NEWSLETTER

Society of Crystallographers in Australia and New Zealand

SCANZ PRESIDENT'S REPORT



Dear SCANZ members.

Happy New Year! Thank you for your continued support of our wonderful and unique society, and for granting me the privilege of serving as President. I have big shoes to fill, looking at the list of previous Presidents and considering their accomplishments in that role and their broader contributions to crystallography. I'd like to particularly thank our outgoing President, Alice Vrielink, for her outstanding leadership over the last term. I have the good fortune of stepping in at the time when SCANZ has the most members and the healthiest finances in its history. No pressure...

The full list of the new Executive and Council elected at the last Business Meeting is as follows:

President: Chris Ling (NSW)
Vice-President: David Aragao (VIC)
Secretary: Jack Clegg (QLD)
Past President: Alice Vrielink (WA)
Councillor: Chris Sumby (SA)
Councillor: Megan Maher (VIC)

Councillor: Helen Maynard-Casely (NSW)

In addition, Peter Czabotar (VIC) continues as Newsletter Editor and Michael Parker (VIC) as ANCCr Representative.



http://scanz.iucr.org/

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SCANZ PRESIDENT'S REPORT

All these people have been actively involved in SCANZ for a long time and are dedicated to advancing the science of crystallography, its standing in Aus/NZ and internationally, and the education of the next generation. I am very much looking forward to working with them, and with all other SCANZ members who wish to become involved formally or informally with the running of the society. Please get in touch with us with any ideas, observations or criticisms – we would love to hear from you.

My thunder has been stolen in that the biggest news of 2017 was announced in the last Newsletter - our successful bid to host the IUCr Congress in Melbourne in 2023. Nevertheless, it deserves repeating that this is an incredibly exciting time for SCANZ and an opportunity to emulate the success of the 1987 Congress in Perth. Of course, since then we have held a tremendously successful Crystal meeting in West Australia's Margaret River, thanks to the organisational ability and dedication of Alice Vrielink, Chris Sumby, Sally Brown and all the members of their teams. The large number of delegates who made the (long!) journey were rewarded with a quality program featuring top local and international speakers, in a venue that will be hard to match. Werner Kühlbrandt (Director of the Max Planck Institute of Biophysics in Frankfurt, Germany) delivered the 1987 Lecture on the amazing power of cryo-electron microscopy, timed perfectly to coincide with the 2017 Nobel Prize for Chemistry on the same subject. Both medals of the society were awarded to outstanding scientists - the Bragg Medal to Mark Spackman and the Mathieson Medal to Vanessa Peterson. Of note from the Business Meeting, the membership voted to approve a new Standing Committee on Education, the first Chair of which will be David Turner. This is a key development that will allow SCANZ to take the lead in crystallographic education in partnership with ANSTO (Australian Synchrotron and OPAL) and the Australian Academy of Science (National Committee for Crystallography).

The timing of conferences means that my presidency will be on the short side, ending at the joint AsCA-2018/Crystal-32 meeting in early December. It will also have a somewhat "caretaker" character to it, as we start long-range preparations for the big event in 2023. However, I still have work to do. In particular, the recent Business Meeting saw a positive and productive discussion of gender and other diversity issues in SCANZ, resulting in a renewed commitment to a formal policy for meetings and to extending that policy to the membership of the Executive and Council. Acting on this will be crucial for IUCr-2023: a key distinguishing feature of our bid to host this Congress was we pro-actively addressed diversity issues, offering a formal policy based on that of Crystal and AsCA meetings, and amenities such as child-care facilities at the venue. This was very well received by delegates, in marked contrast to vocal criticism of the IUCr 2017 organising committee (and the current IUCr Executive) on the same issue. SCANZ can and should take the lead.

Wishing you a happy and productive 2018, and looking forward to seeing you in Auckland in December if not before,

Chris



Bragg Medallist from the Crystal 31 Meeting Mark Spackman with SCANZ President Alice Vrielink



Mathieson Medallist from the Crystal 31 Meeting Vanessa Peterson

CRYSTAL 31 MASLEN SCHOLARSHIP REPORTS

Dear SCANZ committee.

