

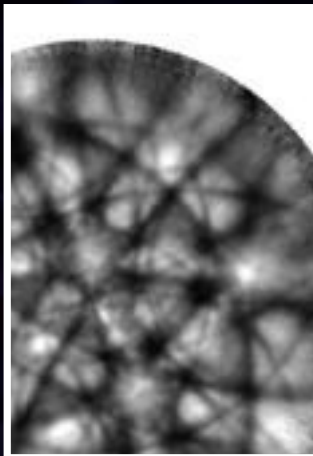
TOP STORIES



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From the Director – Spreading the light



Australian Synchrotron staff have been busy attending or organising meetings of various kinds with some very important groups – including our user community, government representatives, international conference organisers, high school students and teachers and the general public.

Working with Australian and overseas synchrotron users, for example, we've succeeded in attracting the 7th International Workshop on Infrared Microscopy and Spectroscopy with Accelerator-Based Sources (WIRMS) to be held in Melbourne in 2013. This and other prestigious events such as the 12th international conference on x-ray microscopy (XRM) to be held in Melbourne in 2014 are further evidence of Australia's increasingly strong performance in many areas of synchrotron science.

I recently attended the 4th International Workshop of FEL Science: Science Challenges of XFEL (x-ray free electron laser) workshop in Cairns with Andrew Peele, our head of science, and several other synchrotron staff who play an important role in ACAS, the Australian Collaboration for Accelerator Science. The meeting was jointly hosted by the SACLA x-ray free electron laser, which first lased in June 2011, and the ARC Centre

of Excellence for Coherent X-ray Science. It was also sponsored by the Australian Synchrotron and ANSTO, and a memorandum of understanding for future collaboration was signed between ANSTO, on behalf of ACAS, and the SACLA team based at SPring8 in Japan.

[Australia's next synchrotron user meeting to be held 8-9 December 2011](#) in the Melbourne suburb of Albert Park will provide plenty of opportunities for synchrotron users to discuss their techniques and achievements and for new users to learn from more-experienced hands.

On a more general note, our annual open day on Sunday 27 November promises to be a great day out, as it was last year when we welcomed more than 3000 visitors of all ages. Staff will conduct specialised tours, answer your questions and provide activities for young visitors. [Entry to the Open Day is free, but bookings are essential.](#)

Last but not least, while I'm not at liberty to divulge any details of recent discussions with state and federal governments, I can report that things continue to progress well. I'll let you know when I have more news about our funding.

Keith Nugent

Director, Australian Synchrotron



Up to speed: David Aragao



This month our short interview features David Aragao, post-doctoral fellow with the macro-molecular crystallography team at the Australian Synchrotron.

Describe your job in 25 words or less.

Balance my research in the membrane structural biology field with giving the best user support, and learn how to maintain and improve MX beamlines.

Best thing about your job?

Not having two single days with the same job and having a true love for what I do.

Worst thing about your job?

Not always having the time I would like for family and leisure.

Biggest challenge facing your team?

It is not incredibly hard to have a state-of-the-art beamline. The tricky bit is keeping it in that state at all times 24/7.

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

Junior researcher in a virtual reality lab. We used to compete to see who would be able to resist the longest getting seasick while navigating worlds upside down.

Best things about living in Melbourne and why?

Having similar weather to what I would encounter in my native Portugal. I hope also to be able to take a scuba diving course, which is something I've dreamed about for quite a long time now.

Your favourite overseas destination and why?

So many that is hard to name a single one. Also they vary a bit with the mood. If I could decide where to go now for a two-three week holiday I would probably vote for the Azores: an archipelago with nine volcanic islands in the middle of the Atlantic with fabulous flora and fauna. And the best thing is that it is not yet spoiled! Shhh! Do not tell anyone! On another side I have an incredible love for trains and train travel. I'll always be ready for more crazy train travel – maybe the Trans-Siberian next time?

A little-known fact about the Australian Synchrotron?

I've just made three months here. Ask me again in nine months and I'll have a better answer.

What's the most unusual or interesting sample you've seen on the MX beamlines at the AS?

