavation work in May, satellite building on September 4.

Daniel Häusermann, Principal Scientist, Imaging & Medical Therapy 

RAPID ACCESS ON TRIAL

Rapid access to the high-throughput protein crystallography beamline at the Australian Synchrotron will be trialled on 8-9 October, 7-8 November and 11-12 December 2008.

The main aim of the new system being trialled is to provide rapid beamline access for experienced users with high profile, highly competitive projects. Assessment criteria for Mode 1 Rapid Access will include, for example, publishing prospects, intellectual property considerations, and evidence of strong competition by other groups. Proposals must be lodged at least three weeks in advance of the shift being sought, and will be considered on a first-come first-served basis.

The rapid access system also aims to provide more immediate access for users who have already had proposals accepted for that round but want to investigate additional crystals. Mode 2 Rapid Access time will only become available if Mode 1 proposals have not filled all the rapid access timeslots.


More: http://www.synchrotron.org.au/content.asp?Document_ID=5448 

HOW TO APPLY FOR BEAMTIME

The next call for submissions for beamtime at the Australian Synchrotron will open on 11 October 2008. This call will be for beamtime between January and April 2009 and will include protein crystallography, mid-infrared microscopy, far-infrared high-resolution spectroscopy, powder diffraction and soft x-ray spectroscopy.

Key dates for the next round (2009/1) are listed here:
http://www.synchrotron.org.au/content.asp?Document_ID=5305.

If you would like to discuss your ideas for future beamtime 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 

- interests and prospects of combining high-pressure perturbation and various biophysical tools, including high resolution structural methods (NMR and macromolecular crystallography)
- scientific results in the field
- recent instrumental advances
- interplay between experiments and simulations.

More: <http://www.synchrotron-soleil.fr/Workshops/2008/HPMB2008> or email: conf-hpmb2008@synchrotron-soleil.fr

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.



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.



NEW SURVEY TO BOOST USER SATISFACTION

A new online survey has been developed to help users provide feedback to the Australian Synchrotron.

All users are required to complete the new survey, even if they have already provided feedback. Future beamtime allocations may be contingent on completion of the survey.

The online survey takes around 15 minutes to complete, and is available via the User Information section on the Australian Synchrotron website.


Survey: http://www.synchrotron.org.au/content.asp?Document_ID=5450 

A SYNCHROTRON BY ANY OTHER NAME

*As noted previously in *Lightspeed*, we are looking for a new name. Not to replace 'Australian Synchrotron', which will remain our official name, but to use as a nickname or pet name.*

Many synchrotrons around the world have short names derived from light source terminology. For example, the Berliner Elektronenspeicherring-Gesellschaft für Synchrotronstrahlung in Germany is known simply as BESSY. The French national synchrotron facility is Soleil. The Sincrotrone Trieste in Italy is Elettra. Japan's 8 GeV synchrotron photon ring is SPring-8.

For the Australian Synchrotron, we would like a pet name that is quintessentially Australian in character, easy to remember and not too long.

We invite all members of the synchrotron community and interested onlookers to submit their suggestions by email to info@synchrotron.org.au by 31 October 2008. The entries will be peer-reviewed and a short list of suitable names will be selected and submitted to the Australian Synchrotron Board to make a final decision. The chosen name will be announced at the 2008 User Meeting in Melbourne in early December 2008. 

READER FEEDBACK

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




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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