

Society of Crystallographers in Australia



SCA

Newsletters

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The SCA homepage is located at <http://www.sca.asn.au>

PRESIDENT'S REPORT

Bangi, Malaysia

Due to the timing of our meetings, I have completed my term of office in the relatively short time of eighteen months. Thirty-two years have passed since I attended my first meeting of the "Bush Crystallographers", the forerunner of the SCA. That meeting was held at Lucas Heights, a few weeks after I started my Honours year working on a project with Hans Freeman. I remember being bewildered from the start. What were these Debye-Waller factors that everyone was so excited about and why did everyone laugh when one of Hans Freeman's PhD students presented his unit-cell dimensions to six significant figures – after all he had measured them very carefully. I was also amazed that people could drink so much for lunch and still make sense of the conference proceedings in the afternoon. With the wisdom of age and experience I now realise that since my condition was probably far worse than theirs, I only believed they were making sense of anything.

Thirty-two years is a long time and one might have expected some changes in crystallography and how it functions in Australia. Small molecule crystallography, meaning the solution of small inorganic and organic structures for their intrinsic chemical interest, which was so evident at crystallographic meetings thirty years ago, is no longer a major part of a crystallography meeting. In 1965 our next President, Max Taylor, submitted his PhD thesis on the structure of a single copper peptide complex. The structure was solved with data recorded on films with intensities either measured by eye or with a manual densitometer. I should add parenthetically that Max's thesis was for many years the prototype for the theses that followed, including my own. He wrote everything so well that any changes subsequent students made to avoid the plagiarism laws only detracted from the original text. The advent of automated diffractometers and

software that can solve more than 90% of structures with little or no intervention has properly focussed the role of chemical crystallography on the outcomes rather than the methods.

What was a major achievement in 1965, the solution of a structure with thirty or more non-hydrogen atoms, had its equivalent in the world of protein crystallography until very recently. Any new structure was a major event. But again with the power of modern technology: image-plate detectors, fast workstations and intelligent interactive graphics programs, the biggest hurdle in protein crystallography is the production of suitable material – molecular biology and protein chemistry – and then of course the growing of crystals. While these areas have had technology revolutions of their own by simplifying the procedures and putting them in the hands of non-specialists, there is still no certainty that any given protein can be purified or crystallised. Thus while the growth in protein crystallography has revitalised the whole field, will this last and what is the cost?

Annual meetings of the American Crystallographic Association and the tri-annual meetings of the IUCr now have up to fifty percent of the presentations in the macromolecular area. This development is not greeted enthusiastically in all quarters. The German crystallographic association has encouraged the protein people to have meetings on their own and the IUCr is actively questioning the format of their future meetings.

One innovation has had the effect of reversing this perceived fragmentation of the crystallographic community. The use of synchrotron radiation for a wide range of crystallographic problems has served to bring together disparate groups who might otherwise have little in common. A major part of my "community" activities in the past few years has involved what seemed like endless meetings organised and superbly minuted by John White. The precursor of these committees sparked by Steve Wilkens and Dudley Creagh and then pursued through the Australian Academy of Sciences by John White and Hans Freeman, led to Australia's very active and successful involvement with the Photon Factory at Tsukuba in Japan. As I noted in a previous article to the *SCA Newsletter*, we now have access to a broad range of facilities at the state-of-the-art third generation synchrotron source in Chicago. We are partners in groups pursuing advanced instrumentation and techniques (SRICAT), chemical spectroscopy and structure (ChemMatCARS) and protein crystallography (BioCARS). Each of these co-operative access teams has a number of individual beamlines tuned to specific applications.

Partly as a result of the use of synchrotron radiation there has been a recent resurgence of physical crystallography in Australia. It is still centred in Melbourne and has recently been showcased with the opening of the new diffraction laboratory in the Department of Physics at the University of Melbourne. There have also been major achievements at the CSIRO laboratories in Melbourne and of course in Canberra and Armidale. One interesting sidelight is the collaboration in the development of X-ray optics involving macromolecular crystallographers and physicists.