The use of what is now trademarked as a Crystal Harp. This uses polyimide-coated quartz capillaries to grow protein crystals by capillarity diffusion in a way that gives the whole assembly the look of a harp.

What would you like to see happen in the future with the MX beamlines at the AS?

Getting more and more oversubscribed. This will lead to the constant need for creative ways to do more with the same.

What are your own research interests?

My research interest focus is on proteins involved in membrane secretion systems. In the biological membranes of cells, and in particular of pathogens, there are a few membrane proteins involved in the secretion of components to the exterior of the cell. These components have various functions, including some associated with infection, protection against antibiotics, and harvesting of important host components to be used to boost the survival of the invading organism. I'm interested in understanding how these export systems work and how we can affect them.

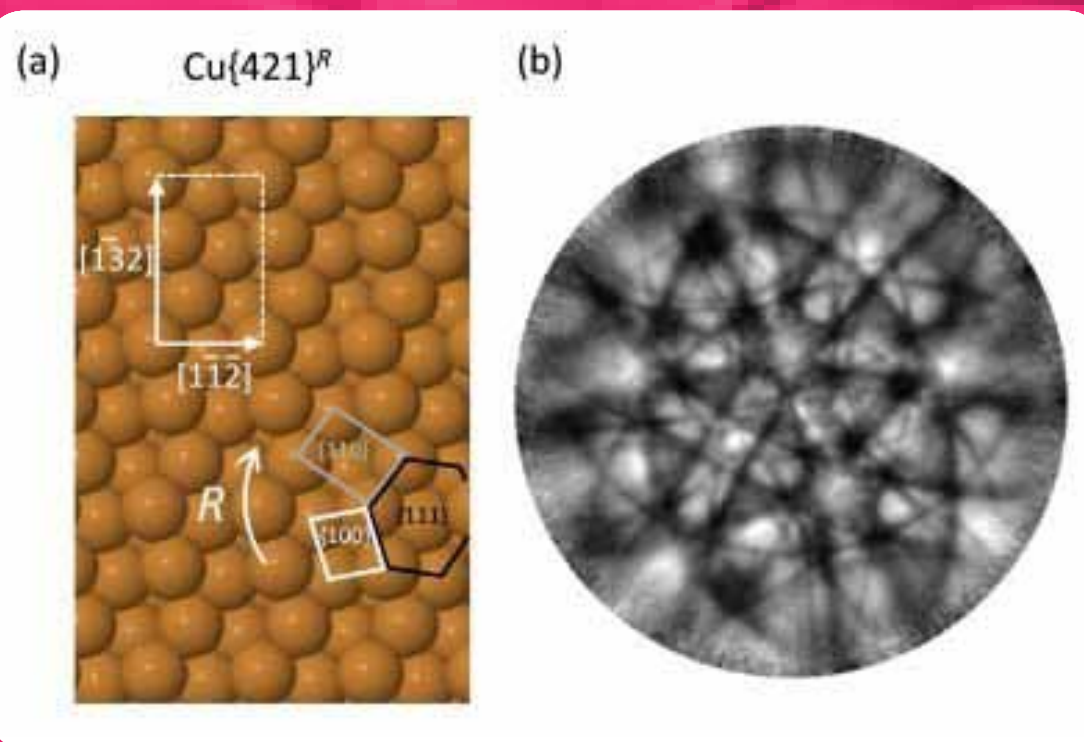
Scientists tackle drug separation issues

Recent work by Australian Synchrotron and university researchers could lead to improved methods for separating 'chiral' drug mixtures, with potential longer-term benefits including more-effective pharmaceutical drugs for consumers.

Most biological molecules occur in both left- and right-handed non-identical mirror images known as chiral enantiomers. Drug synthesis often produces chiral pairs: equal quantities of both left- and right-handed forms, but typically only one of these forms will be effective. In some cases the other form may even be harmful, as was the case with thalidomide, where one form was a sedative but the other form caused birth defects.

Anton Tadich and Lars Thomsen from the Australian Synchrotron and their collaborators at La Trobe University and the University of Newcastle have discovered a way to determine the chiral orientation of metal substrates that show significant potential for separating chiral drug pairs. Their work was featured recently in [Physics Today online](#) and will appear shortly in *Physical Review Letters*, the peer-reviewed journal of the American Physical Society.

