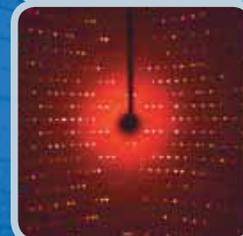




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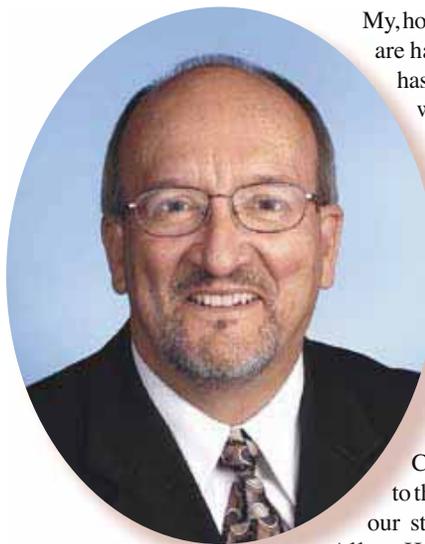
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President's Column: Fall 2008

My, how time flies when you are having *fun!* The year has gone by quickly, cold weather has returned, elections results are in, and this is my final President's column! First, let me congratulate and welcome to the Council our new Vice-President, Judy Kelly and our new Secretary, Carrie Wilmot. Congratulations also

to three new members of our standing committees, Allen Hunter (Continuing Education), John Rose (Data and Standards) and Thomas Proffen (Communications). For full election details, see pp. XX-YY. I am happy to report that in spite of the troubled economic times, your ACA is in sound financial condition. Thanks to the skill and extraordinary foresight of S.N. Rao and our Treasurer, Bernie Santarsiero, our endowment accounts and financial reserves had very little stock market exposure by this fall when the markets did a nosedive. That said, we do need your continued support and I urge you to renew your ACA membership, if you have not already done so. Also, encourage your students and collaborators to consider joining the ACA. Membership has its privileges - you can more fully participate in our society, and you will receive *Physics Today* and all four issues of *RefleXions*. As you renew your membership, please give consideration to including one or more of our ACA programs in your year-end charitable giving. At its fall meeting, the Council decided to rename our student travel account the "Student Initiatives Fund". We always have many more needs in this area than we have resources, so I especially encourage you to consider contributing to this very worthy fund.

The Council continues to address the business of the ACA and the needs of our members. Plans for our meeting in Toronto next July 25-30 are progressing nicely, and Jim Britten, Program Chair, and our SIGs have assembled an outstanding program. The format for the meeting will be slightly different than last year's, with plenary lectures each morning. In response to the favorable reaction at Knoxville, the Council has decided to provide a CD along with a small program book for the Toronto meeting in lieu of the full abstract book. The ACA Awards to be presented next year go to Mike James (Buerger), Shih-Lin Chang (Warren), and Svilen Bobev (Etter). The Margaret C. Etter Early Career Award is also given each year, and I encourage you to nominate your promising young colleagues. Next year's award selection committee will be Carrie Wilmot (Chair), Radu Custelcean, and Bobby Huether. Nominations are due in the Buffalo office by May 1, 2009.

The ACA is one of three Regional Associates within the IUCr. We are looking at ways to better serve and improve our lines of communication with the entire crystallographic community across the American continents. We also need to improve our ability to cooperate and work with the USNCCr and the IUCr. The IUCr Executive Committee is planning to meet in Toronto next year in conjunction with the ACA meeting, so that will be a good opportunity to further this initiative. Your Council is also working with the USNCCr to monitor the operation of schools to train future crystallographers. The small molecule school is tentatively set for June 22- July 1, 2009 at the Indiana University of Pennsylvania. Details concerning the macromolecular school are still pending. We hope our members will take advantage of ACA sponsored courses covering small molecules and macromolecules, as well as the workshops that precede our ACA annual meetings. Since the ACA Council voted to post a summary of its Council minutes, you can find out more about Council deliberations and actions on our web site.

The ACA was founded in 1949, so next year we will celebrate our 60th anniversary in Toronto. Sixty is a mature (*not old*) age, that connotes fullness and wisdom. There are now many "generations" of crystallographers associated with the ACA. It is a joy to see the energy that the younger generations of crystallographers bring to our science, their SIGs, and our annual meetings. At the same time, it is with sadness that we note the passing of colleagues who have contributed so much to the field of crystallography and the ACA. In particular, we mourn the loss this fall of Lyle Jensen, John DiMarco, and Hans Freeman.

We as a scientific community as well as our nation are facing challenging times. Setting priorities, finding solutions to our problems, and making tough funding decisions lie ahead. In the fall issue of *RefleXions*, several of us contributed to the "Advice to the New US President" column. As we congratulate President-elect Barack Obama on his election, we remind all our leaders in Washington that it will take the efforts of all of us working together to move forward to the better times that lie in our future. We as scientists and citizens can and should play a significant role in that process.



Marv Hackert (center) thanks Lisa Keefe (left) for her 6 years as ACA Secretary and Alan Pinkerton (right) for his 3 years of service in the Presidential succession.

In closing, let me thank all ACA members for the honor of serving as your President this past year and encourage your support for Bob Von Dreele as he serves as our President for 2009. There are many rewards that come from service, and I encourage you to be mindful of opportunities where you can step in to help and make a difference. It has been a pleasure working with, and getting to better know, my fellow Council members, our staff in Buffalo, the many SIG volunteers that make the ACA such a wonderful, professional organization, and of course Connie (Chidester) Rajnak and Judith Flippen-Anderson for their work on our beautiful newsletter. Lastly, I want to extend a very special thank you to our departing members of the Council, Lisa Keefe who has served as our secretary since 2003, and our Past-President, Alan Pinkerton.

On behalf of the ACA Council and our membership, I want to encourage members to contact Bob (or me, or any of your Council representatives), with your ideas for improving the operation of the ACA or our annual meetings. I look forward to seeing many of you in Toronto next July.

Marv Hackert

News from Canada



The 2009 ACA Toronto meeting program is developing smoothly and David Rose and Marcia *et al.* have the local planning under control. Sessions and exhibits will be on the same floor so you will never be far from your coffee. Lachlan Cranswick has the website up and running at www.cins.ca/aca2009/, with new information appearing moments after conception. Two workshops have been approved by the

Continuing Education Committee: *JANA - Incommensurate Crystal Structures - Friday July 24, 2009 and Saturday July 25,*

2009 (Chairs: Jim Kaduk and Olivier Gourdon) and *Handling Twinning in Macromolecular Crystallography - Saturday July 25, 2009* (Chairs: George Sheldrick, Garib Murshudov, and Peter Zwart). The program will include the usual five days of four parallel sessions, however this year each morning will begin with an unopposed plenary lecture. Check out the session titles (see pages xx and yy) and start planning to boost the Canadian content for this meeting. We should be able to smell Tim Horton's coffee, maple syrup, and a hint of hockey gear in every meeting room.

Canada was successful in its bid to host the 2014 IUCr meeting in Montreal. Proposed by the Canadian National Committee for Crystallography and led by Louis Delbaere and Joe Schrag, with Marie-France Polidori of the Palais des Congrès de Montréal providing invaluable assistance, the low key but convincing arguments won over the majority of the international delegates at the General Assembly. There was a lot at stake, since a loss would mean

that the Americas would have to wait at least another three years to host the world's crystallographers.



Some of the selling points were the attractiveness, easy access, and safety offered by the Montreal site; the need for a North American meeting; the National Research Council of Canada underwriting the financial success of the meeting; and Louis cheerleading in front of the General Assembly in a Montreal Canadians hockey sweater. Special thanks go to the US National Committee for their support and help with the lobbying. The ACA headquarters will be contracted to handle much of the operation of the meeting so there will not likely be a separate ACA meeting in 2014. More details can be found at www.cins.ca/cncc/montreal2014iucr/.

To quote Louis Delbaere: "Feelings of relief and pride came over me when we were successful in obtaining the IUCr2014 bid for



Celebrating the success of the Montreal bid for 2014: Jim, Britten, Marie-France Polidori (Palais de Congres), Pam Whitfield, Joe Schrag, Louis Delbaere and Carol Delbaere

Montreal at the Osaka 2008 General Assembly. The competition with Prague and Hyderabad for the 2014 meeting was very intense. All members of the Canadian National Committee for Crystallography who were present in Osaka worked continuously at the Canadian booth and throughout the meeting. Canadian pins were very evident on many registrants and accompanying persons in Osaka. We worked diligently as a team and all Canadian crystallographers can share in the positive results."

As a bonus to an already successful trip to Japan, Louis was elected to a six year term on the Executive Committee of the IUCr, and Pam Whitfield, Lachlan Cranswick, and Hanna Dabkowska were selected as Commission Chairs.

Back in Canada, I had the opportunity to sneak into a protein crystallography meeting in Hamilton, Ontario. I bumped into some distinguished visitors including Vivian Cody and Bob Blessing (who didn't bat an eye when I called him Walter). The meeting organizer, Lynne Howell, provided the following summary.

"Friday, November 14th marked the successful completion of the 17th Annual BHT (Buffalo-Hamilton-Toronto) Crystallographic Meeting, a regional 1-day crystallographic meeting that draws its attendance from Southern Ontario and Western New York. This year the morning plenary session was given by Jack Bikker (Wyeth Pharmaceuticals) whose talk entitled "*Structure-based drug design*" generated a lively question and answer period, and significant interest from all members of the audience. The afternoon session featured talks by six trainees and three faculty members new to the region. The day finished up with a planning session for next year's meeting to be held on November 6th 2009, and a wine and cheese reception co-sponsored by Qaigen and Rigaku."



Speakers Left to right: Jack Bikker, John Allingham, Clara Kielkopf, Robert Fieldhouse, Carrie-Lynn Keiski, Eaton Lattman, Shekeb Khan, Yu Soen Chung, Jose Antinno Cuesta Seijo. Missing from the photo is: Robert Spitale.

Reminder: We will hold a short chemical crystallography workshop as a satellite to the Canadian Society for Chemistry (CSC) meeting in Hamilton, ON, May 2009. Anyone interested in participating or helping out should contact Jim Britten (britten@mcmaster.ca).

Jim Britten

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(signed) Marcia Colquhous for American Crystallographic Association, Inc.

Elizabeth A. Wood—Address at the ACA Meeting in Charlottesville, VA, March 1975

Introduction by R. Burbank: And so the curtain falls on the first part of our program. We have displayed the family tree, but there is still the merger or union of the American Society for X-ray and Electron Diffraction (ASXRED) and the Crystallographic Society of America (CSA) to consider. Back in 1957, at the time of the 4th Congress of the International Union of Crystallography in Montreal, the *Norelco Reporter* came out with a special commemorative issue. It included an article on the history of the American Crystallographic Association, which seems to have been forgotten by most people over the intervening years. It was co-authored by two people who played very active roles in the committee work, discussions and negotiations that led to the formation of ACA. One of those people was the secretary of CSA, Bill Parrish, who unfortunately could not be with us tonight. The other person was the secretary of ASXRED who later became the 8th president of ACA. I first met her at a joint meeting of ASXRED and CSA in 1948. I have never ceased to admire her outstanding attributes as a stage woman. She has graced our speaker's podium at a banquet on more than one previous occasion and it is a pleasure to welcome her back this evening. She is going to speak to us tonight on some of the history of the ACA and possibly will convey a little bit of the flavor of our early meetings. Ladies and gentleman, I am pleased to introduce Elizabeth Armstrong Wood.



Address by Betty Wood:

You know, when Rob first asked me if I would come here tonight, he said, "Would you be willing to say a few words, you know, 15 or 20 minutes that would give the flavor of those early meetings?" I said sure, I could do that. Then I saw the title of the talk listed as the history of the American Crystallographic Association. Well, that

was not just what I contracted for, and finally it came out in the program as "a historical address." I have seen a news release in which it was called "The Historical Address." This progression towards formality or formidableness I think deserves to be called some kind of a law, and since I assume that it is the work of our esteemed program chairman, I suggest that we call it Stewart's Law. Well, when the title of a talk threatens a speaker, with its inhibiting influence, the speaker disregards it...that's Wood's Law. So I shall proceed as I originally intended with giving you the flavor of some of those early meetings.

History is often written in a desiccated, lifeless sort of way. For example, one reads, "On January 1, 1950, the ASXRED and CSA ceased to exist and the ACA began." Well, that doesn't begin to give you the idea of the turmoil that surrounded the Amalgamation,

with a capital A. I remember a meeting chaired by Adolph Pabst. That was the CSA meeting just before the amalgamation. That was in Ann Arbor, Michigan. Remember the Crystal Bell in Ann Arbor, where they used to have beer in pitchers on the tables? That was why we enjoyed going to Ann Arbor, Michigan. Adolph Pabst was chairing this meeting. Now, he is a gentleman of the old school. In his mind, no one speaks without being acknowledged by the chair. Well, the heated argument about the amalgamation got so violent, that people leapt to their feet and argued with each other across the room and Adolph Pabst said, "Gentleman, gentleman." This didn't stop them, so he took the very violent means of hitting the table with the gavel. This didn't stop them and he hid his head in his hands in despair. Then, taking heart, he picked up his gavel and held it out, saying, "Please, somebody, *somebody*, take the chair and control this meeting, I can't." You see, that doesn't come out in history.

Then there was Martin Buerger. Like many of us who came into crystallography from mineralogy, he knew that there was a great deal of crystallography before x-rays were ever shone upon a crystal surface and he felt that this was what the Crystallographic Society of America had made possible, had given a forum for. So he said, "If there is an amalgamation of these two societies, I'll just have to start another one." He didn't.

