

Lightspeed

Australian Synchrotron News

July 2009



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THE AUSTRALIAN SYNCHROTRON IS PROUD TO HOST

SRI09 | 27 SEPTEMBER TO 2 OCTOBER 2009

THE 10th INTERNATIONAL CONFERENCE ON SYNCHROTRON RADIATION INSTRUMENTATION
AT THE MELBOURNE CONVENTION AND EXHIBITION CENTRE



Australian Government
Department of Innovation, Industry, Science and Research
This conference is supported by the Commonwealth of Australia under the International Science Program



FROM THE DIRECTOR: IN SEARCH OF ENLIGHTENMENT

Quite a few years back, in the formative days of the Australian Synchrotron Project, decisions were made about the kinds of science that would be conducted here in the first stage of development.

Now we have eight operational beamlines – separate laboratory areas around the synchrotron dedicated to specific kinds of experiments. A ninth is well underway to complete the first set.


But with more than 2805 scientific visits and thousands more potential users who have registered their interest, our beamlines are already oversubscribed. We have space to build another 29 laboratories around the storage ring, but the big question is “which ones?”.



Prof. Robert Lamb outside the Australian Synchrotron

So the AS is about to embark on a consultation process that will help answer that question in a way that reflects the needs and desires of all our users as well as the broader science community.

Starting in August 2009, Australian Synchrotron staff will travel to venues around Australia and New Zealand to ask what kind of new laboratories you would like built at the synchrotron – a collective wish list, if you like.

We will then use that information to develop the case for funding the next set of Australian Synchrotron beamlines. 

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HAPPY ANNIVERSARY!

The Australian Synchrotron celebrated a double anniversary in July 2009, marking the achievement of first light (a sustained electron beam in the storage ring emitting light) on 14 July 2006 and the official opening ceremony on 31 July 2007. July 2009 also saw the birth of the synchrotron's new website at the same address (www.synchrotron.org.au).



Australian Synchrotron staff celebrated first light in the storage ring on 14 July 2006.

Back (L to R): Greg LeBlanc, Jason Wirthensohn, Munish Jain, Martin Spencer and Erhard Huttel.

Front (L to R): Rohan Dowd, Skippy, Mark Boland and Eugene Tan. Photo: Mark Boland.



DEVELOPMENT ROADMAP PHASE 1 – HAVE YOUR SAY

The Australian Synchrotron is inviting the scientific community to provide project plans and ideas for consideration as we embark on the process of planning for the future.


The grandly-titled Australian Synchrotron Development Roadmap will lay out the facility's development objectives over the next decade, embracing the ideals of cohesion, compatibility and complementarity with existing capabilities. Its ultimate objective is to enable world-class science at the AS.

At the AS development plan workshops to be convened around Australia and New Zealand in August 2009, you can hear what we have achieved so far – and have your say about where we are going.

All contributors to the consultation and submission process are encouraged to think broadly about new supporting infrastructure, accelerator development, beamlines and experimental equipment that could facilitate optimal scientific outcomes for all.

Australian Synchrotron staff are keen to work collaboratively with the scientific community, its interest groups and representatives who will drive the submissions that result from this Phase 1 consultation process. We welcome all enquiries relating to the Development Roadmap and are keen to assist in any way possible with submission preparation.

We look forward to meeting with as many of you as possible in our August workshops.

Enquiries about the Development Roadmap should be addressed to Ian Gentle at ian.gentle@synchrotron.org.au or Garry Foran at garry.foran@synchrotron.org.au. 

UP TO SPEED

This month our short interview features Anton Tadich, scientific support officer on the soft x-ray spectroscopy beamline at the Australian Synchrotron.



Describe your job in 25 words or less.

I help train users and assist with their experiments, maintain and improve beamline hardware, and document beamline procedures. I also do my own research.

Best aspect of your job?

Engaging with scientists from widely varying backgrounds.

Worst aspect of your job?

Sometimes when hardware issues arise, we have to fix them quickly to get the users back on track so they can get their data in time. This can get a bit hairy sometimes!

Apart from the Australian Synchrotron, what's the coolest job you've ever had?

Farmhand in St Andrews, driving a tractor sideways across the hills.

Best things about living in Melbourne and why?

The diversity of people and places to see.

Your favourite overseas destination and why?

Japan has a fascinating culture and it's so different to Australia. They're really in touch with new technology.

A little-known fact about the Australian Synchrotron?

The synchrotron uses around 4000 kilowatts of electricity per hour, about the same as 1000 houses.

What do you think is the most important or interesting aspect of the

NEW INSIGHTS INTO PARKINSON'S DISEASE

Australian researchers led by Antony Cooper from the Garvan Institute of Medical Research in Sydney are hot on the trail of new clues that could help identify the cause of Parkinson's disease in some patients.