Where does this leave the SCA now and in the future? Our recent meetings, including this one and the last at Queenstown in New Zealand, have been very successful with a steady attendance at the domestic meetings of 90 to 100 people. But the chemical crystallographers are often notable for their absence and soon, with limited travel funds, will the protein crystallographers be forced to choose and only attend meetings with a biologically oriented audience? We have already adjusted our domestic schedule, which means that only every third meeting of the SCA will be in Australia or New Zealand. Other meetings are deemed to

coincide with IUCr congresses or meetings of AsCA. Will this inevitably dilute the formerly unique atmosphere of SCA meetings inherited from the bush crystallographers and will it ultimately lead to a slow decline? One possible solution would be to join our meetings with others in Australia such as the Australian Institute of Physics or the Royal Australian Chemical Institute. In my view this would only hasten to fragment the membership, with people opting to attend only those meetings closest to their own areas of interest.

If one puts a positive spin on these musings, then it might be said that we are simply the victims of our own success. Crystallography is now an integral part of so many disciplines that it is becoming increasingly difficult to maintain a separate identity. How do you answer the question, "What are you?" Is the answer, chemist, physicist, biochemist or *crystallographer*?

Whatever you decide please continue to support the SCA and the hardworking executive officers, by attending meetings and if possible by contributing to the running of the Society itself. On that note I should like to thank the three people who actual do most of the work of the Society. Firstly, the secretary, Trevor Hambley. Immediately after Trevor joined the Chemistry Department in Sydney I was impressed by how organised he was. He dispatches his secretarial duties with cold efficiency while managing a facility that solves dozens of structures a year, publishes a huge number of papers, teaches undergraduates and directs one of the largest groups of graduate students in the Chemistry School. Trevor will be sorely missed and his successor has a very hard act to follow. As most of you know the treasury moved from Queensland to Western Australia after the last meeting, bringing with it the problems of transferring accounts and the like. Brian Skelton has organised things with great skill and I can see from the balance sheet that we are still in a healthy financial position. As well as that job, Brian deserves a very special extra vote of thanks for his role as the *Newsletter* Editor. He produces each issue on time working to a schedule dictated by receipt of the IUCr Newsletters. Lastly I should like to thank all the members of the committee for responding to requests for information promptly and offering their often insightful comments. This grandfatherly advice of the former President, Chris Howard, was always very welcome.

To me, it's a great honour to have been elected to the position and I thank you all for the opportunity.

Mitchell Guss

Treasurer's Report

Bangi, Malaysia

This Treasurer's Report sees a change in Treasurer together with a transfer of the SCA's finances from Brisbane to Perth. The investment accounts previously held with the Queensland universities' credit union, Unicredit have been consolidated into one Term Deposit account with the Western Australian universities namesake Unicredit. The investment with the Australia Guarantee Corporation (12 month Debenture) remains.

The major event in the SCA's financial calendar over the last two years has been the support of Crystal XX in Queenstown, New Zealand. A summary of the conference Income and Expenditure has been included in this report. The organisers returned \$2348.76 (\$NZ2637.57)

as operating surplus to the SCA. However, this amount is reduced by \$1814.24 (\$NZ2000) which was provided as a loan to the organisers. Further conference expenses paid directly by the SCA were \$6100 for student scholarships and \$2596.05 (\$US2000) for the invited speaker's airfare. The Society's *1987 Fund* supported Crystal XX to the extent of \$8000 leaving a loss of only \$161.53 to the SCA. The costs of student travel scholarships to AsCA'98 \$3900 have also been met by the *1987 Fund*.

As in previous reports, the major expenses during the last eighteen months since the Queenstown meeting has been *Newsletter* costs and subscriptions to the Asian Crystallographic Association (AsCA) and to the Federation of Australian Scientific and Technological Societies (FASTS). An amount of \$1100 was paid to the *Newsletter* Editor for the printing and distribution of the Society's *Newsletters*, \$1195.30 was paid for 1997 and 1998 subscriptions for membership of FASTS and \$720 (\$240 per annum) for 1995-1997 subscriptions to AsCA.

The statement also shows that although income from subscriptions remains fairly constant, the interest from investments has decreased by approximately 25% over the previous period. However, overall the Society's income exceeded expenses by around \$2750.

Following a recommendation suggested at the last Council meeting, a report from the trustees of the *1987 Fund* is attached.

Brian Skelton

Location of Funds

Most of the funds are deposited in Unicredit (WA) account No. 25403 as a working account S1 or as term deposits in an I20 account. These term deposits and the Investment with Australian Guarantee Corporation are earning 4.5% interest or better.