Thank you for the opportunity to attend the Crystal31 Conference in beautiful Bunker Bay this summer. This was my first time in Western Australia and it is a location that I am now keen to return to.

After a very pleasant drive down from Perth airport (mainly pleasant because I was not driving, instead alternatively dozing in the back and admiring the "Christmas Trees" (pictured)) we arrived at the Margaret River region. Owing to the reputation of the region, we visited Wise Winery and there sampled some excellent wine, and gin too, and then continued on our way to Bunker Bay.



Picture from Google Images as unfortunately I didn't get my own shot of these amazing Western Australian 'Christmas Trees'.

Upon arrival, I immediately walked down to the beach to be stunned by the beautiful white sands and clear azure water – even better than the pictures from Google I had been showing to anyone who would look before I left! What could tear me away from these views? Why only the 1987 Fund Lecture of course! Werner Kuhlbrant gave an exciting lecture on cryoEM. I was particularly impressed by how the cryoEM structure of the TOM complex was used in conjunction with other studies – the homology model of the core barrel from VDAC1 and the crosslinking data from another group to show how a full complex might be arranged. Following that we proceeded to the Welcome Reception where I stationed myself near a cheese platter and enjoyed conversation with my fellow crystallographers, topics ranging from constellations to stromatolites.

The following days comprised delicious buffet breakfasts, and stimulating structural biology talks. I thoroughly enjoyed the talks and found that regardless of the technique being used, either crystallography, cryoEM or others, the talks were interesting and easy for me to follow. I think this was due to the structure-centric way of trying to understand a given scientific problem. As a biochemistry student, I was surprised to find that I was also able to follow and appreciate some of the chemical/materials science talks, including Vanessa Peterson's, in which I learnt a lot about batteries, and also Gabriel Murphy's Rising Star presentation. That talk was interesting not only because of the highly unusual observations, but also because now I know that I should time my 'tron trips for when his lab isn't there!

On the final day of the conference I was very excited and grateful to be able to present my own work in a 15-minute talk. This was a very nice conference to present at due to the atmosphere of community, and engagement of the audience. I got some very insightful and helpful questions at the end of the talk, and this to me highlighted one of the great strengths of the conference, in that it is very supportive of students. I really enjoyed meeting other PhD students at Crystal31. It was great to see their presentations and learn about



Bunker Bay when I went swimming – luckily no sharks in sight!

their work, and to see more experienced scientists asking questions and sharing their knowledge.

In between the busy scientific and shark patrolling schedule I even found time to go for a dip in the Indian Ocean. The Crystal31 conference provided a platform for scientists from all stages of their career to present their work and receive constructive feedback. It was also an opportunity for me to begin to meet other local crystallographers, which was a rewarding experience, and affirms to me that I am very glad to be a part of the SCANZ community.

Katherine Davies, Walter and Eliza Hall Institute I have attended the CRYSTAL 31 conference that was held at the Pullman Bunker Bay Resort in Western Australia from 3rd to 7th of December 2017. The flight from Melbourne to Perth was so quick, about three and half hours only. Then we had a nice coach trip from Perth towards the Bunker Bay. Upon arrival to the Pullman resort, the view was fascinating with its location facing the Indian Ocean with a beautiful white sandy beach and crystal-clear water that was perfect for swimming. The weather was so beautiful and sunny.

In this conference, the chemical and biological crystallographers were joined together to their common interest crystallography where I have learned more about the most recent research outcomes in both fields.

This conference also gave me the chance to communicate with other research groups from Australia and New Zealand who are conducting similar research to my current research work about metal-organic frameworks. I also learned more about the most recent results in the designing and applications of these materials. On the 4th of December, I had the opportunity to present my research in a flash presentation within

two minutes. During the afternoon poster session, I also presented my poster where I met interesting researchers and explained to them my scoop of research in more details. I am so pleased to say that I have won in the poster competition and was awarded the CrystEngComm prize. Therefore, I would like to thank the Royal Society of Chemistry for their prize.

