



## CXS 2nd Annual Workshop 2007

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### Coming Events

#### COHERENCE 2007 Conference:

25 - 28th June 2007, Asilomar,  
California (USA)

Please go to the following website for more  
details: [www-als.lbl.gov/coherence2007/](http://www-als.lbl.gov/coherence2007/)

#### CXS Annual Workshop 2007:

11 - 13th April 2007, Melbourne,  
Victoria, Australia

It's official! The CXS Annual Workshop: "*Physicists and Biologists Working Together – Facilitating X-ray Biophotonics*" will be held on 11th - 13th April 2007.

The workshop's focus will be on the development of high resolution diffractive imaging of biological samples using synchrotron, high harmonic generation laser and X-ray free electron laser sources.

We anticipate over 100 physicists, chemists and biologists with related interests will attend the workshop, which will cover the following themes:

- Protein Structure Determination
- Imaging of Biological Systems
- Advanced Microscopy
- Optics and Imaging
- Sources and Detectors
- Coherent Diffractive Imaging

To date the following international speakers have accepted an invitation to present at the workshop:

- Ian McNulty - Advanced Photon Source, Argonne National Laboratory, USA
- Ivan Vartaniants - HASYLAB, Hamburg, Germany
- Carolyn Larabell - Lawrence Berkeley National Laboratory, USA
- Ralph-Hendrik Menk - Synchrotron Light Laboratory, ELETTRA, Italy
- Tetsuya Ishikawa - RIKEN, Spring-8 Center, Hyogo, Japan
- Franz Pfeiffer - Paul Scherrer Institute, Switzerland
- Bonnie Wallace - Birkbeck College, UK
- Qun Shen - Advanced Photon Source Argonne National Laboratory, USA
- Andrzej Krol - SUNY Upstate Medical University, Syracuse, USA

There will also be contributing speakers from CXS. The workshop will have poster sessions, with plenty of time for discussion and the development of new collaborations.

The event will be located at the University of Melbourne's Bio21 Institute in Carlton; one of the largest biotechnical research centres in Australia, which houses state-of-the-art purpose built laboratories. For further information on Bio21 visit their website at [www.bio21.unimelb.edu.au](http://www.bio21.unimelb.edu.au).

Additional features of the workshop will include a guided site tour of the Australian Synchrotron facility in Clayton. For further information on the Australian Synchrotron visit their website at [www.synchrotron.vic.gov.au](http://www.synchrotron.vic.gov.au).

Finally, you will also have the opportunity to purchase tickets to attend the CXS Annual Workshop Dinner which will be held in the Rainforest room of the world renowned **Royal Melbourne Zoo**. The Rainforest room is situated beside a tranquil lake overlooking the Zoo's Japanese Gardens and features a large private aviary full of Australian rainforest birds. Opening on to two outdoor terraces, this will provide a unique and enjoyable environment.

For further information on all matters relating to the CXS Annual Workshop or to obtain a registration form please visit our website at [www.coecxs.org/workshop2007.html](http://www.coecxs.org/workshop2007.html)



An Australian Synchrotron tour will be an added feature of the CXS Annual Workshop

## Welcome Aboard!



Dr Eugeniu Balaur joins the  
CXS team

We are pleased to welcome Dr Mark Pfeifer and Dr Eugeniu Balaur to the CXS team.

Dr Mark Pfeifer graduated with a BS in Physics from the University of Notre Dame and a PhD in Condensed Matter Physics from the University of Illinois (USA). He followed this up as a postdoctoral fellow at the Advanced Light Source at Berkeley National Laboratory, splitting the appointment between BNL and the University of Oregon.

Mark's research interest involves using coherent X-ray diffraction to probe interfaces and defect structures. His current role at the CXS is to facilitate the design, construction and commissioning of a coherent diffraction X-ray microscope

being built at La Trobe University. He will also be travelling to synchrotrons to help with diffractive imaging experiments.

Dr Eugeniu Balaur graduated with a Masters of Science from University of Kiel (Germany) and a PhD in Materials Science from Friedrich Alexander University of Erlangen Nuremberg (Germany).

Eugeniu has now taken the opportunity to obtain a postdoctoral position as a research fellow in the Sample Preparation team of CXS. In the frame of this project, Eugeniu will be working on the preparation of membranes as supports for X-ray diffraction imaging and for organic modification of them with complex organic molecules (e.g. proteins).

## In Brief

### Publications:

2006 saw a total of 41 publications by CXS members.

### Scientific Progress:

CSIRO are continuing with their work on the analysis of 2D powder diffraction data for Purple Membrane (*Bacteriorhodopsin*) measured by T Oka. MaxEnt methods are now being invoked to help unravel blurring of diffraction data due to disorder and instrumental effects.

The Detector and Beamline Development team are in the process of system modelling to allow for the development of suitable hardware specification on which to work. The baseline is for a detector system which will work over an energy range of 0.5 KeV to 2 KeV and provide two dimensions of spatial information. Communication is underway with other CXS members on several parameters which are yet to be defined.