Parkinson's affects up to 50 000 Australians, whose symptoms include uncontrollable shaking, muscle rigidity and slowness of movement. Some types of Parkinsonism are linked to the presence or absence of the PARK9 protein, which is believed to help pump positive ions such as iron, zinc and manganese across internal cell membranes.

"We're investigating the possibility that PARK9-deficient people might suffer from highly localised manganese imbalances that stop neurons working properly," Antony says.

Brian Chan from the Garvan Institute and Jade Aitkin and Joonsup Lee from the University of Sydney recently brought some samples to the Australian Synchrotron to find out precisely where manganese and other metal ions are located inside the cells and whether there are differences between PARK9 patients and healthy controls.

They used the synchrotron's x-ray fluorescence microprobe, which offers resolution down to 0.1 micrometres and detects much lower concentrations of elements than other techniques such as proton-induced x-ray emission (PIXE). A typical human cell is about 10 micrometres across; human hair is 20-180 micrometres thick.

Preliminary results suggest PARK9 cells may contain elevated manganese levels. Further research is under way. A longer article about this work appeared in *Australasian Science* July 2009.

More:

<http://www.synchrotron.org.au/index.php/news/publications/australian-synchrotron-case-studies/238>

Australian Synchrotron light source?

It brings together so many different techniques under one roof for materials science investigations.

What's the most interesting sample you've seen on the soft x-ray beamline.

One user group looked at organic solar cells with porphyrins (a kind of water-soluble pigment) mixed into the device to see if that improved the cell's ability to trap sunlight.

What's the most amazing thing you've ever been asked to do for the Australian Synchrotron?

Appear as an extra in the Nicolas Cage movie filmed at the synchrotron last year. My scene with Ben Mendelsohn actually appeared in the movie!



BEAMTIME APPLICATIONS

Beamtime submissions for the 2009/3 round (September – December 2009) closed on 17 June 2009. Users will be notified from mid-August.

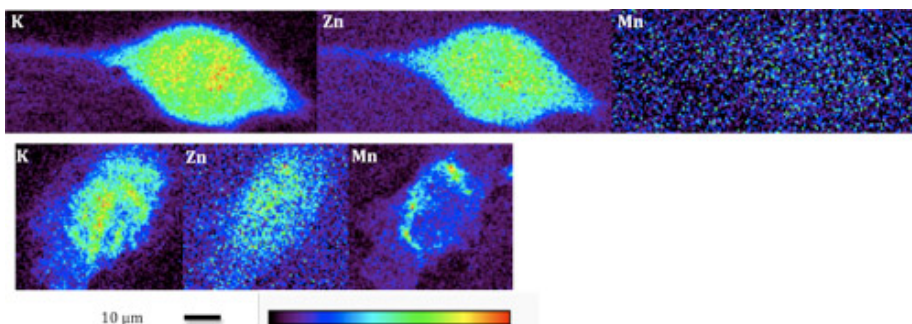
The next call for submissions is scheduled to open on 10 September and close on 5 October 2009. This call is for beamtime between January and May 2010 (round 2010/1).

Key dates for beamtime submissions are listed on the new synchrotron website here:

<http://www.synchrotron.org.au/index.php/features/applying-for-beamtime/2009-2010-proposals-schedule>

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



Synchrotron x-ray images of manganese and other metal ions inside neural cells could help reveal the metabolic defects behind Parkinson's disease.

Images obtained at the Australian Synchrotron by Brian Chan (Garvan Institute of Medical Research) and Jade Aitkin (University of Sydney).



THE BUSINESS OF SYNCHROTRON DEVELOPMENT

The Australian Synchrotron's new Business Development Manager is Kerry Hayes.

Born and bred in Melbourne, Kerry worked overseas for a number of years with an international medical equipment manufacturer. Prior to joining the synchrotron, Kerry was Director of Business Development at the Melbourne Convention + Visitors Bureau, where she led a team developing international bids in scientific and medical disciplines. Kerry's work with the Bureau enabled her to establish strong relationships with many of the Australian Synchrotron's foundation investors.



Kerry Hayes

"Events and conferences are a great way to bring international experts to a city," Kerry says. "They are also great opportunities to show the rest of the world the exciting work being done in Melbourne."

Kerry's work will involve developing relationships with the synchrotron's sponsors, investor groups, and major stakeholders to ensure that the facility can satisfy their expectations – and anticipate their future needs.

"We want the Australian Synchrotron to be the nation's premier research facility and to provide a client experience that consistently meets or exceeds their expectations," Kerry says. "We are also developing a range of activities and materials in response to the general community's keen interest in us."