Then there was a lot of talk about the name of the society. You couldn't call it the Crystallographic Society of America because obviously, that was a direct snub to the ASXRED. They were just being absorbed by the CSA, and that wouldn't do. You couldn't call it the American Crystallographic Society because then its initials would be ACS and that was the American Chemical Society. There was a good deal of feeling for calling it the American Society for the Study of the Orderly Arrangement of Matter in the Solid, Liquid or Gaseous State. Well, some people thought that was too long and that acronym was not pronounceable. So quite a few people were in favor of calling it the American Crystallographic Association. But then there was Bert Warren. Bert Warren said, "I'm a physicist and I'll be (word deleted) if I'll be called a crystallographer; if you call this society the American Crystallographic Association, I simply can't belong to it." Well, you may remember that he subsequently became a member of the Executive Committee of the International Union of you know what. It's very fortunate for us that he did stay with us and shared with us his beautiful work on the non-Bragg diffraction effects which have in them information that, until he showed us how to get it out, was hidden from most of us.

Of course, the real history of an association such as this lies in the interchange of ideas, the stimulation its members get, the papers in *Acta Crystallographica*, in the *Journal of Applied Physics*, and in the Metallurgical Journals that were first given at an ACA meeting and that benefited from the exchange of ideas and the discussions in ACA meetings.

In the very early days, the meetings were very small...I mean really small: 35, 40, 45 people. In the prehistory entry in this historical document that Rob has referred to, of the various meetings and where they were held, there is one that reads "October 1-4, 1945, ASXRED Meeting at Lake Geneva, Wisconsin." Now there's the bare fact. But you should have seen where we met.

You went to the bar in the place where we stayed and beside the bar there was a panel that didn't look like a door, but it was a door. And if you knew the way, you could go through that door into a room behind the bar; and that was quite a big room. It was about 30 x 20 feet and held all of us and there was a screen in it and a projector and it was air-conditioned, I seem to remember; at least it was ventilated because we didn't suffocate. We didn't know what that room was doing behind the bar. We suspected it was a bookie joint. Anyway, that's where we held our meeting. That was the meeting at which Willie Zachariassen abolished any committee that didn't have a report; if it wasn't necessary, it should be abolished. That's the kind of logic that Willie is good for... you know he wrote a book that was so comprehensive that it covered just about everything in x-ray diffraction, but it was so elegant in the mathematical sense that many people were unable to get out of it the information that was in it and if you asked Zach a question, he'd simply say, "you haven't read my book; it's in there, it's in the equations."

This reminds me of Paul Ewald's doctoral dissertation. You know, that dissertation had to do with the interaction of electromagnetic radiation and solids and you may know the story of his going to talk to Max von Laue about it. Max von Laue had just been writing an encyclopedia article. You know instructors have to do things on the side to earn a little extra money and he'd been writing an encyclopedia article on electromagnetic radiation: in particular, light and the associated effects such as diffraction and other effects of light. When Paul Ewald talked to him about his dissertation, according to Paul, that was the first time that Max von Laue had ever heard that a crystal, according to the mineralogists, was made up of very small units; they didn't know their size, but extremely small units of matter that were arranged in a geometrical way. Max von Laue had heard from Roentgen, who was also in Munich, that maybe his x-rays were electromagnetic radiation of very short wavelengths.

When Paul Ewald talked to Max von Laue about his dissertation, von Laue asked Ewald, "what would happen if the radiation falling upon your crystal were of such a wavelength that it was close to the spacing of those pieces that you think the crystal is made up of" and Ewald said that his answer was, "Well, that should come right out of the equations of my dissertation because they are perfectly general. There are no boundary conditions on the equations, so you just have to read the dissertation." And then he went on trying to discuss the dissertation with von Laue, but von Laue was paying no attention to him and finally he gave up trying to talk about his dissertation with him because he was obviously very excited about something and was not listening.

I have here with me something that Bill Parrish sent to me, written by Ewald, which is in his handwriting. It had to do with a talk that he was going to give and I think it's worth quoting. He writes, "The discovery of the diffraction of x-rays by crystals by Max von Laue in 1912 is an example of a discovery originating entirely in the mind of one man and coming as a surprise to even the best experts in the field. It was, in the accepted sense of the word, a 'stroke of genius'." And then he goes on to speak about the surroundings in Munich at the time that this occurs, mention Roentgen, Sommerfeld and Groth, who was a mineralogist; and

farther on he speaks of the influence of the work done by these scientists on the conception of Laue's brilliant idea. "Apart from these famous professors, there was a great crowd of eager pupils and assistants who met at their table in the Hofgarten Café after playing 9-pins. Work and pleasure were blended in one and the contact between the younger men created an atmosphere of friendship and mutual help and stimulation." It is quite likely that without this background, not all of the threads would have come together in the one brain that possessed the originality to combine them in the prediction of a new phenomenon and the tenacity to see the experiment carried out. In that case, not only crystal structure analysis, but also x-ray spectroscopy, and indeed the rapid and safe development of atomic physics following Niels Bohr's first papers, would have been held back for an indefinite period. So you see, the Pretzel-Bell aspect is important.

Actually, our early meetings were ones that combined playing and work. We always kept the afternoon free for sports and sitting around on the grass. We met in the springtime where we could be outdoors, where we could swim together or play tennis together and enjoy the out-of-doors together, so that we came together as a group of friends. There was a great deal of the kind of interchange that Paul Ewald just described. Everyone knew everyone else, everyone did everything together; there were no multiple sessions, no parallel sessions, so there was nobody milling around in the hall. When it came time for the meeting to be held, everybody went to the meeting. When the meeting was over everybody went to dinner or went outdoors to play or whatever it was we were going to do. We did things together as a group. I remember in one of these early meetings - and now this is going back to the third year of the ACA when Paul Ewald was president- we had the meeting at Camp Tamiment in Pennsylvania... Somehow that was a very nice meeting. Do you know how Paul Ewald found that place? Instead of asking around at universities for an invitation, he asked the conference bureau, the visitor's bureau in New York City, to find him a place where we'd be far away from a city, where people wouldn't be distracted, where we could swim and have a little meeting room where we could meet, and they came up with Tamiment.

So that's where we met and it was there that a young man named Clifford Shull gave a paper on the new neutron diffraction work. He had maxima that were very, very broad and spread out and then he applied some rather sophisticated mathematics and came out with rather precise figures at the end. I remember that Peter Debye, speaking in that typical German-professor kind of way he had (genial, but clearly with a fatherly sort of attitude towards the younger students) said to Clifford Shull, "Young man, your data are fuzzy, your mathematics should be fuzzy!"

Well, Debye was not the only one who criticized speakers. We all remember Fankuchen and the way he would get up again and again after a paper and say, "Now there was just a point I didn't understand. Would you put your third slide on again please... now you claim..." and then he would simply tear apart the student's evidence. As Bill Parrish put it, he would comment in an abrasive way to stimulate discussion. We all know that Fan was a great teacher and he was determined that the younger generation of crystallographers should grow up with very self-

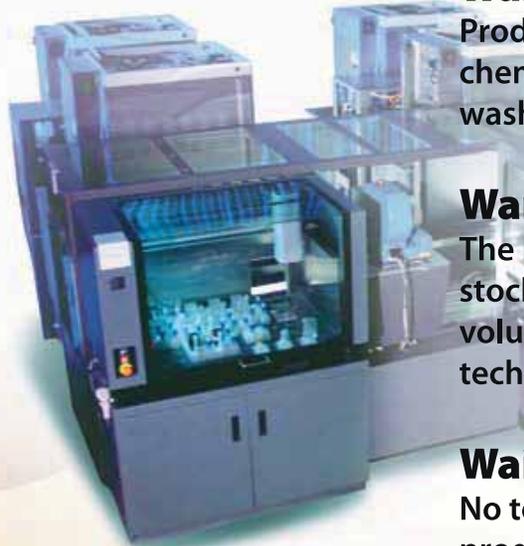
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criticizing habits of work... that they should not put on work that was shoddy, that they should not claim they had a result unless they had very, very good evidence for it, and he was acting always as a teacher and a missionary, I think, when he did this. He liked to keep the discussion hot and going in a lively way. This was what made him the terror for all young students who were giving their first papers.

A much less abrasive teacher, also one of our great teachers who was determined to keep us honest, is sitting right down here in the front row; this is José Donnay who would insist on people using terms correctly. This is not a trivial matter because confusion of ideas can easily result from misuse of terms. We have all heard endless discussions which finally became resolved when it developed that the two people who were arguing were just putting entirely different interpretations on a particular term that was used. So your service to these students was an extremely important one. It is always stimulating for the younger people in the Society to have the founders of the Crystallographic discipline present not only questioning them, criticizing their work, but arguing with each other.

I remember one time when Paul Ewald and Peter Debye were on their feet in a meeting room arguing back and forth violently about the dynamical theory of diffraction and Paul Ewald quoted an equation, whether out of his original dissertation or one of his later papers on the subject - I don't know - and Debye in his German professorial way... (I know he isn't German, but he talks like a German professor) said, "Well, if you want to get mathematical, I can get mathematical too." He was always the completely self-confident person, a genial, completely relaxed individual. The last time I saw Peter Debye, he was in Newark Airport waiting for an airplane. He was sitting there with his feet out in front of him, crossed, reading a paperback 'whodunit.'

One of the things that Lindo Patterson used to do which I think is a really great thing was to seek out a student or anybody who had given his first paper or a very early paper, especially one who seemed a little uncertain as he gave his paper, and comment on the paper, leading him into a discussion about the paper. If it had been well given, he commented on this particularly. It was very stimulating to a person giving his first paper to have Patterson come and discuss his work with him.

There was a lot of teaching and learning going on, not only for the young, but for everybody. X-ray crystallography was a new discipline to everybody. That genius in geometry, Martin Buerger, was always a lucid teacher, and he took part in one of the very exciting periods of our Association, the development of direct methods of structure analysis. In 1946, the ASXRED met at Lake George. This was a summer resort just before it had opened for the summer, and the idea was that we would use it before it was filled up with hotel staff either. As a result, the wives of the crystallographers (fortunately I wasn't a wife... I was a crystallographer under those circumstances) just moved into the kitchen and were the kitchen staff. The head of the hotel claimed that he was constantly trying to get a kitchen staff, but since he had one for free, we had our suspicions. Well, it was at this meeting that Martin Buerger presented the implication

diagram and he credited Fankuchen for pointing out that since he was able to proceed with his analyses using the implication diagram, there must be phase information lying hidden in the assemblage of diffraction data. And you all know the story of what happened after this. Soon after this came the Harker-Kasper inequalities and David Sayre's paper on the relation of signs and certain structure factors and then the Hauptman and Karle paper on solution of the phase problem, ACA Monograph No. 3.

Another exciting sequence has been the development of computer methods, beginning of course with Ray Pepinsky's marvelous machine. People came from all over the world to twiddle the dials and push the buttons that would change the magnitude and signs of the terms in the Fourier summation and instantly show on the oscilloscope the effect on the electron-density projection. Perhaps this meeting gave a special send off to our interaction with friends from abroad. ACA has always had a very close relationship with many crystallographers in Europe, people who come to see us often like Kathleen Lonsdale, (*Are there any people like Kathleen Lonsdale?*) Dorothy Hodgkin, Caroline MacGillavry, André Guinier, Beevers, Lipson, Robertson, sometimes Sir Lawrence Bragg.

I remember Robertson at that meeting at Ray Pepinsky's place in Penn State. You know Penn State was placed in the Middle of the state so that it would be accessible to everybody easily. Well, I can see by the laughter that many of you have tried to get there. Poor Monteath Robertson had been traveling for a very, very long time when he arrived in Penn State for that famous meeting which was the first meeting of the American Crystallographic Association. The following day he described to us what finally happened when he arrived at this room in the College at about 2:00 o'clock in the morning. He was more dead than alive and he knocked on the door of the room which he was to share with Lindo Patterson. There was no sound at all. So he knocked again, very much harder and finally he heard a shuffling sound inside and, as Robertson told us the next day, "The door opened and there before me was a dimly resolved Patterson in pajamas."

Well, there are many other exciting sequences of discovery and some of you I know are waiting for me to mention the particular sequence of discovery in which you were involved, but you remember that I was supposed to speak for 15 to 20 minutes, and I'm afraid I have already exceeded my time.

You know, as we meet again these past presidents that we just had standing in the room and other senior citizens of the Society, they seem now as malleable and ductile as pure copper. They stood up when they were told to stand up and they sat down again when they were told to sit down. It is hard to believe that they were once as fractious as an ionic or covalent crystal. But you know, old crystallographers don't melt away, they just get a few more dislocations.

Editors Note: This article was reproduced from "Crystallography in North America" published in 1983 by the ACA. It is presented as part of our series on the people behind the ACA Awards.

The AIP Governing Board met Thursday, 6 November in Naperville, IL.



The meeting coincided with a highly successful quadrennial Congress of the Society of Physics Students, which represents undergraduate and graduate physics students. Judging from compliments from people during the Congress, the ACA gained very positive visibility at the opening banquet when Krystle Williams, graduate student at Rochester University gave a poised and interesting summary of her work with Clara Kielkopf on RNA splicing proteins. She opened by proudly announcing her affiliation with the ACA! I had missed the banquet but caught up with Krystle on Friday. She is an interesting and bright young crystallographer in her third year, and is looking forward to the Toronto meeting.

Krystle was representative of a very exciting group of physics students who impressed all on the Board with their enthusiasm and commitment to the theme of the Congress, Scientific Citizenship: Connecting Physics & Society. The Congress itself took place in Wilson Hall on the Fermilab campus. The original estimated attendance of 200 was under by a factor of three, which put Fermilab's logistical resources to the test. In the end, the Congress went off without a hitch, and Board members I spoke to agreed that it was a splendid affair from start to finish, with a close to an ideal blend of plenary lectures, tours of the National Laboratory, policy lectures, and small working groups.