Anton and his collaborators studied a chiral copper substrate using photoemission techniques on the soft x-ray beamline at the Australian Synchrotron. They also used a special angle-resolving photoemission spectrometer built by La Trobe University Physics Department and located at the BESSY synchrotron in Berlin, Germany. They then compared their photoemission distribution results with geometric lattice projections of the substrate structure to determine which of the two possible chiral structures was correct.



(b): emission distribution of photoelectrons excited from a chiral copper surface, $\text{Cu}\{421\}$ (shown in (a)). The pattern allows researchers to identify the precise chiral orientation of the copper surface, which is important for understanding how the surface reacts with chiral molecules.

Dirty subject for researchers

Its name may be mud to some of us, but organic matter plays an essential role in soil and plant health – as well as harbouring inorganic (metal) and organic (pesticide) contaminants. Researchers have begun using synchrotron techniques to uncover new information about the structure and behaviour of soil organic matter.

Despite its importance for plant growth and environmental remediation, relatively little is known about some key aspects of soil organic matter, such as the distribution of different forms of organic matter in a particular soil, and the chemical environment surrounding beneficial and contaminant metals.

Enzo Lombi from the Centre for Environmental Contaminants and Remediation (CERAR) at the University of South Australia is using a range of synchrotron techniques to study trace metal distribution in plant and soil samples. Recent subjects include iron and zinc distribution in rice and barley, and copper, zinc and nickel uptake by plant roots.

<http://www.synchrotron.org.au/index.php/aussyncbeamlines/x-ray-fluorescence-microprobe-x-ray-microspectroscopy/highlights-xfm/a-dirty-subject>



Beamtime applications

Beamtime submissions for round 2012/1 (January-May 2012) closed on 28 September 2011. Users will be notified from mid-December 2011.

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

<http://www.synchrotron.org.au/index.php/features/applying-for-beamtime/proposal-deadlines>

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

Australian Synchrotron User Meeting information

The Australian Synchrotron is pleased to announce our 2011 Australian Synchrotron User Meeting, which will be held at the Sebel hotel, Albert Park across 8-9 December.

Our user community has grown to more than 3000 registered users with expertise across all areas of the physical and biological sciences, technology and industry. This meeting will be an excellent opportunity for members of the user community to showcase their research and network with some of the best scientists in Australia, as well as to catch up with the latest developments at the Australian Synchrotron.

The User Meeting will also provide potential users with a chance to better understand the contribution that the AS can make to their research, and an ideal opportunity to consult and network with users and synchrotron staff members.

The program and the diversity of subjects being discussed, is an illustration of the health of the Australia and international user community.

Over the course of the two day conference, the 2011 User Meeting will offer users the opportunity to learn about developments in areas such as medical imaging, nano-electronics, forensics and geo chemistry, amongst others.

It is in many respects, a unique opportunity for users to share their research findings and to build collaborative relations with other members of the science and business community.

I hope you will join with me in supporting the event's purpose in fostering and supporting the user community and its vital role in science research and innovation.

Kind regards,

Richard Garrett,

Chair, 2011 User Meeting Organising Committee

Abstracts

Abstract submissions have now closed and we are in the process of advising those accepted for presentations and posters.

Further information about the program can be found [here](#).

Registration

The Registration fees for the two day conference (including tea breaks, lunch and the Welcome Reception/Poster Function) are:

AUD \$190 General full fee paying

AUD \$190 Australian Synchrotron staff

AUD \$90 Students

The cost for the conference dinner is an additional \$80 for all attendees.

Please note: tickets to the conference dinner are selling fast. Get in quick to ensure you reserve your place!

Satellite meetings/workshops

XFM GeoPIXE Workshop: Quantitative element imaging and Maia detector data analysis using the GeoPIXE software.

Further information [here](#).

MX Workshop: Further information [here](#).

GNXAS School: Further information [here](#).

Australian Synchrotron User Meeting information (cont.)