ANZAAS – AUSTRALIAN SYNCHROTRON INAUGURAL WINTER SCHOOL

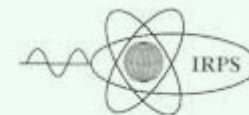
In July 2009, 46 of Australia's and New Zealand's brightest tertiary science students gathered at the Australian Synchrotron for the facility's inaugural winter school.

The four-day program aimed to give young researchers – Honours, Masters and early PhD students – an understanding of synchrotron techniques and operation for research purposes. Participants attended lectures, toured the facility and performed beamline experiments that complemented their lectures.

EVENTS DIARY EVENTS IN AUSTRALIA

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: mcmconferences.com/isrp11

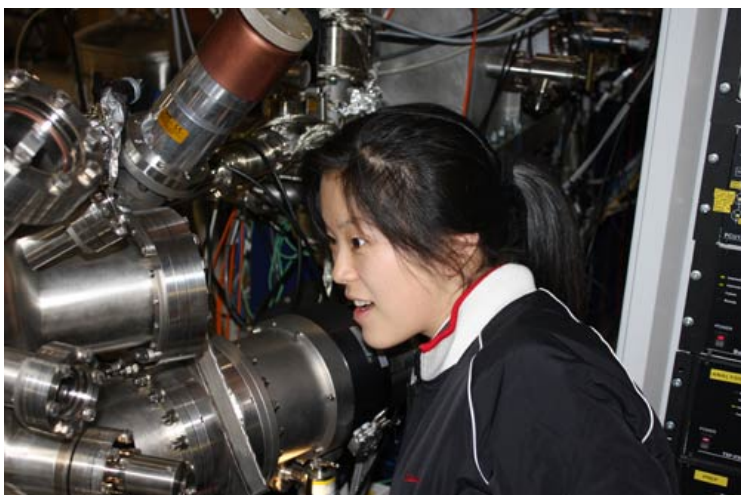
10th International Conference on Synchrotron Radiation and Instrumentation 2009 (SRI 2009)

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 www.sri09.org/

Participation was open to all universities in Australia and New Zealand on the basis of one nominated student per institution. All accommodation, travel and catering expenses were paid for by the Australian Synchrotron.



Haishun Jin, a Master's student from Auckland University, on the soft x-ray beamline at the synchrotron's inaugural winter school.




INTERNATIONAL RECOGNITION FOR SYNCHROTRON PHD STUDENT

Physicist Evelyne Meier, a Swiss-French PhD student at Monash University and the Australian Synchrotron, has received international recognition for the quality of her work.

At a recent particle accelerator conference in Canada, PAC09, Evelyne gained second prize in the Award for Scientific and Aesthetic Excellence in the Student Poster Section. Her poster was entitled Electron beam stabilization using a neural network controller at the Australian Synchrotron linac. She has also been invited to speak on her work at the Free Electron Laser 09 conference in August 2009 in Liverpool, England, a rare honour for a student.

Evelyne's work is part of a major international collaboration called the FERMI@Elettra project: Free Electron laser Radiation for Multidisciplinary Investigations at Elettra. Her PhD is jointly supervised by Monash University, Elettra and the Australian Synchrotron.

As the title of her PAC09 poster suggests, Evelyne is helping to develop a feedback system that will help stabilise the electron beam that drives the next-generation FERMI free electron laser (FEL). FELs are the latest hot topic in the development of new-generation light sources. The laser-like light from a FEL source is extraordinarily intense with highly detailed resolution capability, but the stability requirements for maintaining the lasing process are pushing the boundaries of feedback systems. 

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

XAFS 14 Conference

26-31 July 2009

University of Camerino, Italy

The 14th International Conference on X-ray Absorption Fine Structure 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.

More: www.xafs14.it/

X-RAY SCIENCE, GORDON RESEARCH CONFERENCE MEETING

2-7 August 2009

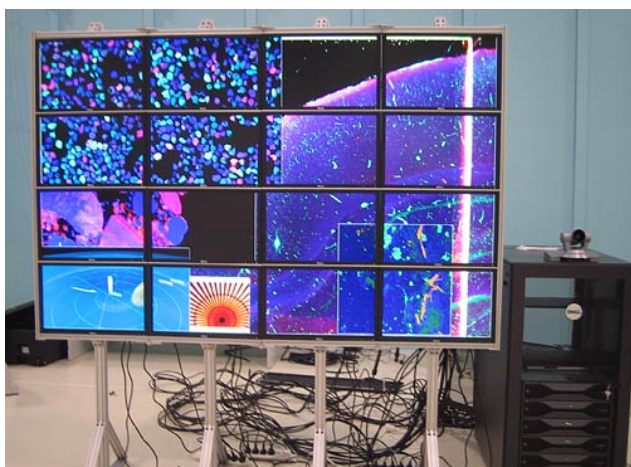
Colby College, Waterville, Maine, USA

Conference participants will hear about x-ray-based science at 3rd generation light sources, and scientific plans and early results from 4th generation sources. Sessions include:

* x-ray scattering / spectroscopy under


36 MILLION PIXELS ON DISPLAY

A 36.864 million pixel OptiPortal has been installed at the Australian Synchrotron. Consisting of sixteen 24-inch Dell monitors, the impressive tiled display will enable researchers to view high-definition static images, videos and simulations.