Unicredit	Account Type	Interest	Amount \$
S1	Working Account	0	3351.06
I20	Term Deposit	4.5%	40314.79
I20	Term Deposit	5.0%	11900.00
Unicredit Total			55565.85
Australian Guarantee Corporation (12 month Debenture)		4.75%	14000.00
Total			\$69565.85

Statement of SCA

Income	1996- April 1997	May 1997- Sept. 1998
Membership	2461.00	2400.00
Interest	2362.31	1713.03
1987 Fund Support for:		
IUCr Seattle	5000.00	-
Crystal XX, Queenstown		8000.00
AsCA'98 ¹ , Kuala Lumpur		3900.00
Crystal XX return ²		2348.76
Total	\$9823.31	\$18361.79

Expenditure	1996- April 1997	May 1997- Sept. 1998
Scholarships for AsCA'98	-	3900.00
Scholarships for IUCr	10200.00	
Fasts membership	578.10	1195.30
AsCA membership	-	720.00
Newsletter Costs	900.00	1100.00
Wreath	100.00	-
Crystal XX Deposit	1814.24	-
Scholarships for Crystal XX	-	6100.00

Crystal XX travel expenses	-	2596.05
State Gov. Tax	6.25	-
Total	\$13598.59	\$15611.35
Profit	\$-3775.38	\$ 2750.44

Note 1. The Maslen Travel Scholarships were awarded to the following students to enable them to attend AsCA'98 in Kuala Lumpur:

1. Husin Sitepu \$800, 2. Chris Ling \$1000
3. Kelly Maxwell \$1000, 4 Josh McKinnon \$1100

Note 2. CRYSTAL XX. A complete Financial Statement of Crystal XX is available. A summary of which is presented here:

CRYSTAL XX	
Income and Expenditure Account	
Summary	
Income	\$NZ
Registration Fees	11562.22
Accommodation Deposits	9700.00
Sponsorship	5951.05
Option Income	3875.28
Deposit from SCA funds	2000.00
Balance of Petty cash	135.85
Total Income	\$33224.40
Expenditure	\$NZ
Lakeland Hotel	18216.54
Centre for Continuing Education	3840.00
Skyline Gondola	4829.77

Other Expenses	3700.52
Total Expenses	\$30586.83
Surplus returned to SCA accounts	NZ2637.57
	\$A2348.76
Expenditure by SCA	\$A
Deposit	1814.24
Travel Scholarships	6100.00
Airfare for Invited Speaker	2596.05
Less support from 1987 Fund	-8000.00
Total expenses by SCA	\$2510.29
Net Loss to SCA	\$161.53

The 1987 Fund

At the Queenstown meeting Allan White reported on behalf of the trustees that the then current state of the fund was:

Equities \$101 008

Cash \$76 281

Total \$177 289

With the change in trustees, the intent was expressed that the fund should be audited at the end of that (1996-7) financial year.

During preparation for the audit, following the take-up of new issues, it was decided to rationalize the portfolio by divesting it of a number of small holdings and franked equities, the fund being overweight in equities and franking being of no benefit to this fund. In the process, difficulty was experienced in establishing the credentials of the new trustee, there being no provision in the Constitution of the SCA for the appointment of trustees outside Council (note that none of the three trustees are currently Council members), or their co-option to Council for such a purpose. There were, moreover, variations in the terms of ownership of the various securities which might create difficulties with the Taxation Department. It was therefore decided to further defer the audit until the auditor could be presented with a more orderly portfolio. This would seem to entail:

(a) Modification of the Constitution. The UWA Solicitor has kindly provided a suggested form of words which we hope will meet with general approval. This should preferably be done

expeditiously, by postal ballot if the meeting be inquorate.

(b) Establish uniform terms of ownership in a technical form agreeable to the Taxation Department, followed by

(c) Modification to share registry entries, if needful, similarly.

(d) If the market still appears overvalued and it is not too late, reduce the weight of equities component by sale of franked securities.

(e) Full audit.

If possible (a) - (e) will be accomplished within 1998.

The current state of the fund is:

Equities \$139 439*

Cash \$51 232

Total \$190 671

\$11 900 having been disbursed to the Society's operating account since Queenstown.