← XAS Breakout: XAS Beamline will have a breakout meeting to discuss the topics below. This meeting will be held on Friday, 9 December in Grand Ballroom 3 over the lunch break. Please arrive promptly as this session MUST conclude at 1:30pm for resumption of post lunch sessions.

- Upgrade and refurbishment of AS XAS,
- Second hutch experiments at AS XAS,
- ANBF Beamline issues,
- Medium Energy XAS (MEX) Beamline development

Location

The Sebel Albert Park, 65 Queens Road, Melbourne. Accommodation is available at the hotel. Please contact Sebel Albert Park directly and advise that you are part of the Australian Synchrotron User Meeting conference.

Getting around

To get from the Melbourne Airport (www.melbourneairport.com.au) to the CBD you can either catch a taxi which will cost you approx \$50-\$60 AUD or pre-book on one of the shuttle bus services:

www.jetbus.com.au

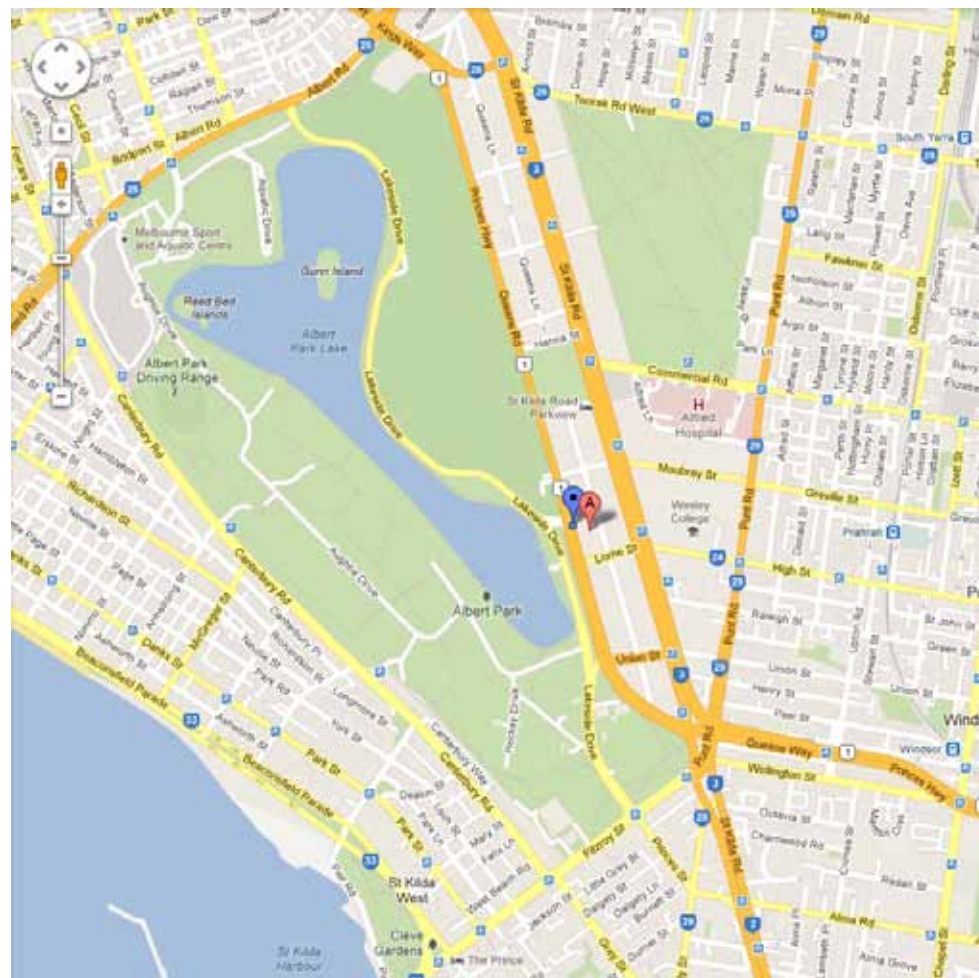
www.skybus.com.au

Domestic travellers arriving at Avalon airport (www.avalonairport.com.au) should allow at least 1 hour for travel to the CBD. Taxis, buses and trains are available with details on the Avalon airport website.