High spots for me were an overview of particle physics at Fermilab by Young-Kee Kim, the dynamo who rides shotgun over the administration of the lab and whose accomplishments and projects include verification of the Top Quark and the search for Higgs bosons. No shrinking violet, she drew a huge and enthusiastic audience response when she referred to Fermilab as the most powerful *operating* particle accelerator, a reference to a serious accidental setback that followed the ramp-up earlier this fall of the Large Hadron Collider (LHC) in Geneva. In fact, however, the LHC appears to be a truly international facility, and we toured a full remote control station set up in Wilson Hall.

Policy discussions among students on Friday centered around the evolution of scientific curricula, featuring a timely lecture by Adrian Melott, founder of Kansas Citizens for Science. He is notable both for his academic research on cosmology and his public interest efforts to steer the teaching of science in Kansas away from pseudoscience. He spoke about his attempts to use irony in combating The Discovery Institute (Phase I: Kamikaze; FLAT - Families for Learning Accurate Theories), the reality of organization and searching for democratic consensus (Phase II) and his ultimate battle fatigue (Phase III: denial; struggle only after you've lost). The audience broke up into groups of ~20 to discuss and frame action items to be recommended to the SPS Council. Among the more coherent suggestions growing out of

these groups was one framed by a junior at a small school in Southern Michigan. Her idea was that physics students could do more to enliven the understanding of the scientific method by developing outreach demonstrations in primary and secondary schools and ensuring that these demonstrations emphasized the comparative roles of expectation and observation in assessing the results of hypothesis-based experiments.

The timing of the Congress and Board Meeting, immediately after a historic election and in the midst of an uncertain and steep economic decline were key to a heightened excitement at both. The team of Fred Jerome, a New York journalist and Rodger Taylor, a Manhattan Librarian electrified the audience after dinner Friday night with a discussion of their book, *Einstein on Race and Racism*. Although Einstein's pacifism is well publicized, it is less widely known that he championed other progressive causes, and it is almost unknown that he acted strongly to combat racism. The authors' work establishes that this was by no means accidental, and that even media such as the *NY Times* systematically eliminated references to his pivotal role in the dismissal of a criminal case mounted against W.E.B. Duboise during the McCarthy Era, and that he co-chaired an anti-racism committee with Paul Robson, and routinely housed Mahalia Jackson when she visited Princeton because the Princeton Inn would not allow rooms to be let to African Americans.

The Fall meeting of the AIP Governing Board is largely devoted to the evaluation of their proposed budget for the coming year. This was a sobering year to experience this process, as the AIP, like all such organizations, faces significant declines in their endowments. CEO Fred Dylla arranged to have the director of the AIP's financial advisors, Tom Dodd, address the Board. Based on a detailed summary of PE ratios, and structural factors leading to the near certainty of weakness in commercial real estate and especially hedge-fund liquidity demands, Dodd's assessment was, unsurprisingly, that worse and perhaps much worse, is yet to come before any of the predictors of economic health reach historic bottoms. His advice, moreover, had unfortunate echoes in other contexts: "Stay the Course".

The other significant issue before the Board continues to be the pressure from the NIH policy on Open Access, which is now law, and which I discussed in my previous report from the spring GB meeting. This issue ought to be of greater concern to ACA members and it raises the important question of whether it is useful to work toward more systematic communication between the AIP and the ACA Council and membership. During the past several months, the AIP leadership sought support from the ACA for a policy statement on copyright protection but none was forthcoming. The issue is of considerable importance to the AIP because it threatens all possible business models for their publishing operation. However, it should also concern ACA members sufficiently for the Council to evaluate and articulate their position. Having attended a number of meetings of the AIP Governing Board I feel that communications between the ACA and the AIP could be improved and I will try in the coming months to move things in that direction.

Charlie Carter

Lyle Jensen (1915-2008)



Lyle Jensen passed away Oct. 16, 2008 in Seattle at the age of 92. He was a gentle and gracious father, church member, scientist and mentor, and he will be missed by many.

Lyle was born to Nels and Matilda Jensen near Stanwood, Washington, a farming, logging and fishing community about 40 miles north of

Seattle. He grew up on the family farm with a great interest in science and technology that included a workshop and home laboratory. He majored in chemistry, with a minor in physics, at Walla Walla College, and in 1939, after marrying his childhood sweetheart, Mildred, he entered graduate school at the University of Washington. He was Ed Lingafelter's first graduate student and obtained his Ph.D. in 1943. He determined unit cell parameters for several long-chain alkyl sulfonates after building an x-ray generator and a Sauter-Schiebold camera. Eye-estimated intensities from the diffraction patterns were used in line Patterson functions to show where the long-chained molecules were located in the unit cell. His dissertation title was "An X-ray Crystallographic Study of a Series of Sodium 1-Alkane Sulfonates".

After graduate school, Lyle joined the Manhattan Project where he worked in Glenn Seaborg's group at the Univ. of Chicago. He taught for a year at Emmanuel Missionary College (now Andrews University) in Michigan and got back to research doing P-V-T studies of hydrogen at The Ohio State University.

Heeding the call of the Northwest, he returned to the Univ. of Washington after the war, and in 1949, he learned that the Dept. of Anatomy in the newly formed School of Medicine might have an open faculty position. He arranged to talk with Stan Bennett, the departmental chair, who told Lyle that he'd see what he could do about the job. A very different world existed in 1949, and in two or three days, Lyle was offered the position. Lyle worked in the department for the rest of his career, and even taught histology to the medical students, albeit with an emphasis on the physics of microscopy.

Bennett, like many of his successors as chairs of the department, had an expansive view of anatomy, and he believed that methods such as crystallography and electron microscopy would eventually have major roles to play in biomedical research. Lyle's interests and activities helped fulfill Bennett's vision.

One of Lyle's passions was his need to be precise in everything he did. In his crystallographic work, this showed up early in his drive to obtain precise bond lengths and angles for biological molecules such as isonicotinic acid, one of the first anti-tubercular drugs. His interest in precision led him to concentrate on collecting accurate diffraction data and extracting as much structural information as possible from it. This involved microdensitometry of integrated Weissenberg photographs, substantial manual calculator time, and eventually large-scale programming efforts on the major mainframes of the day. Lyle's dedication to careful measurements and analyses allowed him to see and locate hydrogen atoms at a time when only a few labs did so. Lyle's interest in high precision small molecule structure determinations culminated in Jonathan Hanson's (and George Brown's and Larry Sieker's) joint x-ray/neutron diffraction study of sucrose in 1973.

In 1960, Lyle spent a sabbatical year at the MRC (Medical Research Council Laboratory, Cambridge, England) where he worked in Kendrew's myoglobin group and watched the early unsuccessful attempts to refine protein structures. While he was away, his home department decided to change its name to Biological Structure, partly driven by his efforts and accomplishments outside traditional anatomy. When he returned to Seattle, he started to assemble a research group to solve protein structures. The first protein of interest, ferredoxin, proved to be a bit difficult, and in 1968, he and Larry Sieker and Jon Herriott solved rubredoxin, a small iron protein. Soon after, Keith Watenpaugh, with his experience in refining large non-protein structures, shifted from doing small molecule research in the group and efforts were made to extend phasing to higher resolution and refine the structure of rubredoxin, even though the current opinion was that that was not possible. Careful use of difference Fourier methods, and subsequently least-squares calculations, showed that the molecular models for proteins could be refined and improved phases calculated from atomic models. Next, Ellie Adman solved ferredoxin and refined it as well.

In addition to the first refinement of a protein, Lyle's group went on to solve several metallo- and redox-proteins, often making use of the weak signal from anomalous scatterers to obtain phases for these structure determinations and using cobalt radiation to enhance the anomalous scattering signal from the iron-sulfur proteins. Lyle's understanding of the importance of accurate experimental measurements, combined with Larry Sieker's dedication to obtaining them, resulted in a number of well-refined, accurate protein structures. Lyle's egalitarian management style and his support for pursuing new ideas and approaches provided many opportunities for his post-docs and students to do precise and careful structure analyses.

There was always a strong international flavor in Lyle's lab. Sven Furberg (Bergen, Norway) worked with Lyle on the structures of nucleic acids, followed by Einar and Jorunn Sletten (Bergen, Norway), and later Frode Mo (Trondheim, Norway) all of whom emphasized highly accurate structures. Asbjorn Hordvik came to learn protein crystallography and along with Ed Hough, went on to establish the protein crystallography lab in Tromso, Norway. David Watson, (England), George Brown (Tennessee), Nick Margulis, (Boston), David Hughes, (England),

Syd Hall (Perth, Australia), Michel Frey (Marseilles), Jan Hermans (North Carolina), and Arthur Brill (Virginia) spent time doing research with Lyle. Muttaiya Sundaralingam, Herman Ammon, Keith Watenpaugh, Jon Herriott, Art Camerman, Ellie Adman, Jonathan Hanson, John Hodsdon, Bjørn Birknes, Kotoku Kurachi, Al Fitzgerald, Muthyala Ramanadham and Ethan Merritt were post-doctoral fellows and research faculty with Lyle: Jean Dow and Ann Bloomer were early graduate students; Ron Stenkamp and Larry Sieker obtained their doctoral degrees with Lyle solving the structures of hemerythrin and neocarzinostatin, respectively.

Lyle was a leader in crystallography throughout his career. He started attending ACA meetings soon after they were organized and he continued to do so until long after his retirement in 1986. The ACA awarded him its Fankuchen Prize in 1983 for his contributions to crystallographic education, including his authorship with G.H. Stout of "X-Ray Structure Determination: A Practical Guide". And in 2000, he was given the Buerger Award at the St. Paul ACA meeting. Lyle served on numerous committees, including the US National Committee on Crystallography, and was elected to the American Academy of Arts and Sciences. He was also a co-editor of *Acta Crystallographica* from 1971-1975.

While Lyle's scientific achievements were substantial, he's probably better remembered by many crystallographers as the neatly dressed white-haired gentleman who was so gracious and kind in his conversations with old and new friends wherever he met them. Many young crystallographers talked with Lyle at meetings and were gently and nicely encouraged to continue their scientific efforts. Several of us also remember his twinkling blue eyes and his enthusiasm for all things scientific. He always seemed to be talking with someone at meetings, learning new things, and gently disagreeing with some of them.

One part of Lyle's personality that many of us loved, got used to, and even rolled our eyes at, was his ability to tell stories. He told stories of all sorts. A memorable one was about when he, his brother and two other fellows drove a Model T from Washington to Detroit to get new cars in the 1930s. In Cheyenne, Wyoming, after crossing some railroad tracks, the Model T's front wheels wobbled, and they swerved a bit trying to get it under control. The police noticed, and stopped them to see what was up. The thought of Lyle Jensen being questioned by the police about erratic behavior late at night in Cheyenne might bring smiles to many who knew him.

And Lyle's penchant for precision was sometimes his undoing as well. John Hodsdon was a group member working on lysozyme, refining the structure in the days before interactive computer graphics. He had to plot his difference maps on plastic sheets and stack them in a staggered way to generate the triclinic unit cell. One day while several of us watched, Lyle came in, enthusiastic about something, and proceeded to make John's map prim and proper by making all the sheets line up in a good orthogonal system. Lyle's need for neatness and precision momentarily overrode his crystallographic knowledge of triclinic lattices, and John got to restack his map once again.

Lyle's enthusiasm, quickness, and integrity were fundamental characteristics that impressed all of us. For many years, the x-

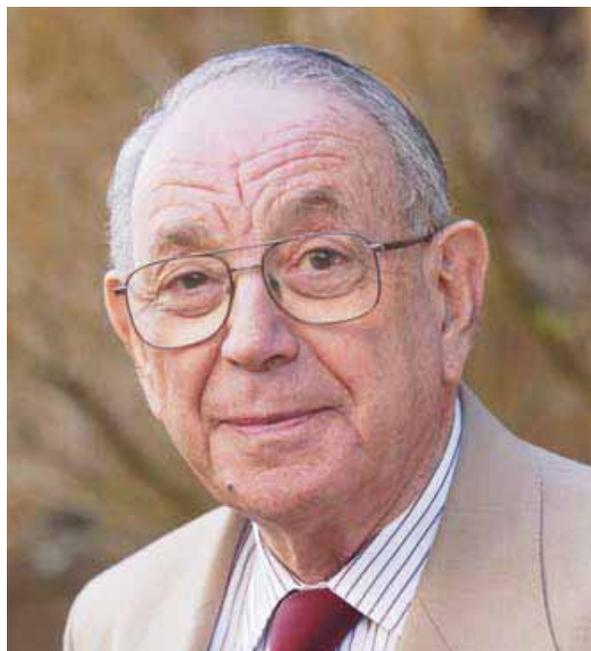
ray generators, cameras and diffractometer were in an adjoining wing of the Health Sciences Building, and often you could catch glimpses of a tall figure on his way to the basement lab with his lab coat-tails flying behind him.

After retirement, Lyle continued to study science and religion with the integrity and commitment to rational investigation that described all that he did and was. He was a dedicated Seventh-Day Adventist Christian, and Lyle found significant harmony between his religious and scientific views by subjecting questions he encountered in both worlds to rigorous inquiry. The characteristics that made Lyle a wonderful friend, leader, teacher and mentor were not reserved for his scientific life. What we saw in the lab was pretty much what his family and church saw. He was a loving, passionate, reserved, precise, gentle, humorous, rational thinker who will be missed by family (Mildred, children Ann, Paul and Mary K. and spouses, seven grandchildren and eight great-grandchildren), friends and colleagues.

Note: Mildred and Lyle's children have expressed deep appreciation for the honor the ACA has accorded Lyle's memory by the publication of his obituary, which they reviewed, and for the outpouring of love and condolences from crystallographers around the world.

Ellie Adman, Jon Herriott, Larry Sieker, Ron Stenkamp, Hugh Stout, and Keith Watenpaugh.