AH White(Trustee-elect)

SR Hall(Trustee)

J Graham(Trustee)

***Portfolio of shares**

8th October 1998

Num. shares	Code	Name	Price ©	Value (\$)
10000	AJS	Armstrong- Jones Industrial Fund	105	10500
27000	AJR	Armstrong- Jones Retail Fund	98	26460
7600	BRS	Bristile	140	10640

559	CBA	Commonwealth Bank	1852	10353
2000	CSL	Commonwealth Serum Laboratories	990	19800
13000	FCLG	Futuris (Convertible Notes)	155	20150
1127	SGW	Sons of Gwalia	502	5658
7909	WFT	Westfield Trust	348	27523
1500	WOW	Woolworths	557	8355
		TOTAL		\$139439

Divested since Crystal XX at Queenstown:

1035 BWA (Bankwest), 4000 MNE (Minproc Holdings), 1065 SGIO.

Notes from

SCA Business Meeting

Bangi Malaysia

- **Report from the National Committee.**

The National Committee is pleased with the decision of the Federal Government to replace the research nuclear reactor at Lucas Heights. Advice on the design of the new reactor has been provided by SCA members. The process leading to replacement of the reactor has commenced with the Environmental Impact Statement currently being prepared. The development of the Australian synchrotron radiation facilities were described. The facility at the Photon Factory in Japan currently has two staff members with the new facility at the Advanced Photon Source, Chicago now having three. The National Committee will make nominations at the Glasgow meeting for IUCr committee positions. *Chris Howard*

- **Report on the AsCA Council Meeting**

A meeting of the AsCA council was held on Wednesday, 14th October, 1998. A bid for the next AsCA meeting was received from Bangalore with Hong Kong also indicating an

interest. A final decision is to be taken at the IUCr meeting in Glasgow. The definition of the boundaries of the Asian region for the purposes of identifying potential membership of AsCA was discussed.

- **Change to the Constitution**

The need for a change to the constitution was outlined by the Secretary and included in the *1987 Fund Trustees' Report* in this *Newsletter*. The existing constitution (Article V, Part 5 The Council (d)) specifies "To act as Trustees of all funds and properties of the Society." Thus, only the council can control funds of the Society. In order to allow the Council to appoint trustees to manage funds and specifically the *1987 Fund* the University Solicitor of the University of Western Australia has suggested that the wording be changed to "To act as Trustees of all funds and properties of the Society or to nominate no fewer than three members of the Society to act as trustees of any funds or property specified by the Council." A ballot form is included with this *Newsletter*.

- **Renaming the Society**

The possibility of the Society adopting the new, more inclusive name 'Society of Crystallographers in Australia and New Zealand (SCANZ)' was discussed. It was agreed that the ramifications should be investigated and a case for changing the name be presented at the next SCA meeting.

- **Funding of Maslen Studentships**

The mechanism for deciding the level of funding was raised and clarified by members who had served on committees awarding the prizes. It was also stated that postdoctoral workers are not eligible. Only student members of the SCA enrolled in Australian or New Zealand universities can apply.

AsCA'98

Student views

The following are reports from students who received SCA Maslen Travel Awards to enable them to attend AsCA'98 in Kuala Lumpur. It is hoped that photographs from the meeting will be displayed shortly on the SCA Homepage at <http://www.sca.asn.au>.

1

Just when Kuala Lumpur was recovering from the Australian onslaught at the Commonwealth Games, another bunch arrived for AsCA '98.

The first three things that hit you after stepping out of the plush new Kuala Lumpur International Airport are the heat, the friendly people and the heat. Fortunately the new Hotel Equatorial resort was just the place to cool off beside the pool. Such were the attractions at AsCA'98.