Finally, I would like to thank my supervisors Prof. Stuart Batten and Dr. David Turner, Monash University for their ongoing support. In addition, I would like to thank the SCANZ for their generous Maslen scholarship to attend the CRYSTAL 31 conference.



Ali Chahine Monash University



Crystal 31 was held at the Pullman Bunker Bay Resort in Western Australia from the 3rd to the 7th of December 2017. Bunker Bay is a small, yet magnificent piece of the west coast, about 3 hours drive south of Perth. The pearl-white sand, crystal clear water and dolphins frolicking on the horizon made it an idyllic location. The only thing to rival the allure of the scenery was, of course, the scientific program.

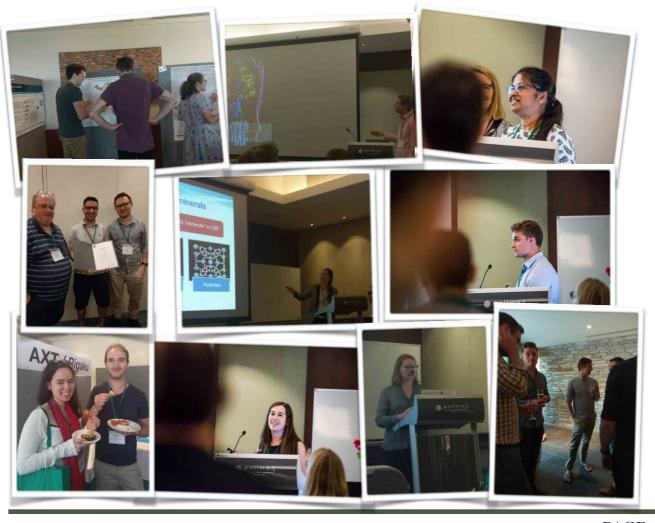
The conference was opened by a talk from Werner Kühlbrandt from the Max Planck Institute of Biophysics in Frankfurt, Germany talking about the CryoEM revolution and his lab's work on mitochondrial ATP synthase. CryoEM featured throughout the conference as it is becoming increasingly utilised by structural biology groups in Australia. The conference also captured the diversity in crystallography-related research with presentations

about organic minerals on Titan, flexible crystals, high-pressure crystallography, metal-organic frameworks and the structure and function of many proteins and protein complexes.

I would like to congratulate the organising committee for putting together a wonderful conference. The meeting allowed me to present my work, reconnect with people I met at previous conferences and meet new faces and fellow Twitterers "in real life" (search #Crystal31 for tweets from the conference). Finally, I'd like to thank SCANZ for awarding me a Maslen Scholarship, which allowed me to travel to Crystal 31 from other side of Australia.



Emily Furlong Institute for Molecular Bioscience The University of Queensland



It was a pleasure to have joined the Crystal31 meeting and I would like to share the fantastic experience I had in Margaret River. Firstly, I would like to thank the SCANZ committee for the award of a Maslen scholarship to attend the conference and my supervisor Sandro Ataide for his support during my PhD.

The conference was in the luxurious Pullman Bunker Bay Resort in Margaret River, Western Australia. The 5-star hotel is located in front of a wonderful crystalline beach, featuring an outdoor swimming pool, a restaurant and a fitness center. The surrounding area is characterized by typical Australian bush and native plants. The region also offers famous wineries



offering wine tasting of different varieties such as Cabernet Sauvignon and Sauvignon Blanc.

Crystal31 is an internationally recognized scientific meeting that brings together academics and industry experts in crystallography to discuss and showcase technologies and cutting-edge research. This four-day conference allowed me to learn about the latest techniques and discoveries in protein crystallography and related fields such as minerals and materials crystallography. Attending this conference was of great benefit to my career as I was able to make valuable connections within the Australian and international scientific community.