Hans C. Freeman (1929–2008)



Hans Freeman, Emeritus Professor at the University of Sydney, his alma mater, died on November 9, 2008. He authored over 160 research papers, and received practically every honor available to a chemist in Australia including the Burrows and Leighton medals of the Royal Australian Chemical Institute and the Craig medal

for chemistry from the Australian Academy of Science. He was elected as a Fellow of the Academy in 1984 and was recognized by the Australian Government for contributions to chemistry by being made a Member of the Order of Australia in 2005. Hans excelled in all aspects of academic life, teaching, research and service to the community. His pioneering research achievement was to establish the field of protein crystallography in Australia and to lead the team that solved the first structure of a 'blue' copper protein, plastocyanin. He was in the laboratory until a few weeks before his passing doing what he loved best. He will be sadly missed by all who had the privilege to know him.

Hans was born in Breslau, Germany in 1929 and left for Australia with his parents and sister in 1938. He graduated as dux of his year at Sydney Boys' High, a school that has contributed many leaders in politics, science, and the arts. He received his Bachelor of Science degree from the University of Sydney in 1949 with first class Honors and the award of the University Medal in Chemistry. He received an MSc in 1952 and his PhD in 1957, both from the University of Sydney. As was common at the time, he was appointed as a temporary lecturer and then lecturer while he was completing his doctorate. It was also during this time that the path he was to follow for his entire research career was chosen. He was awarded a Rotary Foundation Fellowship (1952-3) to spend time at the California Institute of Technology. He studied with Eddy Hughes learning the fundamentals of crystallography. X-ray crystallography was to be the cornerstone of Hans' research for the next fifty years. But even from the outset his interest was on molecules of biological interest. It wasn't a practical proposition at the time to study proteins themselves but amino acids, peptides and related molecules were in reach of the new technology. The structure of biuret hydrate formed the basis of his PhD dissertation. From there he refined the focus of his work to metal complexes of peptides, and then later to metalloproteins and it is as a bioinorganic chemist that Hans is widely known.

In 1970 Hans seized an opportunity offered by the University of Sydney to explore new areas of research and formed what was to be the first protein crystallography laboratory in Australia. There was significant opposition to protein crystallography from others in the crystallographic community, fearing that it would take a disproportionate share of the available funding and detract from studies in fundamental physics. They were, of course, correct. Protein crystallography is now a flourishing enterprise in Australia with more than fifteen centres. Hans dedicated the first goal of the laboratory to the solution of the structure of plastocyanin. To that end, in the days before recombinant expression, the protein was purified from thirteen natural sources before crystals were finally grown from extracts of the leaves pruned from poplar trees on the campus. The visualization of the structural basis for the 'blueness' of 'blue' copper proteins was a significant achievement in the field of bioinorganic chemistry and is widely quoted in many texts to this day.

Hans was a regular participant at casual meetings of the so-called 'bush crystallographers'. Despite an initial reluctance to formalize the organization of crystallographers in Australia, Hans was instrumental in the formation of the Society of Crystallographers in Australia (SCA, later to become SCANZ)

and was elected its first president in 1976. He started the society on a path that promoted and supported crystallographic science in Australia and internationally.

He was the program Chair for the 1987 IUCr Congress held in Perth, Western Australia. Hans ensured that the meeting showcased outstanding science. The exceptional local organization, led by Ted Maslen and Syd Hall, together with the strong program ensured that the meeting was a financial as well as scientific success. The income from the invested funds has been used very profitably since 1987 to fund travel by Australian and New Zealand students to IUCr, AsCA, and SCANZ meetings and to bring a distinguished lecturer to each of the local meetings of the society.

Hans was a charismatic lecturer for whom teaching was a love and a privilege and never an obligation. He enthused generations of first year students with a love for chemistry. His lectures were always beautifully structured and informed by research. Hans continued teaching a special first year class long after his formal retirement and did so until not long before his passing. Hans was conscious of the fact that Australia suffered from a tyranny of distance that meant senior students had fewer opportunities than those in the northern hemisphere to interact with leading researchers. In 1972, he was instrumental in the formation of the Foundation for Inorganic Chemistry at the University of Sydney, that each year since has brought one or two international scientists to the School to deliver a series of lectures. Included among these visitors have been protein crystallographers, bioorganic chemists and x-ray spectroscopists. Many of the students have subsequently joined these scientists as post-graduate or post-doctoral students.

Hans made a significant and lasting contribution to Australian science when he co-authored a report for the Australian Academy of Science entitled "Small Country, Big Science". The "small" referred to the population not the land area. The report highlighted the need for access to major research facilities not available in Australia at the time. These included high energy nuclear facilities and synchrotron radiation sources. As a result of the impact of the report, the government put in place easily accessible funds for travel by Australian scientists to overseas facilities. This funding has had a major impact on many different scientific disciplines in Australia. A further outcome of the report was the establishment of the Australian Synchrotron Research Program (ASRP) of which Hans was a board member until its incorporation into the Australian Synchrotron earlier this year. Access to synchrotron sources, first at the Photon Factory in Tsukuba, and later at the Advanced Photon Source, Argonne was a major boost to crystallography in Australia. The expertise gained by the support of scientists by the ASRP led eventually to the construction of the Australian synchrotron in Melbourne that is proving to be an outstanding success.

Hans Freeman leaves behind a legacy of significant research, institutional innovations and generations of students imbued with a love of science. He is survived by his wife of more than forty years Edith, his loving children Maeva and Philip, and his sister, Eva.

Mitchell Guss

John DiMarco (1963-2008)


John was born in Lynbrook, NY and was living in East Brunswick, NJ when he passed away suddenly in September.

He received a BS in physics with honors from Hofstra University in 1985 and an MS in Physics from Brooklyn Poly in 1987 where he continued to do post-graduate research at Brooklyn Poly under the guidance of Ben Post.

He joined Jack Gougoutas and the solid state chemistry (SSC) research team at Bristol-Myers Squibb in 1991 where he was a co-author on 12 patents and more than 25 research papers. At BMS his research focused on rational drug design, novel crystallizations, solid state transformation analysis, structural disorder analysis, dynamical diffraction, powder diffraction and polymorphism.

John was a remarkable member of the BMS community. He was always willing to lend a hand, taking on extra responsibilities and sharing with others. He was generous with both his time and equipment. For many years macromolecular crystallography lent a port on one of its x-ray generators to solid state chemistry (SSC), because it yielded a more intense beam of x-rays than any generator that SSC had at the time. John offered and took on as his responsibility the care and routine maintenance on that machine – a considerable effort each month that freed others to pursue their own research projects.

John was always smiling and acted as if it was his responsibility to cheer everyone up. He frequently cracked jokes, often at his expense, but never at anyone else's. This was a characteristic of John's that was not only familiar to his colleagues at BMS but to his colleagues and friends within the ACA where he had been a member since 1990. He was a good friend, a warm person, and a great colleague and will be truly missed by all who knew him.

He is survived by his wife, Doris Di Marco; two daughters, Grace and Christine and a son, Jack.

An Inspiring new IUCr Commission: CrysAC

The relationship between crystallography and art, or more personally crystallographers and artistic expression, has always been very flirtatious based on an immediate attraction between the two partners. Crystallographers are drawn naturally to the fascinating beauty of the structures and patterns that they unveil hidden in the crevices of their unit cells. The attraction seems irresistible!

With those images in our eyes, we might have soon discovered the work of the pioneer Viennese graphic artist Koloman Moser (1868-1918) or the work of the better known Dutch graphic artist M.C. Escher (1898-1972) and his imaginative excursions into the tiling of the plane. To him it was like an obsession. His color plates and those of others (H. Hinterreiter: 1902-1989) illustrated the concepts of polychromatic symmetry arguably before this notion appeared more widely in the literature. Moreover, Escher's later works used his amazing artistry and richness in detail to depict imaginary self-reflecting worlds that were braided together with Gödel and Bach in that imaginative, tripartite golden braid written by Douglas Hofstadter entitled *Gödel, Escher, Bach* inviting all of us to reflect upon the unique threads of the human spirit, upon our own consciousness, and who we were.

It is well documented that Escher got his inspiration to explore the tiling of the plane from the ceramic tiles that he saw in the magnificent palace of the Alhambra in Spain in 1936 during one of his trips to Andalusia. If this was a window of inspiration for him, it is also a source of study, analysis, and exploration for an enlarging group of crystallographers and mathematicians exploring geometric patterns in Islamic art. The maturity of this field of study is evident by the existence of the IUCr MaThCryst commission devoted to these topics and to the multitude of papers that continue to appear on these topics ranging from descriptions of decorations, to the detailed mathematical analysis, and understanding of the artisanal and practical aspects of these artistic manifestations of the human spirit. A significant review of the current work in the field was presented at the satellite meeting of the European Crystallographic Society (ECM24) in Marrakech entitled *'The Enchanting Crystallography of Moroccan Ornaments'*, sponsored by the MaThCryst commission.

The scope of these investigations is enormous and the detailed studies might unveil unknown cross-pollination and influences between the different cultures in space and time; or it could reveal independent discovery of symmetrical patterns of decorations and motifs by the human mind.

What else is there besides the mathematical theory of ornamentation to attract crystallographers to art? What can the experimental methods related to crystallography add to the understanding of the relationship between art and crystallography or even more encompassing art and science? As noted by C.P. Snow, the schism between the two cultures became more significant in the 19th century but there is great impetus to bring these two critical threads of the human spirit together again. Crystallography could provide a unique bridge and agglutinant. There is a tremendous amount of academic research on this theme with art historians, artists, scientists, and cultural observers all

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over the world taking sides in a continuous spectrum with two separate poles. Can the relationship between art and science be described by the nebulous concept of 'spirit of the times' (as embedded in the German word 'Zeitgeist'), or is there a real causal link between art and science supported by concrete evidence? A large number of books and research papers published in professional journals by the leaders in the field present their individual work or review that of others and address this question in various ways. The range of studies is enormous and details can be found at the commission's website. Crystallographic and related techniques (diffraction, spectroscopy, microanalysis, and microimaging) applied to the microanalysis of samples (both crystalline and amorphous) originating from ancient paints, pottery, cosmetics, unguents, archeological materials, and many others can provide critical information on the composition, origin, production technology, authenticity, physical and cultural migration, historical development, and other related issues. Thus, it can provide unambiguous evidence to art scholars and historians, critics, archeologists, and anthropologists battling with questions that cannot be answered by more traditional methods. What branch of science or technology can claim such a wide range of 'artistic' leanings and applications with direct impact in the art-science interface?



The members of the CrysAC Commission at the IUCr2008 Osaka meeting (courtesy of R. Gould, University of Edinburgh). Left to right: Abdelmalek Thalal, Alicja Rafalska-Lasocha, Simona Quartieri, Eric Dooryh e, Cele Abad-Zapatero, Anke Z urn, E. Makovicky (Gautam Desiraju is absent)

In response to the growing interest and developments in the use of crystallographic methods to analyze historical, cultural and archaeological artifacts (among others) the Executive Committee of the IUCr at its meeting in Osaka (August 2008) approved the formation of a new commission appropriately named 'Crystallography, Art and Cultural Heritage (CrysAC)' devoted to the support and expansion of all of those lines of enquiry. The decision followed the request presented by E. Dooryh e (CNRS, France) who has been the leading force behind a proposal drafted by a group of crystallographers interested in this area of research. A satellite symposium organized jointly by the MaThCryst and CrysAC commissions will be held at the next meeting of the European Crystallographic Association (ECM25) in Istanbul in August 2009 devoted to the theme of *Symmetry and Crystallography in Turkish Art and Culture*.

Any person interested in pursuing the scientific problems that this branch of crystallography is trying to address should always keep in mind three cardinal points as beacons to guide her or his interests in the areas of research that this commission seeks to explore. First, the analysis, explanations, and insights into the artifacts/samples do not destroy the beauty and uniqueness of the objects under study no matter how aseptic the language of mineral names, textures, chemical formulae, and space groups might sound. Second, the scientific and technological aspects represented and underlying in any form of art (graphic, decorative, architectural, or other) are a part of the cultural heritage of the societies and people of the Earth who created them. Finally, it is through the wise and intelligent usage of the findings, explanations, and concepts expressed above that we can make our work and our discoveries more accessible to lay people so that the discoveries enrich their lives as much as they enrich ours; our findings can illuminate art in unique ways for the specialist and for our fellow humans. We feel that this new commission will provide an inspiring opportunity to achieve all these goals in future years.

Visit the CrysAC website or join our open mailing list. We welcome your comments, suggestions, and insight as to the goals, objectives, directions, and strategies of this new commission to make this new initiative of the IUCr a complete success for all of us and for society at large. An extended version of this article has been published in the IUCr News (Issue 16 Vol 3) and the full motivational essay can be found at the commission's website

Resources:

MaThCryst: www.crystallography.fr/mathcryst

CrysAC : www.crystallography.fr/crysac/.

Commission mailing list:

listes.uhp-nancy.fr/wvs/info/crysac

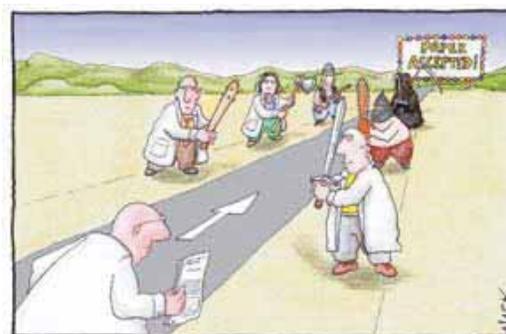
Islamic art: www.castera.net

Bibliographies:

www.crystallography.fr/crysac/bibliography.php

www.leonardo.infolisast/spec.projects/artsciencebib.html

Cele Abad-Zapatero - on behalf of the members of the commission



Most scientists regarded the new streamlined peer-review process as 'quite an improvement.'