Dr Danielle Smith has joined the Biological Science Program team and is currently making clones for the expression of domains of a mitochondrial outer membrane protein. Some success in the expression of MiD51 as fusion protein has been made and the team hope to set up conventional hanging drops with Jacqui Gulbis. Methods of differential staining of malaria parasite-infected erythrocytes has also been undertaken, with two manuscripts on EM imaging of

infected erythrocytes being developed.

The Short Wavelength Laser team are preparing to make a waveguide for enhancement of efficiency of HHG radiation.

The Theory and Modelling team has been collaborating with the Short Wavelength Laser team to try and extract phase information from their time resolved molecular polarization experiments. They have also been collaborating with the Experimental Methods team on the influence of incident phase curvature on the facility of phase retrieval if the illuminating source is partially coherent. This has led to the identification of conditions under which reliable reconstructions of images may be obtained. Work is developing on new methods of phase retrieval from diffraction data, as well as exploring the mathematical foundations of coherent diffractive imaging.

### Linkages:

CSIRO have been working on linkages to ICTP (Trieste) and MMSN for participation and funding support of the 2nd Annual CXS Workshop.

The Biological Sciences team have had the following visitors this quarter:

- Dr. Nils Wiedemann, Freiburg
- Claudia Leidhold, Freiburg (PhD student)
- Prof. Peter Thorsness, Wyoming State University (sabbatical visitor and Institute for Advanced Studies Fellow)

- Prof David Ferguson, Nuffield Dept of Pathology, University of Oxford, Oxford, UK

The Short Wavelength Laser team have had the following visitors this quarter:

- Enrico Gratton, laboratory for Fluorescence Dynamics, UC Irvine, USA
- Ken Jacobsen, Cell & Developmental Biology, School of Medicine, Chapel Hill, U. North Carolina, USA
- David Jameson, Dept. of Cell & Molecular Biology
- John A. Burns, School of Medicine, University of Hawaii, Manoa, USA

### Conferences & Workshops:

Prof Rob Lewis was an invited speaker at the Australasian High Energy Physics and Medical Physics Conference in Christchurch, New Zealand, October 2006.

A/Prof Mike Ryan was an invited speaker at the International Network of Protein Engineering Centers in Elsinore, Denmark, October 2006.

Prof Leann Tilley gave a seminar at the Department of Biochemistry and Molecular Biology at the Australian National University, October 2006

Prof Keith Nugent was an invited speaker at XTOP 2006 in Baden Baden in September 2006, as well as at the RACI Annual Meeting at RMIT, December 2006.

## Yallourn Primary Students come to the Big Smoke

*Principal of Yallourn North Primary School, Ian Whitehead, writes of his students visit to CXS.*

Primary school students touring CXS at the University of Melbourne?

Seems a bit odd doesn't it? But the idea was an inspired one according to the teachers of Yallourn North Primary School, a school of a 160 students in Gippsland's Latrobe Valley.

Once through their secondary education few students from Yallourn North Primary School pursue the option of enrolling at a university. Yet state wide evaluation and the staff's own testing program reveals many students have the capability and potential to go to university.

The problem at Yallourn North and many

schools like it is that family cultures do not usually consider university for their children; it's just not on their radar.

Every two years the grade 5 and 6 students at Yallourn North Primary come to Melbourne for a 3 day camp. The students were asked to closely observe the university students and try to imagine themselves in their place in ten years time.

We walked across the South lawn and past the Law buildings on the way to the Physics building where Simon Bell from the Atom Optics group in the School of Physics, and Lachlan Whitehead from CXS were waiting to show the students their laboratory and explain their work.

The students were enthralled with Lachlan's lasers and blown away with Simon's tour of the Atom Optics

lab and his explanations. We hope we have put the seed of thought in the mind of the students.

Did the visit have an affect? Well, all the boys bought those cheap lasers from Victoria Market. That's a start.



## CXS End of Year BBQ and Overview Meeting

Members of CXS took part in the annual End of Year BBQ and Overview meeting held at the University of Melbourne on 20th December 2006.

The Director, Professor Keith Nugent, opened the meeting with an overview of the past year, what has and hasn't worked, focus areas for improvement, and discussion on the future; particularly relating to funding, grants, workshops and the T8 building opportunity at Clayton.

Each program team provided a presentation on their progress and planning for 2007 and beyond.

The meeting's casual atmosphere allowed all in attendance to freely discuss the variety of topics presented and make comments and suggestions.

The festivities were helped along by the excellent BBQ lunch and the free flowing

beer and wine.

Deputy Director, Professor Leann Tilley, concluded the proceedings with a facilitated discussion on future collaborations.