The first day of the conference started with the 1978 fund lecture from the egregious Professor Werner Kühlbrandt who presented the cryo-EM structures of mitochondrial membrane protein complexes with emphasis to ATPase. The lecture was followed by a warm welcome reception with drinks and food. The second day started with the impressive talk of Vanessa Peterson and the biological assemblies session. The third day focused on signalling and protein regulation and applications of porous material. During the last day of the conference, in the Rising Stars session, young talented students and scientists had the fantastic opportunity to present their research. Of notable importance was also the Keynote lecture of Professor Murray Stewart who talked about protein and RNA nucleocytoplasmic transport from a structural point of view. Finishing with closing remarks, a wine tasting session and the conference dinner.

Being able to present my PhD work during the poster session was a great opportunity for me, as I was able to present my work to other scientists in the field and obtain some useful feedback about my results. Academics from different fields asked me about many facets of my research and judged me. I am grateful and humbled to be awarded with the Poster prize.

I have learned more technical details about challenges in crystallography and the latest equipment being used within the industry from speakers and industrial representatives at the conference.

Attending this conference was an extraordinary experience that enriched my career and my knowledge. Looking forward for the next meeting!

Camilla Faoro University of Sydney SCANZNEWSLETTER Jan 2018

I'm very grateful to have received the Maslen Scholarship to attend the Crystal 31 conference, not only because it was one of the most amazing conference locations I have ever visited, but also because we have been exposed to a high quality of presentations amongst a very skilled and diverse crowd, with their diverse topics: from crystallography to cryoEM; materials to proteins, and batteries to Saturn's moon!.

My presentation was in the Rising Star session, which was a great opportunity for early career researchers to share their projects and ideas and I really enjoyed presenting amongst very talented and motivated young scientists.

Of course I would like to point out the vast amount of electron microscopy presentations, which was of special interest to me, as a cryoEM structural biologist. This made me feel very welcome in the crystal31/SCANZ community, so thank you SCANZ for taking us onboard!.

Many thanks to everyone who shared insights into their research (and the problems in their projects!) and that I had the opportunity to talk to during the conference – I got lots of new ideas and established new networks

and can start the final steps of my PhD project on a motivational high!

Finally, but most importantly, I would like to thank the organising committee for giving me the opportunity to share my PhD story in an oral presentation, SCANZ for the award of the Maslen Scholarship that payed for my flights and conference attendance, and my supervisor Michael Landsberg and the whole Landsberg lab for the ongoing support.

Sarah Piper Institute for Molecular Bioscience The University of Queensland





Crystal 31 Poster Prize winners

SCANZ No 69 JAN 2018

I would like to thank you for the opportunity you gave me to attend the Crystal31 meeting.

First off, I know location should not be one of the highlights of a conference, but as it was my first time in the Margaret River region, it really made this meeting enjoyable.

On my way to the meeting from Brisbane, I started to become excited about the evening lecture by Werner Kühlbrandt. As a soccer fan would be enthusiastic about meeting idols like Pele or Ronaldo, the electron microscopist in me was eager to meet one of the pioneers of the technique that I use on a daily basis. And I was not disappointed!

His introduction by my supervisor Michael Landsberg really highlighted the difficulties that people like Werner had to go through to process their data and it was much clearer why the chemistry Nobel prize this year was awarded to some other pioneers of cryo-EM, Richard Henderson, Jacques Dubochet and Joachim Frank. But let's get back to this lecture. It was very interesting to see how people in Werner's lab try to understand membrane proteins and it gave me interesting ideas on what to work on next.

The following welcome reception was also really nice, and it could not have been better with the beautiful wine of the Margaret River region. Unfortunately, I had to limit myself to one glass because I was giving a 15 minute talk the next day in the biological assembly session.

Just before my talk, I had the opportunity to meet Werner and exchange a few words about densitometers, the ancient machines people used to use to scan photographic films - it made me feel lucky to work in a fully digitalised world!