Nick Kim, U. Waikato, NZ. See Nearingzero.net/res.htgml

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Knoxville - A good time was had by all – listed from left to right. Top row: Zachary Miknis, Bill Bauer, Kristin Wunsch, Robert Huether, Dong Li Wang, Helen Rho. Row 2: Brandon Goblirsch, Peder Cedervall, J. Thompson, C. Malliakas, Mark Wilson. Row 3: Brian Toby, Bob Sweet, Chris Nielsen, Mark Saper. Row 4: A.D.Rae, Carroll Johnson, Bob Bau, Jill Trehwella, Paul Butler. Row 5: Dan Anderson, Peter Mueller, Jennifer Swift, Cheryl Klein Stevens, Dean Miles, Carrie Wilmot.

ACA 2008 Election Results**Council Officers****Vice President**
Judy Kelly**Secretary**
Carrie Wilmot**Standing Committees****Communications**
Thomas Proffen**Continuing Education**
Allen Hunter**Data and Standards**
John Rose**SIGS****Biological Macromolecules**Chair-elect: Ed Collins
Secretary: Mark Wilson**General Interest**Chair-elect: Peter Mueller
Secretary: Christine Beavers
Member: Jeanette Krause**Fiber Diffraction**Chair-elect: Paul Langan
Secretary: Olga Antipova**Industrial**Chair-elect: Tim Rydel
Secretary: Jeff Scrodinger**Neutron Scattering**

Chair: Craig Bridges

Powder Diffraction

Chair-elect: Peter Chupas

Service CrystallographyChair-elect: Saeed Khan
Secretary: Charlotte Stern**Small Angle Scattering**

Chair: Undeclared

Small MoleculesChair-elect: Richard Staples
Secretary: Peter Mueller**Synchrotron Radiation**

Chair-elect: Marc Allaire

Young ScientistChair-elect: Ryan Jackson
Secretary: Megan Barker**Canadian Division**

Secretary: Undeclared

Judy Kelly Vice-President

Professor Emerita, Department of Molecular and Cell Biology, Member of the Institute for Materials Science, University of Connecticut, Storrs, CT 06269-3125.

Statement: As I finished high school, the common college majors for women in my peer group were English and History. Knowing I would not be satisfied working in those areas, I chose to go to Berkeley College in New York City and trained to be a secretary. It was a good choice for me at the time. The skills I learned have stayed with me throughout my working life. I landed a great job with The M. W. Kellogg Company, an international engineering

company. I worked for the Manager of Government Contract Sales and was involved in interesting projects like the Atomic Energy Commission facility at Idaho Falls. From there, I became the Administrative Assistant to the President of Dover Corporation, a manufacturing conglomerate headquartered in New York City. While working in these positions, I realized I wanted to be involved in the technical side of projects, not the administrative side. So, I began attending college at night school. It took a long time, but it was well worth it because I ended up as a crystallographer – what better world to work in day and night.

As a member of the ACA since the 1970s, I have found participation in our annual meetings to be an important benefit of our organization. Stimulating, informative, and well organized conferences provide the venues for presentation of research results and the essential opportunity to exchange ideas and information. It is critical that the ACA remain relevant and vital for all our members, especially in its role in the education and training of young scientists. Today's challenges are great for crystallographers who are in the early stages of their careers. The ACA should help them prepare for the multidisciplinary approach to research that is now the norm for success.

It is the job of the ACA to be an effective research and educational organization for scientists training and working in all fields represented by the ACA. Maintaining balance among the twelve Special Interest Groups in our organization is critical so that we serve researchers and educators interested in all the disciplines represented by the ACA. Toward that end, as Vice President I will work with Program and Session Chairs to further enhance our annual meetings, including seeking additional outside funding so that our programs and workshops can be as rich and varied as possible.

The ACA is a voice for our community of scientists. To the larger scientific community, we must continue to stress the power of diffraction and scattering in structural studies that are important in a wide range of fields.

My seven years serving as the Head of the Department of Molecular and Cell Biology gave me management and administrative experience that will be useful to me as a member of the ACA Council. The two years that I served as Chair of the Biological Macromolecules

SIG and my stint as Program Chair for the 2006 ACA meeting in Hawaii also give me background that will be useful to me while I am on Council I am honored to have been elected Vice President. I look forward to joining the ACA Council and to fulfilling the responsibilities of the Vice President. I will work hard to help the ACA grow and thrive in the coming years.

Carrie Wilmot - Secretary



Associate Professor Department of Biochemistry, Molecular Biology & Biophysics, U. of Minnesota, Twin Cities; Director of the Kahlert Structural Biology Laboratory, U. of Minnesota.

Statement: I am honored to have been elected ACA Secretary. I have been a member of the ACA since 1999, and have been Chair of BioMac SIG. As Chair, I had the pleasure of putting together the BioMac SIG sponsored sessions for the Knoxville meeting, which has given me insight into how the ACA functions. The position of Secretary primarily requires organizational skills. In my current position as Director of the Kahlert Structural Biology Laboratory at the University of Minnesota, and in my previous position as Director of Facilities of North of England Structural Biology Centre (NESBiC) in the UK, I gained considerable experience in organization. I have also organized an international symposium, and Chaired sessions at multiple conferences. I plan put my organizational skills to good use in promoting informational dissemination and exchange within the ACA community

*Thomas Proffen
Communications*



NPDF Instrument Scientist, Lujan Neutron Scattering Center, LANL, MS H805, Los Alamos, NM 87545.

Statement: Being a crystallographer (I indeed have a PhD in crystallography) by education, I joined the ACA as soon as I came to the US about 9 years ago. One issue close to my heart is bringing a notion of what and how important crystallography is to the wider public, to schools and to the colleagues in the next building. On more than one occasion when asked my profession, my reply 'I am a crystallographer' resulted in being asked about the healing powers of a particular stone, so there is a long way to go. I remember attending the IUCr meeting in Seattle and, in particular, listening to the panel discussion by several Nobel prize winners, all related to crystallography. Even I was impressed. I see the function of the ACA Communications Committee as key to providing a united voice to politicians, funding agencies and the public. I will work as hard as I can to achieve these goals.

*John Rose
Data and Standards*



Assoc. Prof. of Biochemistry and Molecular Biology, Univ. of Georgia, Athens, GA 300602. Assist. Director, SER-CAT, APS, Argonne National Laboratory.

Statement: I am pleased to have been elected to the Data and Standards Committee. Being trained as a small molecule crystallographer and having spent over 25 years as a practicing protein crystallographer, I know the importance of reliable and validatable data standards. This is especially important today as the field of structural biology is expanding at a phenomenal pace with over 50,000 structures in the PDB. I also believe that my experience as a consultant and annotator for the PDB for almost 10 years has given me a unique perspective on data validation and data standards, which should be of benefit to the ACA. Finally, as a researcher and teacher who uses structural information provided by others, it is important that this information be reliable and complete.

There are several areas that need our attention:

(1) Software development - I believe all federally supported software development projects should be open-source and all software adequately documented so that others can modify the code to add features or address local concerns.

(2) Data formats - there should be a standardization of the image and reflection

file formats. Instrument and software producers should be encouraged to produce image files in imageCIF format for long-term compatibility.

(3) Raw data - raw image files related to the refined structure reported in the literature should be publicly archived in a standard and supported format.

(4) Web tools - There has been an explosive growth of web tools for structure validation and analysis both for small molecules and macromolecules. However, it is important that these tools/databases be well documented, maintained and updated, if needed, to reflect the ever-growing PDB and other databases.

(5) Training - as more and more researchers are adding structural studies to their research program it is imperative that these investigators and their students have a solid understanding of the software used in the analyses and potential sources of error, both in the data itself and in the resulting structure.

I plan to work with the Committee, the ACA, and others to help address these areas. I will also encourage the ACA to continue activities such as symposia, workshops and summer schools aimed at training the next generation of crystallographers

Allen Hunter - Continuing Education



Director of the YSU-PUI Undergraduate Diffraction Consortium, YSU Structure and Chemical Instrumentation Center, YSU-S&CIC, Prof. of Chemistry, Dept of Chemistry, Youngstown State University

Statement: The ACA must continue to play a central role in the education of professional crystallographers. I believe that it is *equally important* for the ACA to play a central role in developing,

evaluating, and disseminating educational materials aimed at non-specialists. This reflects the reality on the ground that non-specialists are increasingly involved in crystal structure determinations. It also provides us with opportunities to show off the beauty and power of our technique and to recruit future crystallographers. To this end I plan to concentrate my efforts on working with other committee members and the larger community in identifying, evaluating, and distributing exemplary materials, modules, and courses that can be integrated into non-crystallographic courses by both expert crystallographers and those earlier on the learning curve. In addition, I will work with the committee and others to increase the awareness in the community of funding opportunities to support these efforts and at the funding agencies of the need for such grants.

Creation "Museum" rebuffed by Cincinnati Zoo

"A promotional deal between the Cincinnati Zoo and the Creation Museum was scuttled after the zoo received dozens of angry calls and emails about the partnership," reported the Cincinnati Enquirer (December 1, 2008). The promotion involved a package deal for tickets to the zoo's annual Festival of Lights and to a Christmas-themed event at Answers in Genesis's Creation Museum.

On November 30, 2008, biologist and blogger P. Z. Myers complained about the promotion at his blog Pharyngula, writing, "the Cincinnati Zoo has betrayed its mission and its trust in a disgraceful way, by aligning themselves with a creationist institution that is a laughing stock to the rest of the world, and a mark of shame to the United States," and urging his readers to write to the zoo to "point out the conflict between what they are doing and what their goal as an educational and research institution ought to be." Other bloggers echoed his call, and the zoo was evidently flooded with calls and e-mails, prompting it to cancel the promotion because of the uproar.

Extracted from a report on the website of The National Center for Science Education's (NCSE - ncseweb.org).

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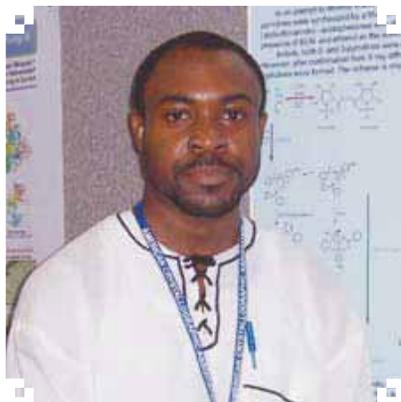
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Following are some the impressions and experiences of the students who received ACA travel grants to the Knoxville ACA Meeting.



It is with much gratitude that I put down these few words of appreciation thanking the ACA organizing committee. Firstly, for giving me the opportunity to attend the annual meeting in the form of a travel award. Were it not for this grant, it would have been impossible for me to make it. For this very reason I say thank you. I would also like to commend your organizational skills. The decorum at the event was worth mentioning. Sincere thanks also go to my supervisor, Tatiana Timofeeva, who also assisted me financially to make my attending this annual convention a reality. I was honored to have the opportunity to present my research work to some of the finest crystallographic brains in the world, and this being my first meeting, the experience was quite fascinating. Meeting and discussing with professors from countries such as Brazil and Japan and exchanging research ideas made the event all the more worthwhile.

Thank you for this great opportunity and I look forward to attending many more ACA meetings in the future.

Paul Tongwa

I would first like to thank the generosity of the ACA for allowing me the opportunity to attend a very informative and worthwhile conference through a travel grant award. I would also like to thank my mentor, Rebecca Page, for getting me excited about and prepared for this meeting. As this was the first national meeting I ever attended, I was quite unsure what to expect. What



I found was a community of people who are very interested in the recent advances in the field as well as devoting time to help develop a future generation of scientists. This was most evident at the Mentor/Mentee Dinner. At this function, I met many senior scientists with various backgrounds who eagerly offered much academic as well as professional advice. Also, the "Practical Approaches to Improving the Formation and Diffraction-Quality of Protein Crystals" session was especially useful to me at this stage of my development and I now have a range of techniques I am anxious to explore. Finally, I greatly enjoyed the poster sessions as I was able to discuss my project with others as well as learn about a broad spectrum of different projects and crystallography applications. I am appreciative of the members of the Pauling Prize judging committee for taking the time to visit my poster. After viewing all of the other posters, I know that receiving an Honorable Mention in this category is truly an award I will value.

Breann L. Brown

I wish to thank the ACA for providing me with a travel grant. I also wish to thank the organizers of the neutron scattering section, Bruce Hudson and Tom Koetzle, for affording me the opportunity to present a lecture at the meeting. This was the first lecture which I have given outside of the university community and I believe the talk was well received. Even though only a few questions were raised immediately following the talk, several fellow researchers approached me to discuss my research throughout the

remainder of the conference. During these conversations I was pleased to answer additional questions, while also being given some possible directions to further pursue my research interests.



In addition, I had the opportunity to meet several other invited speakers in the neutron scattering session that I have heard of in the past. This was a very good experience. Although I am primarily a neutron scattering graduate student, I have gained a limited amount of crystallographic experience, so it was quite enjoyable to hear several sessions on magnetism and materials crystallography. The overlap of the neutron and x-ray science was very interesting to me personally. The highlight of the conference had to be the tour of the Spallation Neutron Source at Oak Ridge National Lab. Since I have been to several neutron scattering facilities, this was especially exciting since I look forward to doing future work at the SNS.

In closing, I again wish to thank the ACA for providing me with a travel grant and the other participants in the neutron scattering session for a great time. Overall, I felt the session was well organized and every talk was of interest.

Matthew Hudson

As a PhD candidate at Memorial University in Newfoundland, Canada, traveling to conferences can be an expensive undertaking, so I felt very fortunate and honored to have been awarded a travel grant to attend my first ACA meeting in Knoxville. My PhD work, under the supervision of L. K. Thompson, has focused on the study of the magnetic

properties of large polymetallic clusters, and I presented a talk on this work in the "Molecular Magnets" session. This was a wonderful forum in which to present my work to an audience of experts in both crystallography and magnetism, who provided me with valuable comments and suggestions. I also presented a poster on some "Cool Structures" that I worked on as part of my graduate research. This opportunity was phenomenal; the conversations that I enjoyed with experienced and expert crystallographers on my work was one of the best learning experiences of my graduate career and I am very grateful to everyone that came to speak with me during the poster sessions.