The conference venue is easily reached by train or tram from all over the city. For tram and train timetables see www.metlinkmelbourne.com.au

For public transport trip plans see www.metrotrains.com.au

Road and street maps: www.whereis.com or maps.google.com.au



Synchrotrons in the news October 2011

Renewable energy dream

The world may be one step closer to a cheap, efficient, sunlight-powered method of producing hydrogen from water, thanks to the recent development by Australian and international researchers of a water-splitting cell that uses a manganese catalyst.

<http://www.monash.edu.au/news/show/splitting-water-to-create-renewable-energy-simpler-than-first-thought>

Fluke discovery

Melbourne researchers have found that parasitic fluke worms responsible for 200,000 deaths a year have a similar 'programmed cell death' pathway to that found in humans, a discovery that could speed up the development of new treatments.

http://www.wehi.edu.au/site/latest_news/worm_cell_death_discovery_could_lead_to_new_drugs_for_deadly_parasite

Probing the brain

Canadian and US researchers are studying how iron in brain tissue changes its chemical form during and immediately following stroke damage in rats. The work will help doctors interpret MRI scans of stroke sufferers and may eventually lead to more-sensitive scanning methods for live patients.

<http://medicalxpress.com/news/2011-09-slac-brain.html>

Binding approach to cancer treatment

The chance discovery that synchrotron x-rays could permanently bind a potential anticancer drug to its protein target (thereby preventing its target from interacting with other proteins) could lead to new cancer treatments with enhanced selectivity.

<http://shared.web.emory.edu/whsc/news/releases/2011/09/x-ray-protein-probe-leads-to-potential-anticancer-tactic.html>

How to tune your graphene

An accidental discovery in a Californian physicist's laboratory has provided a unique route for tuning the electrical properties of graphene, a material with great promise for replacing silicon in the microchip industry.

<http://www.physnews.com/nano-physics-news/cluster183758196/>

Bondage mystery solved

A US-Swedish team with expertise in biochemistry, genetics, computational modelling and x-ray crystallography has solved a 40-year mystery: how enzymes that desaturate plant fatty acids know where to insert the double bonds.

http://www.bnl.gov/bnlweb/pubaf/pr/PR_display.asp?prID=1326

Synchrotron shines in audit

The Australia Synchrotron, a facility that offers scientists a powerful light source for research, has achieved pretty much what it was supposed to, according to Victoria's auditor-general Des Pearson.

<http://www.theaustralian.com.au/higher-education/synchrotron-shines-in-audit/story-e6frgcjx-1226120644396>

Open Day on soon

The Australian Synchrotron Open Day on Sunday 27 November 2011 will have something for everyone, including specialist tours, 'Hands on Science' sessions for kids aged 8-12, colouring-in activities, and Tubby the Robot. Come and see us for yourself...

[Click here to make a booking](#)

Photo competition winners - October 2011

Thank you to everyone who entered the August-September 2011 photo competition.

[Click here to see the winning photos displayed on the website.](#)

A new round of the competition is open, with a closing date of Monday 28 November 2011.

[Click here to go to the competition entry webpage.](#)

Below: the winning photo for August-September 2011, taken by Kieran Lim from Deakin University.





Construction update

Watch those spaces!

Three of the new buildings being constructed around the Australian Synchrotron are now in use: the technical support laboratories building, the office extension pod and the switchroom extension. External construction of the user accommodation building is complete, and the building is being fitted with furniture in readiness for users.

The biggest construction project, the National Centre for Synchrotron Science building, is nearing completion, with installation of windows and Rodeca panelling on all exterior walls. Inside the building, auditorium seating and lighting are in place, and interior walls and office fittings are quickly taking shape.

Commenced in late 2010, these projects are an initiative of the Australian Government being financed from the Education Investment Fund.

[Click here to download a map](#) (pdf, 140kb) with information about new parking arrangements for visitors to the synchrotron.

National Centre for Synchrotron Science (NCSS)

- Two-storey building with a 400-seat auditorium, seminar rooms, exhibition space, User Office, staff offices, cafeteria and underground parking.
- Building construction is ahead of schedule. Installation of the translucent Rodeca panelling facade is almost complete and most of the exterior windows have been fitted. Kitchen equipment has

been installed and joinery items are being fitted out throughout the building. Auditorium lighting comprises an impressive array of 120 circular fluorescent luminaries.