I shared my session with Sara Sandin, Alastair Stewart and other talented scientists. Sara presented some data she had acquired using phase-plates, little sheets of amorphous carbon inserted in the microscope which increase the contrast of the image by 'magic' (in reality by shifting the phase of the signal). Alastair talked about the ATP synthase, work which I have been intrigued about ever since I first saw him presenting his work at the 2015 East Coast Protein Meeting in Coffs Harbour. It was great to share a session with such talented people.

Since it was a crystallography meeting, I was also curious about technical developments, and to my surprise, most of the talks focused on answering biological or chemical questions, something which is also quite common in the field of electron microscopy where the biological question seems to be dominant compared with technical developments! After the second day of the meeting, we had dinner with Bostjan Kobe from the University of Queensland and a few other people and I remember one of the questions he asked Sarah Piper, one of the rising stars, and myself: "How do you people (meaning electron microscopists) feel surrounded by all of these crystallographers?". I was pretty quick to answer Bostjan, "I don't feel that I am surrounded by crystallographers, rather by structural biologists" and it was probably the most interesting message I took home from this meeting, that we are all here to solve problems and to understand what is surrounding us and the more difficult these problems are, the more we will need to develop the techniques we are using to solve them. And this leads to the last people I met at Crystal31, Janet Newman and Tom Peat, who perfectly illustrate this idea. Tom works on Atrazine, a nasty chemical which appears to be almost non-degradable in

the ground and which is the source of catastrophic pollution, while Janet specialises in improving the quality of protein crystals. Together they try to understand how Atrazine can be degraded. I think this really represents the current status of our field - there is no separation between the technique and the biology, but a harmony which leads to the improvement of both fields.

I am now looking forward to the next meeting in Auckland, and am hopeful that I will see many more complicated problems solved with crystallography, cryo-EM, SAXS and many more structural techniques.

Cryo-EM structure of the Bluetongue virus core-like particle:
a recombinantly-engineered nanodelivery system

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Lou Brillault

Institute for Molecular Bioscience, The University of Queensland

I attended the Crystal31 meeting at Bunker Bay, Western Australia, in December 2017 and would like to thank the SCANZ committee for organizing a fantastic meeting and for their financial support. The meeting was a great opportunity to get in contact with leaders in the field of crystallography and electron microscopy in a relaxed and friendly environment.

Werner Kuehlbrandt opened the meeting with a fantastic overview about what cryoEM could do to solve some of the hot questions in his laboratory concerning mitochondrial membrane protein complexes. This was followed by a welcome reception with the stunning views Bunker Bay had to offer, where I could reconnect with colleagues I met at previous meetings and also make some new connections.

The next day started off with the Mathieson Medal lecture and one of the keynote lectures. Both where quite different to what I am usually exposed to as a biochemist and introduced me to a few different disciplines X-ray and neutron diffraction can be used for. I was also happy to hear about a few things that are going on at ANSTO.

Just after that I had the opportunity to talk to everyone about my poster in a two-minute poster slam session. This was a valuable experience to me and the overall session gave a really good overview about most of the posters presented at the meeting. I had a lot of useful discussions during the poster presentation, also on the

days I was not formerly presenting and I think we all took something away from it. In this respect I would also like to thank my poster judges for giving me a very generous prize.

Other highlights for me were learning about structures of the ESCRT complex and DSBC proteins, stabilization of charges in the membrane by sulphate and phosphate transporters, seeding in LCP and the talks in the rising stars session. I think you all did a really great job.

The conference dinner combined with wine tasting was a great way to finish the conference. I won't be in Australia next year, but if I can somehow make it, I would love to come back to the next meeting(s).