Not only that, but there was also a whole bunch of high-powered crystallographers on the

cutting edge of technology, many whose papers I had read but faces I had never seen. Every way you turned there were new techniques, new uses of old techniques and of course lots of crystallographic structures both large and small. Since my particular interest is protein crystallography, it was wonderful to hear Professor Tsukihara describe his mammoth cytochrome C oxidase structure and discuss the animation of the proton pumping mechanism. I am unsure what I will remember most about that lecture in years to come, the careful interpretation of data to understand such a complex problem or the mild-mannered presentation of what I consider must be one of the most incredible achievements of crystallography. In contrast to the calm presentation of Professor Tsukihara, other speakers were very excitable. Professor Janner's insights of symmetry left me feeling that this work was not only a consuming passion but also a way of life for him – forever seeing the symmetry of the world. In fact, there was so much enthusiasm that the final presenter, Bill Duax, who figured he had travelled the furthest to be at the conference, decided that his extra miles loaded down with props for his talk meant that he should be able to give an additional presentation!

It was a fantastic opportunity to talk 'shop' with many people from all around the world who face the same challenges that I have in different laboratories and on different projects but have had to approach them in a manner dependent upon the limits of resources. I now have a greater appreciation of the outstanding facilities available to me at the Biomolecular Research Institute.

I have to say that not only was the conference impressive but the hospitality was outstanding. The Malaysians have to be some of the most welcoming people around and sensational cooks. At conference mealtimes an unbelievable array of foods were on offer in plentiful quantities. After the conference the variety and prices of delicacies available at the roadside markets throughout the city were heaven on earth for food junkies!

I am grateful for the opportunity to attend AsCA'98 and would like to express my sincere gratitude to the SCA for generously providing financial support. I arrived back in Australia very early Sunday morning with a bit of a tan and revitalized enthusiasm to complete my studies and learn more of what this vast field has to offer.

Kelly Maxwell

Biomolecular Research Institute, Melbourne

2

The first thing I noticed on arrival in Kuala Lumpur (well the second thing actually - the first thing was the awesome size and extravagance of the new airport) was the humidity. Over the period of the conference I figured out there were two ways to avoid it - stay inside or get in the pool.

After giving my oral presentation on the first afternoon, my nerves were relaxed and I was free to absorb plenty of science. As a fairly new student of crystallography, it was most valuable to attend a broad range of talks, and the wide variety of talks and posters emphasised the important role that crystallography plays in such a diverse areas of science.

The IUCr 50 symposium was a highlight, which included Ted Baker's especially informative talk, reliving the history and development of the IUCr, and an interesting talk by Carol Brock on the biphenyl problem - something which has intrigued many in the past, and I'm sure will continue to interest many people well into the future.

Although only a small number of the talks and posters presented at the conference were relevant to my area of work, I have left the conference with several new ideas, as well as a much broader appreciation of the field of crystallography.

We were certainly not going to go hungry at AsCA'98, with fantastic breakfasts and lunches, as well as the incredible Chinese Banquet, which was a welcome surprise for my taste buds, accustomed as they are to less adventurous steak-and-three-veg fare.

All in all, AsCA'98 was an extremely valuable experience scientifically, socially and culturally, and I am indebted to the SCA for the generous funding which allowed me to attend.

Josh McKinnon

University of New England

3

In the weeks leading up to AsCA'98 in Malaysia, Australian newspapers seemed to be promising the participants a bit of excitement beyond the crystallographic (e.g. Sydney Morning Herald the day before the conference started: "Riot police watch as 3,000 protest"). As it turned out, however, at the Hotel Equatorial in Bangi there was nothing to distract us from a stimulating, enjoyable and well-organised conference, apart perhaps from the pool.

The conference was for the most part run in three parallel sessions, which allowed everything to proceed quickly and smoothly. Moving from one room to another between presentations kept things interesting, albeit with the occasional hard decision. Having only two parallel sessions for the plenary lectures was a good incentive to attend first-class lectures in fields about which I knew little (such as protein crystallography), which is certainly one of the best aspects of attending a conference. I particularly enjoyed Professor Janner's talk relating quasicrystals and biomolecules, generally at the opposite ends of the crystallographic spectrum, through "scaling symmetry", a genuinely original concept conveyed with great enthusiasm, and generating a lot of discussion. For me this represents science at its most engaging.

Personally, I found that attending a second conference with many of the same people present (the SCA previously helped me get to Crystal XX in Queenstown) was really useful. The first time around involved a lot of shaking hands with people while sticking close to my supervisors, whereas this time I actually recognised people and consequently talked to them about science, careers and other interesting stuff rather than having to explain who I was. I also had the opportunity to present both a talk and a poster, which I now realise are very different undertakings but about the same amount of work. I would like to thank the SCA for giving me the opportunity to attend both meetings, which I think have been of enormous benefit to my development as a scientist.