- The NCSS building has a five-star rating under the Green Star system, which is a comprehensive, national, voluntary environmental rating system that evaluates the environmental design and construction of buildings. To achieve this rating, the building includes features such as 20 kilolitre water tanks for recycling water, high-efficiency heating and cooling systems, and 100 photo-voltaic panels on the roof to offset the power needed for the facade lighting, which is a key feature of the building's exterior. [Click here to read more about the NCSS building and its green credentials.](#)
- Several elements of the NCSS building, such as landscaping, fittings, and audiovisual equipment, are being managed separately from the main construction works.
- Investigations into the operation of the cafeteria are continuing.
- Following several feasibility studies in late 2011, a detailed landscaping design is being developed from the landscaping masterplan to address aspects such as tree types and locations, irrigation pipes, concreted areas, parking, benches and seating. The design calls for many new trees to be planted, particularly around parking areas and the user accommodation building. A vegetable garden will be established near the existing barbecue area.

The entrance roadway and lighting for the main synchrotron building will be redesigned. The landscaping work is expected to be put out for tender in March 2012.

- See overleaf for photos of construction work on NCSS building.

User accommodation building

- Two-storey building with 50 self-contained rooms, communal kitchens, lounges, laundry and reception. The ground floor includes disabled facilities.
- Construction is complete. Following successful assessment of the prototype bedroom, all bedrooms are being fitted out with furniture. The kitchen, laundry and lounge areas are also being equipped with furniture, fittings and equipment.
- "The user accommodation building is so nice, particularly the lounge area, that synchrotron staff are already joking about occupying the building themselves," says Alexis Kouts from the Synchrotron's Major Projects and Technical Services Group.
- "Provided the new furniture is delivered on schedule, we hope to begin making the accommodation available to users in April 2012."
- Processes are being developed for carrying out the necessary cleaning, scheduling, security, repair and maintenance tasks.

[Click here to go to user accommodation building photo page.](#)



Construction update (cont.)

← Modular office extension (office extension pod)

The modular extension 'pod' connected to the main synchrotron building is complete. It has been fitted out with workstations and office furniture and is now occupied by staff from several groups, including Major Projects. The building provides a simple but functional open office area with plenty of natural light. Spare desks are available for visitors to use.

[Click here to go to office extension 'pod' building photo page.](#)

Technical support laboratories building

This building is occupied and fully operational with four laboratories, an open plan office, meeting rooms, mechanical workshop and stockroom. The large spaces within this building have enabled the engineering group to be consolidated into one area, supported by tools and equipment located downstairs.

[Click here to go to technical support laboratories building photo page.](#)

Switchroom extension

Extension to the existing low voltage switch room, which had reached capacity. The uninterrupted power supply (UPS) system is now operational. A cooling system is being installed for days of extreme heat. Thanks to three brand-new 'uninterruptable power supply' (UPS) systems, the AS storage ring can continue operating for up to 15 seconds without any power, enabling synchrotron operators and users to continue working through any short-term power supply disruption.

[Click here to go to switchroom extension building photo page.](#)

We will post regular updates on our website to keep you informed of progress.

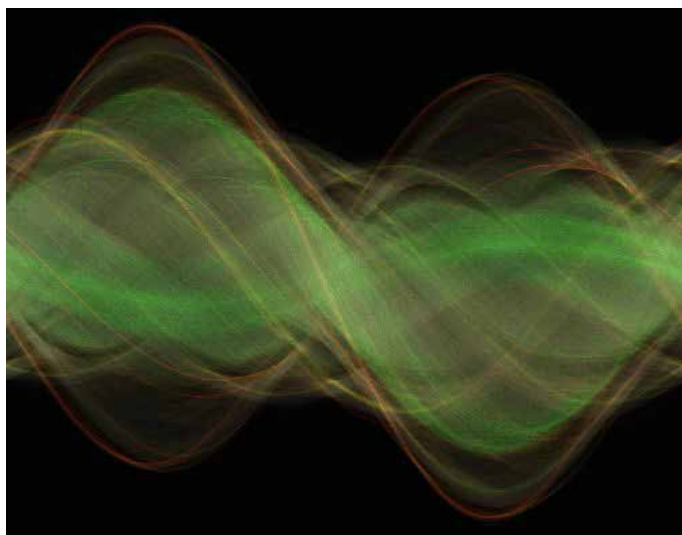


[14 October 2011]: inside the NCSS, looking south past the auditorium wall (LHS).