While attending the opening reception and the Young Scientist Mixer I met many other graduate students. Learning about their different backgrounds, current research projects and future goals was a very enriching experience, particularly since we all had a common reference point: our shared interest in crystallography! I also attended the tour of the Spallation Neutron Source at Oak Ridge National Laboratory, which was very impressive and informative.

I was honored to have been awarded the *Journal of Chemical Crystallography* poster prize. After the banquet and award ceremony an experienced crystallographer from Canada said to me "One of the greatest things about ACA meetings is that they are not just about the science; they are also about the people." This statement rang absolutely true for me, and I look

forward to future ACA meetings where I can continue to learn about the science of crystallography with many of the wonderful people that I met in Knoxville, and with other professionals in this field.

Louise Dawe



I was very impressed with the Knoxville ACA meeting - my first attendance of this conference. I expected a lot of talks on structures and was not disappointed. What surprised me the most was the many other topics covered in this meeting - neutron diffraction (including a tour to Oak Ridge National Lab), the latest advances in x-ray crystallography such as sulfur-SAD pioneered by B.C. Wang, crystal catchers - a tool to help mounting crystals etc. In addition, the list of exhibitors at the conference was amazing. I got to talk to vendors that we dealt with a lot but never met, learnt about the latest tools and equipment available that could help my research and also to test drive different instruments that my lab is interested in purchasing. I appreciate very much the travel grant that made it possible for me to attend the meeting. As a graduate student that is close to finishing her Ph.D studies, this conference was a great place to network and meet other researchers for possible postdoctoral opportunities.

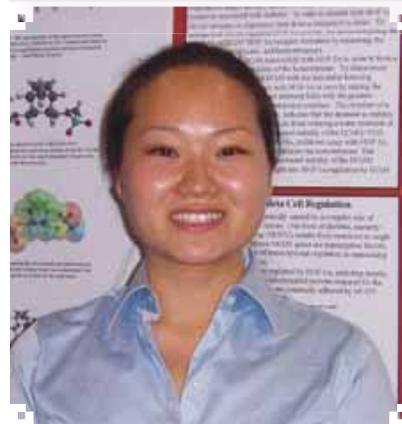
Marianne Lee

I'm very thankful to the ACA for providing me with a travel grant. Receiving the grant took the pressure off of the "How can I get there cheaply, stay cheaply, and eat cheaply in a city I know nothing about?" mantra by providing me with the means to concentrate on the conference versus my next expense.



I had the opportunity to chat with a lot of interesting people at my poster-providing me with great feedback to take home and apply. The scientists in attendance (industry and academics) were extremely interested in helping the students at the conference, (more so than other conferences I've attended), which was welcomed by people like myself. Thank you.

Theresa Detrie



I would like to take this opportunity to sincerely thank the ACA for selecting me to receive a travel grant and the organizers for making this meeting a huge success. I would also like to thank the ACA, the IUCr, Hampton Research, Area Detector Systems, Corp., Hoffman-LaRoche, Inc., Pfizer Global R&D La Jolla, and Pulse Ray for providing me with the means to attend my first ACA conference.

This conference was a great way to be exposed to a broad spectrum of topics in crystallography. My favorite sessions were "Challenges in Industrial Crystallography", "Complementary

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think forward

Crystallography

Methods for Structure/Function Studies of Biomolecules”, and “Difficult Structures”. I appreciated the honesty of how difficult some of the structures were to obtain, and it was heartening to learn how these researchers overcame their problems using specific techniques. Being able to sit in on talks given by those whose papers I’ve read or programs I’ve used was very exciting. I also enjoyed the student talks and the poster sessions.

The combination of poster sessions, talks, and the mentor-mentee dinner has left me in awe of and inspired by the brilliance of the scientists, both new and established, that were at the conference. Overall, my first ACA conference experience was phenomenal. Thank you for giving me the opportunity to attend. I hope my lab is able to make it to Toronto next year!

Helen Rho



Coming to the ACA meeting I did not expect to learn a whole lot. I am not a crystallographer and I expected to be shut out by a wall of jargon. Instead, I met many scientists that were more than willing to help me over that wall and join them. From the presentations to the poster sessions, there were people that loved to talk about science, whether it was about neutron beams or protein conformations. Then there were all the dinners! The Young Scientists Special Interest Group was an incredible opportunity to talk to my peers who are going to be the future of the field. The mentor/mentee dinner was a time to get away from the technical discussions and talk about the future obstacles that may hinder my academic endeavors.

Corey Wischmeyer



I would like to thank the ACA both for the Student Lecturer Etter Award and for the travel grant I received. This was my first time attending an ACA meeting, and my experience was a very pleasant one. I especially enjoyed the sessions entitled: “Challenges in Industrial Crystallography” and “Supramolecular Chemistry: Organic Crystals from Assembly to Function.” Throughout the meeting, it was wonderful to speak to professors, researchers from industry, graduate students and postdocs about their areas of expertise and share the research that I have been taking part in for two years. During my talk, it was very rewarding to speak to and interact with an interested audience about my research and discuss new ideas and questions to address afterwards. This conference broadened my knowledge of the growth and structure of inorganic, organic, and macromolecular crystals, and helped me to think about what kind of work I would like to pursue in the future.

Clare Yannette

Solution small angle x-ray scattering (SAXS) is becoming a very valuable tool complementing crystallographic methods in order to determine the three-dimensional structure of biological macromolecules. Recent advances in instrumentation as well as software analysis tools have allowed for answers to difficult structural problems. Flexible proteins in particular are extremely challenging systems but important for a variety of functions such as transcriptional/translational regulation, cell cycle control, modulation of the assembly of other proteins, neuron development etc. Participating in the conference allowed me to present my

work on flexible proteins using SAXS. It was also a very nice opportunity to attend



lectures and read posters from leading scientists, presenting recent developments in the field of structure determination of biological macromolecules. Moreover, I was able to discuss and exchange ideas, views and opinions with other participants of the ACA meeting. I would like to thank the conference organizers for inviting me to present my work and express my appreciation to the sponsors for subsidizing my travel expenses.

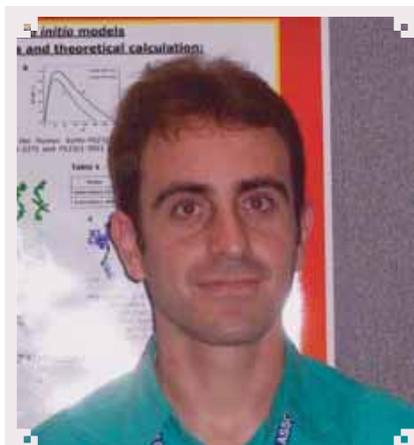
Efstratios Mylonas



Thank you for both the travel award and the Margaret C. Etter student lecture award for Synchrotron Radiation. This was the first ACA meeting I have attended, and it was a very good experience. Compared with other meetings I have attended, the ACA did a very good job of facilitating the

young scientist crowd, both with the talks presented and with the functions catered to us. It gave me a very favorable impression of the ACA meeting, and allowed me to get to know some of my peers. I was able to meet a number of people that I have only been in contact with through e-mails, or heard about while talking to staff at CHESS. It was very nice to meet a number of these people face to face. Many of the talks I attended were insightful for me. I have been mostly involved with the x-ray sources, optics, and equipment used in crystallography. It was nice to see many examples of different techniques and equipment used for crystallography. The meeting gave me a better feel for the directions that crystallography is going in the future. Again, thank you for the travel support and the award. I plan to attend again in the future.

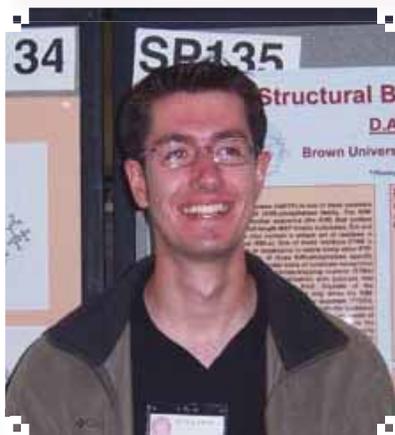
Sterling Cornaby



I would like to thank the ACA and sponsors for providing me funds for my trip from Brazil to United States. This was my first experience at an ACA conference and it was quite fascinating. I tried to attend as much sessions as possible, because all of them were very interesting, but I had to make choices. I particularly enjoyed the small angle scattering sessions and the discussion about natively unfolded proteins, whose structures are a new challenge not only for structural Biology but also for the physics and other sciences. In addition, I really believe that the combination of NMR, crystallography and small angle scattering is necessary to study some proteins structures. Moreover, during the conference I had the singular

opportunity of discussing my work with important specialists from my area of research. Concerning the city, I liked Knoxville and enjoyed the agreeable climate during the days we stayed there. I thank all the participants, sponsors and organizers for the pleasant meeting.

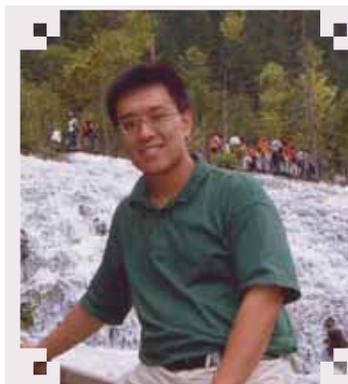
Júlio César da Silva



Attending the ACA meeting in Knoxville allowed me to learn about all manners of cutting-edge crystallographic research that is presently being carried out. From structural neurology to electron crystallography in industrial petroleum research, these lectures made it abundantly clear that the versatility of crystallography is ever expanding. Attending the ACA meeting also provided me with the opportunity to hear lectures from truly legendary crystallographers. I learned about strategies for data collection from Zbigniew Dauter, and about overcoming difficulties during phasing from Gerard Bricogne and George Sheldrick. Perhaps the most enjoyable aspect of the ACA meeting were the poster sessions, in which I learned not only of the great successes of fellow graduate students, but also of their struggles and how they were able to develop strategies for overcoming these obstacles. It was my great pride to discuss with these brightest of minds my own research, and I eagerly anticipate future discussions at the ACA 2009 meeting in Toronto.

David Critton

As a third year graduate student, I am extremely thrilled to have been a recipient of a lecture opportunity and the travel award for ACA meeting. The travel grant



provided me an excellent opportunity to present my research at the meeting as well as interacting with top experts in the field. The ACA Knoxville meeting will be an important milestone in my science career, having exposed me to research conducted in virtually every aspect of crystallography related research very early in my career as a structural biologist. This meeting helped me understand that there is much more than just doing experiments. Thank you again, ACA.

Ray Changrui Lu



I would like to thank the ACA for the travel grant which enabled my participation in the conference. This was my first ACA meeting and a thoroughly enjoyable experience! There were three sessions on supramolecular chemistry, which were especially valuable to me as the talks related directly to my area of research. From these sessions I gained valuable insight into my field. It was also very interesting to learn about the diversity of work relating to crystallography outside of my direct field of research. I presented

a poster during this meeting, which was another first for me. Being able to talk about my research to an audience interested in what I do was very rewarding and I was given some good suggestions for my work. For me the best part was all the people that that I got to meet. From professors whose papers I read, but have never met in person, to other graduate students. Finally, getting the opportunity to visit Oak Ridge National Laboratory was an added bonus to visiting Tennessee. Thank you once again for giving me this wonderful opportunity!

Ilana Goldberg



I would like to thank the ACA for the generous travel award, giving me the ability to attend the meeting in Knoxville. This was my first opportunity to be present at an ACA meeting, and I found it very valuable both academically and personally. The diverse set of workshops, talks and discussions gave me the ability to greatly expand my knowledge of crystallography, crystallographic techniques and complementary methods such as SAXS. In particular, I found the session "Engaging your Brain" to be very useful and informative on the methods that can be used to solve a difficult structure.

I would also like to thank the ACA for the opportunity to present my work at a poster session. Discussing my research with other crystallographers and scientists was a very worthwhile experience. In addition, attending the awards banquet and mixers afforded me the opportunity to discuss research in a less formal setting. As a graduate student looking forward to furthering my career, I found

the discussions and other networking opportunities presented at the meeting very insightful in relation to the challenges and excitement that lie ahead in the field.

Thank you again for the positive experience, and I look forward to attending future ACA meetings.

Robert C Spitale



Thanks to the travel grant from the ACAI could very happily accept my first invitation to speak at an international conference. Speaking at the "Macromolecular Dynamics" session allowed me to enjoy interesting discussions with several scientists and I thank Joseph Curtis for inviting me. In the other sessions, the excellent talks from renowned speakers lived up to my high expectations, but I was also very impressed by the quality of the 'Etter Early Career Award Symposium' and many posters. In short, great science, super-friendly people, excellent conference dinner and general organization...

Kathleen Wood

As this was an international year the USNCCr gave out travel grants to help students attend the IUCr Congress in Osaka. Following are the impressions of the Congress formed by some of the travel awardees.



I would like to thank the USNCCr for selecting me for a travel award to attend the IUCr 2008 triennial congress in Osaka, Japan, thus giving me an opportunity to become involved in the broader, international crystallographic community. I first learned of the IUCr travel awards through the ACA. As this was my first IUCr congress, I was constantly comparing it to ACA meetings, so I was struck by the scale of the congress. I met with five members of the National Committee during the congress (not counting the buffet), and I found the interactions enlightening, especially with regard to the various interlocking crystallographic associations and the IUCr's system of international representation.

My primary goal in attending the congress was to learn about the latest advances in instrumentation, software, crystallization technology, and neutron crystallography. Thus, I particularly enjoyed the Software Fayre and the sessions on x-ray microbeams, new advances in crystallization, and neutron structural biology. The rest of the scientific program was also very exciting. I attended the Ewald lecture, a section on computational methods, three poster sessions, as well as sessions on complementary methods, membrane protein structures, drug

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discovery/design, diffractive imaging, new neutron sources, structural genomics, modulated structures, and one of the meetings of the General Assembly.