Chris Ling

ANU

4

It was a good experience for me to attend the 3rd Asian Crystallographic Association

Conference in Hotel Equatorial, Bangi, Malaysia. Bangi is a nice choice of venue. The local Organising Committee did an excellent job in organising the conference, accommodation, local transport, morning and afternoon tea, and lunches for approximately 300. I also would like to congratulate all the AsCA'98 Organizing Committees for all the hard work they did to make it possible for this conference to be as great.

It was a very good experience for me as a young crystallographer to meet fellow crystallographers from Australia, Bangladesh, China, French, India, Indonesia, Japan, Taiwan, New Zealand and USA.

I found the three plenary talks given by Professor H. Kamitsubo on *Spring-8 Moves Into User Operation*, Ted Baker on *The History of the IUCr* and Professor S.L. Chang on *Direct Determination of X-ray Reflection Phases Using Multiple Diffraction: Theory and Experiments* to be excellent.

The microsposium on the field of my research areas (i) structure refinement by powder diffraction and (ii) neutron diffraction, contained a good mixture and variety of topics that are up to date and vital. I have learnt a lot from the techniques currently employed by the speakers. I enjoyed the excellent talks given by Dr J. Faber on *Application of Crystallographic Databases to Materials*, Chris Howard on *Neutron Powder Diffraction Determination of Oxygen Positions in Metal Oxides*, Brendan Kennedy on *X-rays or Neutrons? Structural Refinements of Metal Oxides*, Dr N. Nimura on *Neutron Imaging Plates and its Application to Neutron Diffractometry* and Dr C.C. Wilson on *Torsion, Migration and Disorder: Variable Temperature Neutron Diffraction Studies of Hydrogen Atom Thermal Parameters*.

The poster sessions were spread over three days, with 164 papers being presented over this period. Overall, I thought, that the quality of the poster papers were excellent.

Husin Sitepu

Curtin University

Report on SCA Newsletter

Since I took over the task of *Newsletter* Editor in early 1998 there has been four issues per year each being distributed with the IUCr Newsletter. This *Newsletter* provides a means of dissemination of information about forthcoming Crystal, AsCA and other relevant conferences in our region and provides reports of these meetings, together with a summary of the Society's Business and Council meetings to members who are unable to attend. It also provides a source of information on other activities of the society, its members and about crystallography in general in Australia and New Zealand.

Articles which have appeared on regular basis include the 'From the President' column and reports from John White as chairman of the National Committee for Crystallography. A series of Sketches of Crystallography Laboratories initiated under the presidency of Ian Grey has almost reached completion.

Recently I have included several reports on new Macromolecular Laboratories that have commenced operation in Auckland, Melbourne and Perth and the first two of a series of articles on new area detector diffractometers that have been installed in laboratories in our region.

A column entitled 'Crystal Fragments' has included personal reports on crystallographers, and I would like to encourage members to forward items of news such as appointments, promotions, awards, etc which would be suitable for this column.

All recent issues of the *Newsletter* have been listed on the SCA's homepage at <http://www.sca.asn.au>.

The costs of printing and postage of the Newsletter over the last twelve months are:

Photocopying \$192

Mailing \$956

Total \$1148

Resulting in a cost of around \$287 per issue.

Brian Skelton

LETTER FROM TSUKUBA

The Australian National Beamline Facility at the Photon Factory

Introduction

Towards the end of the 1980s a core group of Australian researchers who made regular use of synchrotron radiation (SR) in their research programmes began devising a plan which would for the first time open the field of SR to all Australian researchers by providing a mechanism for routine access to a state-of-the-art facility such as the Photon Factory here at KEK. Through their efforts in lobbying the Australian government and the generosity of the Photon Factory management, the Australian National Beamline Facility (ANBF) came into being.

The ANBF in its current form is a collaborative research project between the Photon Factory and the [Australian Synchrotron Research Program](#) (ASRP). The ASRP is funded by the Australian government directly under the Major National Research Facilities programme and includes with the ANBF an Australian involvement with three Collaborative Access Teams (CATs) at the Advanced Photon Source (APS) at Argonne National Laboratory in Chicago, USA.