[14 October 2011]: inside the NCSS user office, looking north towards the main synchrotron building (right) and the IMBL satellite building (left).

The virtual virtues of fluorescence tomography



A technique that creates 'virtual' sections of small 3D samples is now available for general user proposals on the x-ray fluorescence microscopy beamline.

Thanks to intensive local development work with the Maia detector on the XFM beamline, fluorescence tomography is no longer limited to measuring very small objects at low resolution. Maia's speed and sensitivity enable users to obtain tomographic

images of elemental distribution within a specimen without the long exposure times and high x-ray doses previously associated with fluorescence tomography. For delicate samples, this substantially reduces the risk of x-ray damage occurring before measurements can be obtained, as illustrated by a recent study of metal distributions in fresh fully-hydrated plant roots [1,2].

General users can apply to use fluorescence tomography from round 2012/1 (January-May 2012). A strong science case will be an important part of your proposal, and users are urged to discuss their requirements with beamline staff prior to submission.

The sinogram to the left shows measurements obtained from a fully hydrated, immature grain of rice. Three sinograms are superimposed: the white, determined from the Compton scatter signal, maps the grain's biological ultrastructure. The red sinogram shows germanium, which also serves as a proxy for Si, and the green sinogram maps zinc.

The reconstructed 2D section of the rice grain is shown below (scale bar = 600 μm). The reconstruction resolution is around 5 micrometres, with the husk clearly visible

around the outside of the grain. Despite localised germanium and zinc hot-spots, their distribution is still clearly elucidated. Germanium inhabits the hairs on the outside of the husk and some structures within the grain. Zinc is found in both the endosperm and the husk.

In rice, arsenite (the dominant arsenic species in paddy fields) is taken up and transported through the silicic acid pathway. Enzo Lombi (Centre for Environmental Risk Assessment and Remediation, University of South Australia) and his colleagues investigated germanium in this specimen as a way of indirectly investigating the distribution of silicon. Germanium can be analysed with hard x-rays and is amenable to tomography in large samples; while silicon's low fluorescence energy means it cannot be efficiently investigated with this technique due to self-sorption.

In the edible part of the grain, germanium was found mainly in the ovular vascular trace, which is the structure that delivers nutrient to the grain. This distribution closely follows arsenite distribution in the grain, suggesting that silicic acid transporters are not only responsible for the plant taking up arsenite but also for uploading this contaminant in the rice grain. Zinc was found in the embryo and in the aleurone layer.

During the three hours required for this measurement, the specimen would not have been subjected to any higher x-ray dose than that experienced during the equivalent 2D measurement from an actual cross-section.

Although the maximum size of the specimen that can be measured is no longer limited by hardware capabilities, self-absorption – the absorption of the x-ray fluorescence as it leaves the specimen – prevents measurement of arbitrarily-sized specimens. As a guide, absorption of the fluorescence should be less than about 50% over the specimen thickness in order for a measurement to be feasible. Refer to [3] for a detailed discussion, or contact Martin de Jonge martin.dejonge@synchrotron.org.au at the XFM beamline for advice.

[1] E Lombi, MD de Jonge, E Donner, et al.: Fast X-Ray Fluorescence Microtomography of Hydrated Biological Samples. *Plos One* 6 (2011)

[2] PM Kopittke, NW Menzies, MD de Jonge, et al.: In Situ Distribution and Speciation of Toxic Copper, Nickel, and Zinc in Hydrated Roots of Cowpea. *Plant Physiology* 156 663 (2011)

[3] MD de Jonge & S Vogt: Hard X-ray fluorescence tomography - an emerging tool for structural visualization. *Current Opinion in Structural Biology* 20 606 (2010).