### PROGRAM TEAM POINTS OF INTEREST:

Biological Science Program team, presented by Dr Mike Ryan -

- Cell program is strong
- Will develop laser work with the Short Wavelength Laser Source Program team
- Develop summer student program
- Biologist on external experiments
- Look into Fellowship opportunities

Short Wavelength Laser Source Program team, presented by Professor Lap Van Dao and Associate Professor Trevor Smith -

- Develop programs with Theory and Modelling Program, Experimental Methods Program and Biological Science Program
- Install new laser equipment
- Via CSIRO develop linkages with laser groups overseas
- Possibly develop with biology based on spectroscopic methods

Detector and Beamline Development Program team, presented by Dr Chris Hall -

- Shared beamtime

- Develop joint student program
- More involvement with Taiwan endstation project
- Use images for outreach

Theory and Modelling Program team, presented by Dr Harry Quiney -

- Symbiotic with Experimental Methods Program
- Include coherence and modelling of X-ray matter interaction in the high harmonic generation project
- CSIRO involvement with Bayesian analysis
- Formalised co-supervision of students
- Biologist on external experiments

Experimental Methods Program team, presented by Dr Andrew Peele -

- Have practical linkages to all groups
- Liaison team to establish new links with other groups
- Interaction with CSIRO on synchrotron

CSIRO team, presented by Dr Jose Varghese -

- Possible bacteria rhodopsin X-ray experiment with Experimental Methods Program
- Develop working group for beamline design
- Analysis of existing beamlines to see what experiments are possible
- Joint students
- Make PhD scholarships available



Some of the attendees of the CXS Overview Meeting and BBQ

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The ARC Centre of Excellence for Coherent X-ray Science (CXS) is an Australian government Initiative which began in July 2005 to explore what can be achieved with coherent X-ray optics; including an understanding of exotic phenomena such as X-ray phase discontinuities.

CXS headquarters is located at the University of Melbourne in Victoria, Australia, with participating nodes at La Trobe University, Monash University, Swinburne University of Technology and the CSIRO. Its mission is to be the world leader in the development of non-crystallographic techniques for the determination of protein structures.

"In Coherence" is produced quarterly by CXS. Contributions are welcome and should be forwarded to Ms. Tania Smith, CXS Chief of Operations, University of Melbourne Vic 3010, faxed +61 3 9347 8912, Email: tsmith@ph.unimelb.edu.au or Ms. Rosslyn Ball, Administration, Email: r.ball@ph.unimelb.edu.au

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## THE MEDIA IN FOCUS - Are You Media Savvy?

It is now a fact of life that the majority of the general public receives its scientific information from the mass media.

So here at CXS, we acknowledge the media's importance and are taking steps to get our message out; to inform the public of our research and increase our opportunity to engage in a dialogue with the public and other scientists. After all, scientists read the paper too.

In the next few issues of *In Coherence* we will be looking at the best ways to work with the media and to prepare CXS members for our proposed media and promotions professional development training sessions in 2007.

### Tips for Dealing with the Media

#### WHAT IF I GET A CALL FROM THE MEDIA?

Often a journalist will contact a scientist directly. As many scientists have little experience dealing with the media this can be daunting so it is reasonable for you to forward the contact on the CXS Chief of Operations (COO), who will deal with all the necessary arrangements for the interview.

If you are fortunate enough to get a call from the media then you are on the right path. But unless you speak in an accessible language and are engaging with the journalist who called you this may be a lost opportunity.

Therefore, get excited about the contact.

What to do at the first contact:

- Say "yes" to the interview! (we can always change our minds later)
- Ask where the journalist is calling from and who they work for
- The media works on short deadlines so find out how much time you have (buy yourself some time if you can)
- Ask in what context the information will be published
- Advise the CXS COO of the contact and ask for any assistance or advice you may need
- Offer to fax them background information (a safeguard against misrepresentation)
- Return calls when you say you will
- Never pretend to be an expert - if you don't know the answer, say so

#### TALKING ABOUT YOUR WORK

Marina Joubert from the *Foundation of Education, Science and Technology* in South Africa is quoted as saying, "Remember, science is about things, but science news is about people."

Yes, our main goal is to get the science out there but it is essential that when you are being interviewed you try and make it personal and express your feelings about your work. This will add an extra dimension to the article and capture people's attention; just what the media is looking for.

After all, if you have been contacted by a journalist then it is likely that it is YOU they want to talk to, not the Head of Department or Director.

#### WHAT'S THE STORY?

More often than not it is the scientific community that approaches the media to get publicity. This is generally done via press releases, but can also take the form of press conferences, direct links to liaison staff, events etc.

Whatever avenue is chosen will depend on how the story is "pitched" - its interest level to the general public, if there is anything unexpected to report or if it has novelty value.

Therefore you need to ask yourself if there is something about your research that will grab people's attention? Is it a first? Do you have a personal experience to tell? Have you won an award? Are you holding an event?

These things can make a "main" news story, but as with a lot of "news-worthy" pieces whatever message you want to present to the media may be hidden in the detail. Therefore it is essential that you make the heart of the story easy to find by pointing it out to them.

Contact the CXS COO for assistance with any media contacts or press releases as this will ensure that all possibilities are covered.