Facilitation of international scientific cooperation is one of the goals of the IUCr, and I am pleased to say that I made several contacts with US and international scientists working in my field. In my work I have encountered a problem with refining a macromolecular x-ray structure beyond 0.8 Å, and at the IUCr meeting I had the privilege of discussing the problem and possible explanations and solutions with Zbigniew Dauter (an expert in data collection) and Garib Murshudov (a leading developer of crystallographic refinement software). Presenting my work at the poster session led to discussions with more than 20 scientists from around the world.

Thank you, USNCCr, for sending me to this very productive and enjoyable meeting!

Anna Gardberg



I would like to express my sincere appreciation for the travel award to the recent IUCr congress in Osaka, Japan. If it were not for this award I would not have been able to attend the meeting. I am a fourth year graduate student pursuing my PhD in the Laboratory of Structural Biology at the University of Alabama in Huntsville. While our lab is well equipped, there is rarely any funding available for students wishing to attend international meetings. This is unfortunate because I believe students like me who attend smaller institutions have the most to

gain by attending these meetings. In a fast changing field like that of structural biology it is difficult to stay up to date and be competitive if you don't know where the bar has been set. Often times students and even principal investigators who are not well informed can suffer for what I call "delusions of grandeur". I have been fortunate that my advisor, Joseph Ng, is well connected within the field and has encouraged me to attend many conferences. In the last three years I have attended and presented at the 11th ICCBM conference in Quebec (2006), The Biology of Genomes conference, Cold Springs Harbor, NY, USA, (2006), the RAMC conference in San Diego, Ca (2007) and the ACA meeting in Knoxville (2008) which is only a short drive north. However, having never traveled outside of North America, I really wanted to get the chance to see what was happening outside the US and I knew that attending the Osaka IUCr would be a great way to accomplish this goal. I believe now more than ever it is important for scientists to understand other cultures in order to be able to form beneficial collaborations at the international level. When my advisor informed me that he could afford to send me if I could attain some travel assistance I sent in my application for this award. I was delighted to find out that I had received the award. However, I must admit I was a little apprehensive about traveling to Japan solo. I get lost in my own neighborhood from time to time and I was a little intimidated by a large city with no signs in English. It turned out to be easier than I expected thanks to some pre-trip planning and the very informative IUCr conference website.

My networking opportunities began almost immediately upon landing in Osaka. I rode the bus from the airport with B.C. Wang and John Rose from the University of Georgia, Athens GA. This was timely because while I had met Dr. Wang on a couple of occasions I had not really spoken to him about my research. Having recently solved one of my protein structures using the sulfur-SAD method, this was the topic of conversation. He told me about the recent efforts of his lab to monitor the anomalous signal during data collection as a way to determine how

much data you needed to collect. Upon arriving at the hotel I was impressed with the ethical standard exhibited by the hotel personnel. Tips were refused and bottled water, personal care items, and even a laptop computer was offered to the guests free of charge.

I loved the way the conference was organized into microsymbiosia with each day essentially having its own theme. I spent most of my time in the main hall. However, I did venture out to hear several interesting talks on new decision making algorithms and recent advancements in automated structure solution software. If I had to pick one word to describe a theme for this year's conference the word would be "Complexes". Membrane protein structures and neutron crystallographic structures also highlighted the conference as well. One stat that stood out in my head was that more neutron diffraction data has been collected this year than all the past years combined. I was very interested in the talks on neutron diffraction because new beams for macromolecular neutron crystallography are coming online in the next few years at Oak Ridge National Lab (ORNL) which is close to home. I also had a chance to meet and talk with a potential collaborator from ORNL- Leighton Coates. My advisor had discussed collaborating with him to attempt to gain mechanistic insights into two of the enzyme substrate complexes I have solved as part of my ongoing PhD work. Both enzymes utilize activated water molecules as part of the reaction scheme and the protonation states of the key active site residues are important to fully understand the reaction mechanism. I have also been able to grow some pretty chunky crystals using the counter diffusion technique of these two enzymes. For these reasons my advisor had suggested collaborating to obtain neutron data for these proteins. Just recently we have met with the people at ORNL and we may have established a working relationship with them. While the beamline at Oakridge is not online yet it looks like I may have other opportunities to collect some data at Los Alamos this year or in Japan next year. The contact made at the IUCr definitely helped in facilitating this collaboration. In addition to an encouraging conversation with my

mentor William Duax at the awards dinner I also got a chance to meet Anna Gardberg also from ORNL and she was actually the one that told me that Leighton Coates was attending the conference and also gave me some good advice about deuteration of crystals for neutron diffraction which I have successfully employed.

I felt more like part of the field at this conference than in previous ones, I was pleasantly surprised to see lots of familiar faces from previous conferences. I talked to a couple of fellow PhD students who I met at the ICCBM conference in Quebec a couple of years ago. It was encouraging to hear of their successes and we spent some time discussing some of the lingering problems associated with our research and where we saw ourselves in the coming years. I must say there were less American graduate students at the conference than I had originally expected. I assumed this was largely due to the escalating cost of travel. This made me even more appreciative of the travel fellowship award.

As far as technology used to complement crystallography, Cryo-EM has really advanced in recent years and I thought these talks complemented the talks on viruses and large macromolecular complexes nicely. I also gained a lot from the talks on structure based drug design. I was really interested in the talk on "antigen transplantation" and "antigen cloaking" two concepts I had never been introduced to. I also took away some knowledge about how I can use mass spec to gain insight into RNA-protein complexes. I have solved the structure of a piwi-argonaute protein and I have collected the data and completed the NMR backbone assignments to examine siRNA binding. However, from what I saw in several of the talks it may be possible to obtain the data I need using ESI-MS. To make a long story short, I benefited much from this conference. In terms of knowledge, potential collaborations and new friendships, it is hard to fit it all into this two page report. Even after more than a month I am still "pumped up" about my research and the future of the field of structural biology. I now know where the bar is and I am encouraged that I can contribute towards continuing advancements in the field. Therefore I

will conclude by simply saying "Thank you, Thank you, Thank You" for the travel fellowship. It has meant so much to me and to my future career as a crystallographer. The IUCr was the best conference I have attended and I cannot wait till the next one.

Ronny C. Hughes



Konnichiwa!! I would like to thank the USNCCr for the travel grant to the 2008 IUCr General Congress and Assembly. Without this award I would not have been able to attend this meeting to present my research. I would also like to thank the Japanese organizers for putting on a very well run and organized meeting. This is my second experience at an IUCr Congress and each meeting seems to get better.

Once again, the quality and scope of the science in Osaka was outstanding. Moreover, I was very impressed with the diversity in the attendees. While walking around all the wonderful posters, I was able to meet a number of young and established scientists from the US, Japan, Canada, UK, Korea, and Taiwan. From them I was able to learn new tips and tricks that could be useful in my own research. For example, the Japanese groups have developed very elegant techniques to improve crystal growth and handling and the European synchrotron microfocussed beamlines are able to determine structures from tiny microcrystals using $1 \times 1 \mu\text{m}$ focused x-rays. This is all very impressive and exciting for macromolecular crystallography. Being able to see the cutting-edge research performed in other countries and applying them to your own research is definitely

one of the main benefits of attending an IUCr congress. In addition, the IUCr was a perfect opportunity to connect and reconnect with former colleagues and professors from Canada.

Many thanks to the IUCr and US National Committee for Crystallography for their support. I look forward to the 2011 IUCr meeting in Madrid- see you there.

Jeff Lee

This was my first IUCr meeting and without the travel award from the USNCCr I probably would not have been able to attend the conference. Neither I nor my advisor had funds to cover all of the expenses associated with attending the meeting.



All of the conferences that I had attended in the past were held in the United States. These meetings were predominantly attended by US researchers and as such my network was limited. The Congress, conversely, provided a forum in which I could also meet and interact with international scientists. Within my own field, specifically, I was able to establish contacts with groups working in Australia and South Africa. I believe that we will continue to have thoughtful discussions regarding our research and also find it likely that these contacts may foster future collaborations.

During the congress, I had dinner with members of the USNCCr and I also spoke with many of them during the poster sessions and in between talks. While many of these conversations/interactions centered on research (always useful), I

also had the opportunity to speak with a few members about their development as a researcher. I found these conversations not only interesting but particularly useful as they improved my perspective on my own career. Though I had heard of the USNCCr prior to applying for a travel award, I had no prior knowledge regarding their activities or responsibilities.

I very much enjoyed the scientific program and thought that it effectively covered a range of topics and found that many of the sessions and topics were relevant to my own research. I had the opportunity to attend talks by some very prominent researchers within my field wherein fascinating new results were discussed. I also found attending talks outside my field to be extremely useful in that they inspired new ideas and alternative ways of approaching my research.

Karah Knope



This was not only my first time attending the IUCr but also my first time visiting a different continent. The Congress broadened my networks foremost by making me aware of the crystallography going on internationally. I was able to see talks about projects I would not have necessarily read papers about. Because of this, I have a much better idea about what kind of projects people are working on internationally. I was also able to meet a competitor for my project (who is from Japan), show him my poster, and discuss why our results were different. I felt the scientific content of this meeting was very diverse, yet still had plenty of sessions on macromolecules, which is what I am

focused on. Within the macromolecular talks, there were plenty of interesting structures and techniques presented, some of which I hope to make use of in the very near future. From my experience at the IUCr in Japan, I am much more likely to attend international conferences in the future. I think one obtains knowledge and ideas that are not necessarily big or hot topics nationally. Also, the chance to meet people and establish new collaborations or contacts is much more likely when you can physically meet with them.

Medora Huseby

I'd like to thank the USNCCr for the generous travel support, which made my attendance to the IUCr congress in Osaka, Japan, possible. This was my first international congress and it was an excellent opportunity to present my work to, and interact with, colleagues from all over the world.

The poster sessions in particular were a great place to meet and talk with young scientists, and the discussions with them were both motivating and enjoyable.

Portions of the congress that I found intriguing included the microsymbiosia on "Interface Between Cryo-EM and Crystallography"; the high-resolution cryo-EM available today can provide tools for accurate modeling of macromolecular complexes and may soon shed light on research related to mine. The method of the selenate substitution in the crystallization conditions containing sulfate for obtaining phases introduced by Jakoncic Jean is something that I would like to try in the future.



In addition, the microsymbiosia on structural pharmacology was of interest to me, as the pharmaceuticals industry is one of my career options. The talks on drug design by means of crystallography and other powerful tools such as SPR and NMR were very informative. It was very fascinating to see how small structural changes introduced to candidate compounds can drastically improve drug potency.

There was also an excellent keynote lecture by Tom Blundell where he discussed the importance of the collaboration between academia and industry in the field of structural pharmacology.

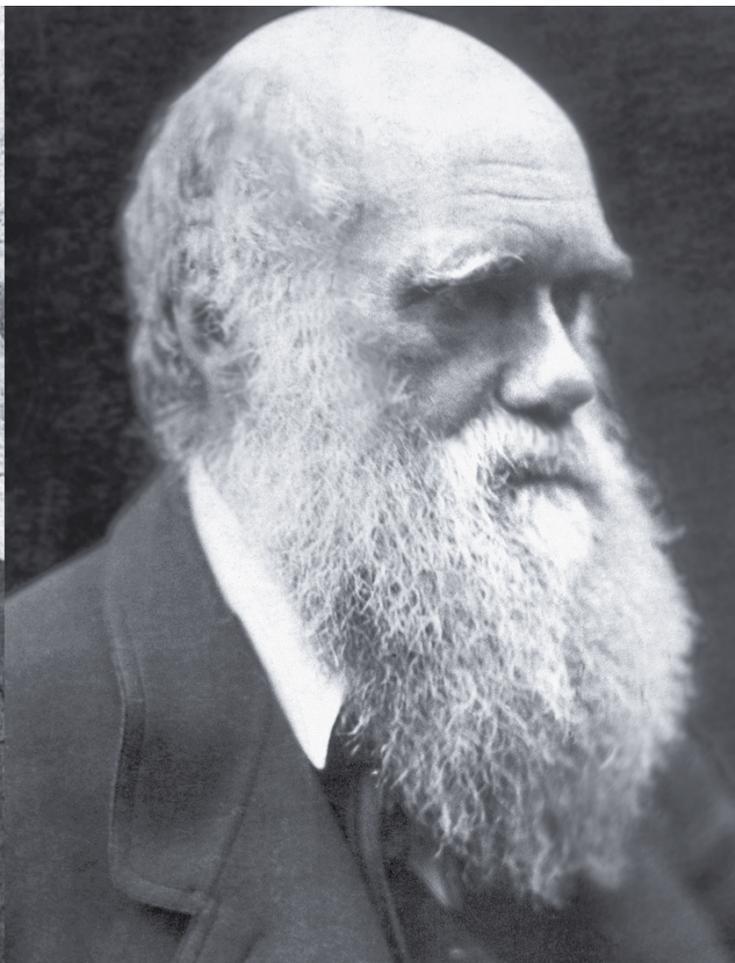
In addition to the knowledge and contacts I gained, the setting for the meeting was also exceptional. I am originally from Japan, and it was the first time in 6 years (since I began my studies) that I have been back - I deeply enjoyed the time I could spend there.

The Congress was truly a valuable experience, and I am very grateful to the USNCCr for this opportunity.