XAS user cabin

A user cabin is being constructed for the convenience of users and staff on the x-ray absorption spectroscopy (XAS) beamline at the Australian Synchrotron.



The four photos show construction progress as at 6 October 2011.

Powder diffraction workshop 2011

More than 30 early-career researchers from across Australia and New Zealand attended the first joint Australian Synchrotron-ANSTO powder diffraction workshop at the synchrotron in September 2011.

Entitled 'Powder Diffraction at Australia's Synchrotron and OPAL Facilities: Experiment Planning to Data Analysis' the workshop consisted of an intensive four-day program of lectures and hands-on tutorials given by a range of speakers. Presenters included AS powder diffraction beamline staff, James Hester and Michael James from ANSTO, Ian Madsen from CSIRO and Craig Brown from NIST (National Institute of Standards and Technology) in Washington state USA.

During the workshop, students learnt about all aspects of powder diffraction research and data analysis: from experiment proposals and planning through to data analysis. Students were provided with a suite of freeware packages to assist their data analysis, as well as comprehensive tutorials and hands-on sessions to help them develop their data analysis skills.

The powder diffraction team gratefully acknowledges the financial support of the AS, Bragg Institute at OPAL, and AINSE. The International Centre for Diffraction Data (ICDD) gave students a live video-link demonstration of their inorganic diffraction database and provided a 30-day trial license to all participants.

The workshop was well-received by participants, with comments such as: "you and your team were very helpful throughout the week. I have some ideas now on refinement and hopefully I can apply my acquired knowledge well when it comes to having to deal with powder diffraction data" and "thank you for organising such a great workshop. The basics of data processing are often overlooked in workshops as they assume the basics are known. However, from experience I know that if the basics are not well understood then the advanced is confusing".



WIRMS coming to Melbourne

The 7th International Workshop on Infrared Microscopy and Spectroscopy with Accelerator-Based Sources (WIRMS) will be held in Melbourne in 2013.

The 6th International Workshop on Infrared Spectroscopy and Microscopy with Accelerator-Based Sources, WIRMS 2011, was held in September 2011 in the city of Trieste, Italy, home of the Elettra Synchrotron. Held every two years, this conference brings together IR synchrotron and free electron laser scientists and users from around the world to facilitate development and collaborative research in these rapidly advancing fields. It typically attracts 90-110 delegates from the synchrotron radiation and free electron laser communities.

Interest is widespread and varied, involving scientists from disciplines as diverse as chemistry, physics, biology, engineering and geology. Topics covered at WIRMS 2011 included facility updates and beamline technical developments, microspectroscopy, time-resolved spectroscopy, extreme conditions, condensed matter, near field, imaging and high resolution techniques. Delegates were also treated to a tour of the Elettra Synchrotron and FERMI free electron laser.

- Five presentations described work performed at the Australian Synchrotron IR beamlines:
- cultural heritage applications (Ljiljana Puskar, AS)
- sub-cellular biological imaging (Mark Tobin, AS)
- far IR/high-resolution IR capabilities (Dominique Appadoo, AS)
- enclosive flow cooling cell development on far IR/high-resolution IR beamline (Chris Medcraft, Monash University)

applications of synchrotron FTIR in volcanology (Jonathan Castro, University of Mainz).

The Australian Synchrotron has successfully bid to host the next meeting, WIRMS 2013, which will be a perfect opportunity to showcase the science of the Australian Synchrotron ... and koalas.

Events diary

Synchrotron-related events in Australia and overseas.

<http://www.synchrotron.org.au/index.php/news/publications/lightspeed-newsletter/lightspeed-articles/647-events-diary-october-2011>

Space for your event

To submit your synchrotron-related event for listing in Lightspeed and on the Australian Synchrotron website, [click here](#).

Reader feedback

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

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Careers at the Australian Synchrotron

The Australian Synchrotron offers a unique working environment for a wide range of specialists. For information on job postings, go to: <http://www.synchrotron.org.au/index.php/about-us/working-at-the-synchrotron/employment-opportunities>

Staff list

<http://www.synchrotron.org.au/index.php/about-us/working-at-the-synchrotron/staff-contact>