The ANBF has two full-time staff members based permanently at the PF. Dr. Garry Foran, the Project Leader, first came to Japan in 1982 as a high-school student and has made many trips to Japan since. He has been living in Tsukuba and working for the ANBF since construction began in 1992. Dr. James Hester recently joined the ANBF after four years working at another institute in Tsukuba (NIRIM). James replaced Dr. David Cookson who is still working for the ASRP but is now part of the ChemMat CARS CAT at the APS.

The ANBF has been operational at the Photon Factory since 1993 and currently hosts about 40 experimental groups per year. The groups cover a wide range of scientific interests including physics, chemistry, materials science, mineralogy, biology and biomedicine (See below for more details). In addition, the ANBF collaboration with the Photon Factory has led to an increased usage of other beamlines at the facility by Australian research groups. Currently about 15 experimental teams per year make use of Photon Factory beamlines other than the ANBF.

Beamline Description

Because the ANBF serves such a wide range of scientific disciplines with many and varied demands, it is by nature a multi-purpose facility providing monochromatic or white beam photons in the hard X-ray range (4 - 25 keV or 0.5 - 2.5Å) for use by experimenters.

Two experimental stations are available at the ANBF. The main station is a multi-configuration two-circle diffractometer which is mounted inside a large vacuum chamber. The instrument is designed to operate in a conventional scanning mode of data collection but is optimised for high-speed data collection using X-ray imaging plates (IPs), which currently have 100 pixels per degree resolution. The main technique for which this instrument is used is high-resolution powder diffraction. A complete high-resolution data set for a single sample can be collected in fewer than 5 minutes using this instrument. Recently several multiple anomalous diffraction (MAD) experiments using the IPs have been performed with encouraging results.

In addition, the diffractometer can be operated in a time resolved mode which makes it suitable to study dynamic processes and phase transitions. The unique combination of IP detection and vacuum operation of the diffractometer makes it appropriate for a number of other techniques. It can be configured for grazing-incidence diffraction to study thin films and surfaces, triple-axis diffraction and small angle scattering which has found popular application in the study of natural fibres of animal and human origin.

The second experimental station at the ANBF is an optical table which is used primarily for X-ray absorption experiments (XAFS) but can be configured also for optics and imaging experiments. An extensive range of detection equipment is available for XAFS experiments including a 10 element germanium solid-state advanced array detector for fluorescence XAFS. A recently-acquired closed-cycle He refrigeration system permits cold XAFS experiments down to 10K. Both liquid and solid-sample XAFS experiments are routinely performed.

Currently, XAFS and powder diffraction make up about two thirds of the experiments performed at the ANBF. Research conducted using the diffractometer during the most recent cycle (Feb - June 1998) included studies of phase changes during cement hardening, annealing effects in ferrite powders, effect of various treatments on wool fibre structure, and effect of high temperature treatment on the phase composition of metal oxides. XAFS projects included studies of reactive Cr complexes in frozen solutions, studies of Ru complexes in solution, studies of Synroc local structure, and investigation of Cu mineral structures.

Two rounds of beamtime applications are conducted each year, usually in mid-July (for beamtime in October-February) and mid-January (for beamtime April - June). Applications are refereed and applicants are normally informed of the outcome within about a month of the application deadline. Further details and application forms can be obtained from the ASRP project manager, Richard Garrett (garrett@ansto.gov.au) and from the ANBF on-site staff (see below), who would be happy to advise on project feasibility.

Back to the Future

After more than five years of operations at the ANBF, the facility continues to mature and attract new and interesting scientific problems both to BL-20B and the PF as a whole. While demand for beamtime at the ANBF is now considerably beyond what can be supplied, it is hoped that the ANBF can continue to grow by concentrating effort into untapped Australian markets such as those research groups that require SR in the vacuum ultraviolet (VUV) and soft X-ray ranges. The Australian Beamline Steering Committee, which is comprised of representatives of the PF and the ASRP, has undertaken to encourage use of the PF by these groups and as a result it is expected that the number of Australians wandering around the PF experimental hall will continue to rise.