Raphael Trenker, Walter and Eliza Hall Institute





From the 3rd until the 7th of December, 2017 I attended the Crystal31 Society of Crystallographers Australian and New Zealand (SCANZ) conference held in the Pullman Bunker Bay Resort, Western Australia. The conferences core scope was devoted to the study and/or utilisation of crystallographic sciences. The conference program consisted of predominantly either single oral sessions directed at broad areas of crystallographical related research and science, some specialised duel concurrent sessions devoted to biological and protein based scientific research or materials and minerals based scientific research in addition to poster sessions. This was a welcome change to previous conferences I have attended which tend to partition sessions into many concurrent sessions, inhibiting the amount of science that can be viewed and enjoyed. I was fortunate enough to be selected to give an oral presentation as a part of the "Rising Star" session. My talk, entitled "The unusual structural chemistry of uranium: controlling phase transformations in ternary uranium oxides." focussed on unveiling some very exciting and remarkable experimental crystallographic science, regarding the ability for uranium oxides, as nuclear waste form candidate materials, to undergo reversible symmetry lowering phase transitions when exposed to high temperature. The talk was largely well received however some dissidence was encountered towards some of the apparent implications of the research, though this made for entertaining debate with delegates at the conference dinner, further

catalysed by the fine selection of wines that were served. The conference was an excellent way to both catch up with friends and colleagues within the SCANZ community but also provided a nice intimate setting which enabled new friends and potential collaborators to be made. It further enabled me to gain positive feedback and opinion on my research and its direction. I am extremely grateful to SCANZ for awarding me the Maslen scholarship allowing me to attend Crystal31 and also the organising committee for selecting to me to present as a part of the "Rising Star" session at the conference. I believe the attendance and experiences I have gained have strongly benefited my development as an actinide research scientist, which will enhance my ability to achieve exceptional research outcomes.





From left to right, Mr Sean Injac, Dr Josie Auckett, Prof, A/Prof Chris Ling, Dr Emily Reynolds, Myself, and Mr Qinbo Xia.



Rising Stars at the Crystal 31 meeting

From left to right
Emily Furlong
Angus Cowan
Gabriel Murphy
Sarah Piper
Gabrielle Watson
Anandhi Anandan

I am a second year PhD student from Bostjan Kobe's group at the University of Queensland. I would like to thank SCANZ for providing me with a Maslen Award to attend CRYSTAL-31 at the Pullman Bunker Bay Resort in Western Australia. I would consider those five days as a wonderful and very enlightening experience.

I started my journey from the Brisbane airport on the 3rd of December, traveling with four other people from our lab (including my supervisor Prof. Bostjan Kobe). After arriving at Perth airport, our journey to Bunker Bay was turned into a 'road-trip' (Pic 1), complete with chocolate croissants and music of questionable taste. Upon arrival at the conference venue, we were greeted with warmth by the organizers, a pristine beach, lush green scenery, and a tranquil atmosphere.

I presented a poster (Pic 2) and a flash poster presentation at CRYSTAL-31. The flash poster presentation was a new learning experience for me, gave me an opportunity to think about my research in a different light and condense it into a short and concise story. My research focuses on fragment-based drug design and presenting at CRYSTAL-31 allowed me to get valuable feedback from a number of world-renowned scientists, in particular, Prof. Michael Parker (Pic 2), Prof. Jenny Martin, and Dr. Tom Peat.

I found this conference particularly interesting as I had a chance to mingle with scientists from the various fields of material science, cryo-EM, and protein crystallography. I followed oral and



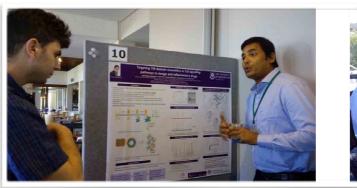
Pic 1: Our 'road-trip' from the Perth airport to the Bunker Bay. From left to right: Bostjan Kobe, Andrew Hedger, Hayden Burdett, myself, and Jeff Nanson.

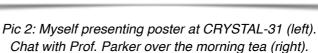
poster presentations carefully that gave me an overarching idea on Australian structural biology research. All the scientists at CRYSTAL-31 were very kind and inspiring. My interactions with them will boost me up for my

future endeavors and career in structural biology research through collaborations and prospective job opportunities. Overall, I thoroughly enjoyed CRYSTAL-31 and am looking forward to attending AsCA 2018/Crystal 32 in New Zealand.

Again, I would like to extend my wholehearted thanks to SCANZ for providing me with the opportunity to attend CRYSTAL-31.

Md Habibur Rahaman The University of Queensland













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