So far the synchrotron's OptiPortal has been used to display high-resolution 4000 x 4000 pixel images of clay (images collected on the x-ray microspectroscopy beamline by Chris Ryan from CSIRO), CT (computed tomography) scans, astronomy images, and a 2600-year-old Cypriot ceramic

pot from the Iron Age (3D video provided by Richard Collmann from The University of Melbourne).

The OptiPortal is being installed at the synchrotron by Chris Myers and his team from VerSI, the Victorian e-Research Strategic Initiative. Chris and his team are developing ways to enable researchers to easily move images to the OptiPortal. The synchrotron's OptiPortal will also be used to stream visualisations across to other OptiPortals such as those installed at the University of Melbourne, Monash University, ANU and The University of Queensland. 

BEAMLINE FOCUS

High-pressure infrared skills exchange

Australian Synchrotron infrared scientists Mark Tobin and Ljiljana Puskar recently returned from France with newly acquired skills that will allow the study of materials under extreme pressure conditions using diamond anvil cells.

Their work alongside French colleagues Jean-Paul Itié and Paul Dumas at the Soleil Synchrotron in Paris in May 2009 is part of efforts to broaden Australia's infrared spectroscopy expertise in this area of research.



Jean-Paul Itié, Mark Tobin, Paul Dumas and Ljiljana Puskar at the Soleil synchrotron.

Enhancing the technical capabilities of the Australian Synchrotron's IR beamline to study how different materials respond to elevated pressure will

extreme conditions

- * new techniques / optics, detectors and others
- * x-rays in environment and nano science
- * x-rays in biology and life science
- * use of coherent x-rays for imaging and studies of dynamics.

Applications must be submitted by 12 July 2009.

More:

www.grc.org/programs.aspx?year=2009&program=xray

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.

More: www.lightsource.ca/wirms2009

SAS 2009

13-18 September 2009
Oxford, UK

The XIV International Conference on Small-Angle Scattering will enable scientists using SAS in the study of soft and hard condensed matter (with light, x-rays or neutrons) to discuss the latest scientific results and technological improvements.

More: www.sas2009.org/



READER FEEDBACK

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



help Australian researchers find out how to reduce the use of solvents and catalysts in industrial processes, determine the characteristics and productive potential of mineral deposits, and investigate important structural changes in food proteins.

The visit was made possible by an International Science Linkage grant awarded to the Australian Synchrotron's infrared microspectroscopy team under the French Australian Science and Technology program (FAST) for 2009-2011.

More: <http://www.synchrotron.org.au/index.php/aussyncbeamlines/infrared-micro/ir-team-puts-french-diamonds-under-pressure>

See report on the Soleil website: <http://www.synchrotron-soleil.fr/portal/page/portal/Soleil/ToutesActualites/2009/Australie>



NEW WEBSITE IS LIVE

The Australian Synchrotron's new website is now live:
<http://www.synchrotron.org.au>

Comments are welcome and should be emailed to
website@synchrotron.org.au 

FUNDING FOR VICTORIAN-ISRAELI R&D COLLABORATIONS

Companies using synchrotron technologies can apply for funding from VISTECH, the joint Victoria-Israel Science and Technology Research and Development fund, to help them turn their innovative ideas into commercial products.

Launched in 2006 as a unique collaboration between the Victorian Government and Israel, VISTECH provides matching grants of up to US\$500,000. Applications for the sixth round are now open and will close on 4 September 2009.

Companies working in the biotechnology and life sciences sector, advanced manufacturing, the environment, water, nano and micro technologies, information communications and synchrotron technologies are encouraged to apply.

Victorian Innovation Minister Gavin Jennings said that Victorian companies could use VISTECH to gain access to additional skills, capital, technology transfer and knowledge. The VISTECH fund will also provide logistical support in finding suitable Israeli technology partners.

The Australia-Israel Chamber of Commerce will visit the Australian Synchrotron in August 2009.

More: <http://www.business.vic.gov.au/vistech> 

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/index.php/about-us/working-at-the-synchrotron/employ>





MORE INFORMATION

A list of Australian Synchrotron personnel can be found here: <http://www.synchrotron.org.au/index.php/about-us/working-at-the-synchrotron/staff-contact>.

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