Thanks to the hard work of the ANBF staff members and the support of the research, administrative and, not least, the technical staff of the PF and KEK, the project has proved to be a great success and stands proud as a model for fruitful and mutually beneficial international scientific collaborations. The ANBF maintains its own office at the PF and can be contacted anytime by the following media. Tel : +81 298 64 7959 Fax : +81 298 64 7967 email : foran@anbf2.kek.jp (Garry Foran) jrh@anbf2.kek.jp (James Hester) The ASRP Administration Office address is: ANSTO Building 16 Private Mail Bag 1 Menai, NSW, 2234 (02) 9717 9012 or [visit the website](#).

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Crystal Fragments

- Peter Colman (Biomolecular Research Institute, Melbourne) presented the CSIRO's Fourteenth Brodie-Hall Address in Perth on 13th October 1998. Peter's talk was entitled *Adapt and Survive*.
- News from the University of Western Australia: Syd Hall has been promoted to Professor. Barbara Etschmann, after graduating PhD, has been appointed Postdoctoral Fellow with A/Prof. Nobuo Ishizawa at the Tokyo Institute of Technology, Yokohama. Bill Harrison has resigned from the Department of Chemistry to take up a position of Lecturer at the University of Aberdeen, Scotland.
- John White (ANU) visited Chicago in October for the APS CARS meetings. He also gave a seminar at Argonne and two seminars at the University of Chicago entitled *Chemical Aspects of Nucleation and Control in Template-Mediated Growth* and *Very Fast Processes of Relaxation in Surface Films*.

The next issue of the *Newsletter* will be in early February. Contributions should be e-mailed to the Editor by 31st January.

CRYSTAL XXI

The next meeting of the SCA, Crystal XXI, is to be organised by Richard Welberry and other SCA members in Canberra, and will be held early in the year 2000.

XVIII IUCR Congress

Glasgow, Scotland, August 4-13, 1999.

The venue for the XVIII IUCR Congress is the Scottish Exhibition and Conferences Centre (SECC). The Congress Web page is located at: [http:// www.chem. gla.ac.uk/iucr99/](http://www.chem.gla.ac.uk/iucr99/).

Deadlines:

February 1999: Submission of Abstracts.

1st June 1999: Registration at Reduced Rate.

1st June 1999: Accommodation Bookings.

Further information will be distributed to SCA members shortly.

Society of Crystallographers in Australia

Office Bearers

President: M.R. Taylor (Flinders University, SA)

e-mail: max.taylor@flinders.edu.au

Ph: (08) 8201-2467, fax: (08) 8201-3035.

Vice-President: T.R. Welberry (ANU, ACT)

e-mail: welberry@rsc.anu.edu.au

Ph: (02) 6249-4122, fax: (02) 6249-0750.

Secretary: B.J. Kennedy (Univ. of Sydney, NSW)

e-mail: b.kennedy@chem.usyd.edu.au

Ph: (02) 9351-2741, fax: (02) 9351-3329.

Treasurer: B.W. Skelton (UWA, WA)

e-mail: bws@crystal.uwa.edu.au

Ph: (08) 9380-3481, fax: (08) 9380-1118.

Council: J. Martin (Univ. of Queensland, Qld)

e-mail: j.martin@mailbox.uq.oz.au

Ph: (07) 3365-4942, fax: (07) 3365-1990.

A. Pring (South Australian Museum, SA)

e-mail apring@geology.adelaide.edu.au

Ph: (08) 8207-7449, fax: (08) 8207-7222.

G.B. Jameson (Massey University, New Zealand)

e-mail: G.B.Jameson@massey.ac.nz

Ph: +64-6-350-4431, fax: +64-6-350-5682.

Past President: J.M. Guss (Univ. of Sydney, NSW)

e-mail: m.guss@biochem.usyd.edu.au

Ph: (02) 9351-4302, fax: (02) 9351-4726.

ANNCCr Representative: *ex officio*

J.W. White (Australian National Univ., ACT)

e-mail: jww@rsc.anu.edu.au

Ph: (02) 6249-3578, fax: (02) 6249-4903.

Nominations Standing Committee

S.R. Hall (Univ. of Western Australia, WA), C.J. Howard (ANSTO), A.W. Stevenson (CSIRO Manufacturing Science, Vic)

Newsletter Editor: B.W. Skelton (UWA, WA)

e-mail: bws@crystal.uwa.edu.au

Ph: (08) 9380-3481, fax: (08) 9380-1118.