Shiho Tanaka



I would like to say my deepest thanks to the US National committee for Crystallography for the travel award which allowed me to attend the 21st IUCr congress in Osaka. It was a great opportunity to participate in a big international conference and also to visit a country with such ancient traditions. The scientific program of the conference was very broad and intense. I believe that



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everything related to crystallography was covered. Nevertheless topics related to my own research were very well represented too, both at morning and evening sessions. Sometimes I would like to have attended two different lectures held at the same time in different rooms. I am glad I was able to make new contacts with scientists from different parts of the world and also to establish better communications with people I met before. What was even more important was to extend my field of view and understand better new tendencies in adjacent scientific areas. I learned a lot about different methods and applications in fields I had not been familiar with before. Also listening to oral presentations and talking during the poster sessions helped me to generate new ideas in my own field of interests. It gave me a new fresh look and allowed me to reach out of routine practice.

Vladimir Zhurov

I first heard about the congress at the last IUCr in Italy, which I attended. I certainly would have attended the conference without the travel award; however, the financial support is greatly appreciated. I was made aware of the travel award via discussions with my former PhD advisor Nick Sahinidis.



The IUCr is certainly the most diverse conference I have attended in the area of crystallography, both with respect to research focus and geographic location of the attendees. I mostly made new

contacts with scientists who live outside the United States, the country in which I reside. I was not specifically interested in new collaborations, but I certainly made some new friends.

The scientific program was comprehensive. Our research involves phasing algorithms, and the logistical placement of my poster greatly facilitated my ability to interact with individuals with similar research interests. The conference certainly elucidated new and exciting research directions both through my attendance of seminars and discussions with peers in the field.

The conference attendees were very diverse: from famous crystallographers to students just starting their PhD research.

There were certainly a large number of 'young' crystallographers particularly at the poster session, including myself.

The IUCr is a big event, and thus, generally seems to attract a much larger crowd from the world of crystallography. You never really know how much a person can help your research until you meet them, even if their particular field seems unrelated. The IUCr certainly provided this melting-pot of interactions more than any other crystallography conference I have attended in the past.

I would like to thank again, the US National Committee, for the generous travel award; an opportunity to share ideas, learn new things, and enjoy the delicious cuisine in Osaka.

Alex Smith

USNCCr - Report on the 21st IUCr General Assembly

The 21st General Assembly (GA) of the IUCr met on the evenings of 24, 25, and 28 August 2008. The US Delegation consisted of James Kaduk (chair), Katherine Kantardjieff, Judith Flippen-Anderson, Brian Toby, and Victor Young. Marvin Hackert (alternate), Bernie Santarsiero, and Ana Ferraras (NRC staff) were present as observers. The GA started with a theoretical total of 79 delegates, but a few delegates were absent.

An application for Category I (1 vote) membership was received from a Regional Committee of Crystallographers from Algeria, Latvia, Morocco, Tunisia, Turkey, and Ukraine. Their dues have been guaranteed by the European Crystallographic Association for two triennia. An application for Category I membership was also received from a Regional Committee of Crystallographers from Bangladesh, Malaysia, Singapore, Thailand, and Vietnam. Their dues have been guaranteed by the Crystallographic Association of Japan and the Society for Crystallographers in Australia and New Zealand for two triennia. Both applications were accepted by the GA, resulting in a new total of 81 potential delegates. Venezuela had been suspended automatically in 2007 for non-payment of dues.

The adhering body from Korea is now the Korean Crystallographic Association (formerly the Korean Federation of Science and Technology Societies). India increased its membership from Category II to Category III (3 votes).

The US proposed several changes to the IUCr Statutes and By-Laws that were explained in detail in summer issue of *RefleXions*. Jim Kaduk gave a presentation on these proposals to the delegates during the first session of the GA. IUCr President Y. Ohashi opposed the changes from the podium and Secretary-Treasurer S. Lidin summarized the Executive Committee (EC) discussions indicating that the majority of the members of the EC were also not in favor of the proposed changes. There was a short discussion after which Ohashi reminded the GA that a 2/3 majority was necessary to approve changes to the By-Laws and called for a vote by the show of hands. The proposal to add representatives from each of the Regional Affiliates to the EC received 12 yes votes, the proposal to allow individuals to speak at the GA received 35 yes votes, and the proposal to require multiple candidates received 25 yes votes. No call for no votes or abstentions was made. All proposals were rejected.

In his comments on the EC report, Secretary-Treasurer Lidin noted that the IUCr uses three currencies - Swiss francs, UK pounds, and US dollars - and that fluctuations among them had depressed the overall financial results. The Union's investments are currently 53% stocks, 10% bonds, and 35% cash. The Union has unrealized stock market losses, but there is no need to realize them; it has enough liquid resources to wait for the market to recover. The Union made many capital investments from 200-2005, investments which decreased reserves but resulted in a state-of-the-art publications system.



US Delegates: Vic Young, Kathy Kantardjieff, Jim Kaduk (Chair), Judy Flippen-Anderson, and Brian Toby. In Front: Ana Ferraras (NRC staff)

Most of the business concerning publishing and non-publishing Commissions was routine. Howard Flack has retired as Chair of the Committee on Electronic Publishing, Dissemination and Storage of Information, and a new chair has yet to be selected. There apparently is no chair for COMCIFS. Henk Shenk reported that there are seven new books in the pipeline for the IUCr book series. The GA approved the creation of a new Commission on Crystallography in Art and Cultural Heritage. Also approved were several changes in the number of members of various non-

publishing Commissions. Davide Viterbo suggested that IUCr support more local crystallographic meetings, with the possibility of meetings in languages other than English to meet local needs. The 22nd GCA was confirmed in Madrid, 22-29 August 2011. Lunch will be included in the registration fee, according to the model of Florence.

In 2007, the USNCCr nominated (sometime multiple) candidates for (almost) all of the Commissions. Many of our candidates were successful, and the current US members of the Commissions are: Biological Macromolecules – Tom Terwilliger; Charge, Spin, and Momentum Densities – Pedro Montano; Crystal Growth and Characterization of Materials – Christine Klemenz; Crystallographic Computing – Ralf Grosse-Kunstleve; Crystallographic Teaching Kathy Kantardjieff and Miriam Rossi; Electron Crystallography – L. D. Marks (Chair); High Pressure – Przemyslaw Dera (chair) and Ross Angel; Mathematical and Theoretical Crystallography – Daniel Litvin; Neutron Scattering – Bob Bau; Powder Diffraction – Simon Billinge and Brian Toby; Small Angle Scattering – Andrew Allen and Peter Jemian; Structural Chemistry – Alicia Beatty and Synchrotron Radiation – Sungsik Lee.

The GA voted not to raise the annual dues, even though a large deficit is expected. The dues for the US, therefore, remain at 15000 Swiss Francs per year.

Three proposals for hosting the 23rd CGA (2014) were received: Canada (Montreal), Czech/Slovak Republics (Prague), and India (Hyderabad) and Canada was chosen. The next order of business was the elections of officers and members of the EC. Sine Larsen was elected over Chris Gilmore as President. Peter Colman and S. Lidin were elected Vice President and Secretary-Treasurer without a vote as there were no opposing candidates and no nominations had been received from the floor.



USNCCr members at their fall meeting. Back row: Doug Ohlendorf, Peter Vekilov, Andrzej Joachimiak, Cora Lind, Bill Duax, Cheryl Klein Stevens, Brian Toby, Joseph Ng, Vic Youg, Jennifer Swift. Front row: Bernhard Rupp, Miriam Rossi, Bernie Santarsiero, Paul Voyles, Roger Pynn, Kathy Kantardjieff, Julia Chan, Bob Von Dreele, Steven Sheriff, Marv Hackert, Jim Kaduk

The voting procedure for regular members of the EC is cumbersome. A 50% majority is required for election, and there were 8 candidates for the 3 6-year terms and one 3-year term (created by election of Peter Colman). After several rounds of voting the new 6 year term members of the EC are J. M. Perez-Mato (Spain), Louis Delbaere (Canada) and E. Boldyreva (Russia). Claude Lecomte (France) was elected to fill the 3 years remaining in the term of Peter Colman who had been elected Vice-President. As a result, with Bill Duax (Past-President) rotating off the EC, for the first time in the 60 year history of the IUCr there will be no US member of the Executive Committee for 2008-2011.

James Kaduk, Chair USNCCr

Senate Economic Stimulus Bill Includes New Science Funding

One of the first actions the new 111th Congress will take in January is the passage of a massive economic stimulus bill. At a news conference yesterday, President-Elect Barack Obama said the deteriorating economy “has made it even more clear that we are facing an economic crisis of historic proportions,” and called on Congress to ready a bill for his signature. “We cannot hesitate and we cannot delay,” Obama stated.

Obama’s views are shared by the Democratic congressional leadership, with House Speaker Nancy Pelosi (D-CA) and Senate Majority Leader Harry Reid (D-NV) announcing their intention to move quickly. Various dollar figures are being discussed for this legislative package, all in multiples of hundreds of billions of dollars.

There are indications that an economic stimulus bill could contain significant new dollars for several science agencies. On November 17, Majority Leader Reid and Senate Appropriations Committee Chairman Robert Byrd (D-WV) introduced S. 3689 that would, Byrd told his Senate colleagues, create 635,000 jobs. The \$100.3 billion bill includes \$1,659.0 million in new science-related spending. The following is the bill language from S. 3689 as it pertains to selected DOE, NASA, USGS, and NIH programs:

Department of Energy:

“For an additional amount for ‘Science’, \$175,000,000, to remain available until expended.

NASA:

“For necessary expenses, not otherwise provided for, in carrying out return to flight activities associated with the space shuttle and activities from which funds were transferred to accommodate return to flight activities, \$400,000,000, with such sums as determined by the Administrator of the National Aeronautics and Space Administration as available for transfer to ‘Science’, ‘Aeronautics’, ‘Exploration’, and ‘Space Operations’ for restoration of funds previously reallocated to meet return to flight activities.”

U.S. Geological Survey

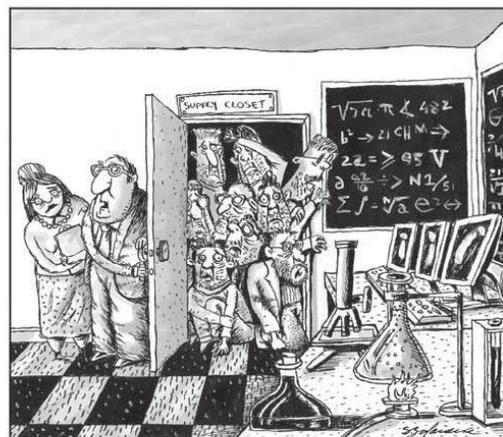
“For an additional amount for ‘Surveys, Investigations, and Research’, \$84,000,000, to remain available until September 30, 2010, for repair and restoration of facilities and other deferred maintenance projects.”

National Institutes of Health

For an additional amount for ‘Office of the Director’, \$1,000,000,000, which shall be transferred to the Institutes and Centers of the National Institutes of Health and to the Common Fund established under section 402A(c)(1) of the Public Health Service Act in proportion to the appropriations otherwise made to such Institutes, Centers, and Common Fund for fiscal year 2008: Provided, That funds shall be used to support additional scientific research and be available for the same purposes as the appropriation or fund to which transferred: Provided further, That this transfer authority is in addition to any other transfer authority available to the National Institutes of Health: Provided further, That none of these funds may be transferred to ‘National Institutes of Health--Buildings and Facilities’, the Center for Scientific Review, the Center for Information Technology, the Clinical Center, the Global Fund for HIV/AIDS, Tuberculosis and Malaria, or the Office of the Director (except for the transfer to the Common Fund).”

S. 3689 contains additional DOE funding for its programs in Energy Efficiency and Renewable Energy, Electricity Delivery and Energy Reliability, Advanced Battery Loan Guarantee Program, Uranium Enrichment Decontamination and Decommissioning Fund, Non-Defense Environmental Cleanup, and Weapons Activity.

*Richard M. Jones -FYI American Institute of Physics
rjones@aip.org*



“It’s been eight long years but we are going to see if they can be revived by releasing them back into their natural habitat.”

Illustration by Steve Zafarana, Norwood, MA – one of the twelve finalists in the 2008 Science Idol Contest conducted by the Union of Concerned Scientists (www.ucsusa.org)

2009 ACA Buerger Award to Michael James

The award recognizes Michael's long career in protein crystallography during which he has been responsible for the discovery and delineation of many protein structures that were landmark achievements in structural biology. He has trained numerous crystallographers that have passed through his laboratory in Edmonton. His career is best described by Michael himself in the following note that has been abstracted from his article on the history of protein crystallography in Canada. The full article will be published as part of the anthology of Canadian crystallography in an upcoming issue of the IUCr News.



Dorothy Hodgkin's laboratory in the University of Oxford was a Mecca for those wanting to learn the methods of Protein Crystallography. Two Manitobans were privileged to study with Dorothy in the 1960's: Carol Huber (Saunderson) and myself. I arrived in Oxford in the fall of 1963 and while I did not work on the insulin project, I did catch the bug to work on the structures of proteins. This occurred in 1965, when I traveled with two fellow researchers from Dorothy's group, Ken Watson and Tony Cooper, to London to attend the unveiling of the lysozyme structure. David Phillips headed the team of researchers (including Tony North, Colin Blanke, and Louise Johnson) that solved this structure at 2.0Å resolution. This really was an inspirational experience, to see the structure of hen egg white lysozyme, the first enzyme to have its structure determined. I was determined to work on the structures of enzymes from that day forward!

In December of 1966, I returned to Canada and joined Dave Hall in the Chemistry department at the University of Alberta. Dave was a small molecule transition metal crystallographer who was starting one of the first crystallographic laboratories in Alberta. I had the good fortune to work as a post-doc in Dave's laboratory on structures of small monosaccharides having a variety of halo-substituents on the C1 atom of the pyranose ring. This research was a collaboration with Ray Lemieux, one of the world's most renowned carbohydrate chemists for having chemically synthesized sucrose. In late 1967, I received a phone call from Larry Smillie and Cyril Kay both members of the Biochemistry department at the University of Alberta. Cyril and Larry wanted to start a protein crystallography group to assist in structural studies of molecules in which they were interested. Having obtained my name from Manpower Canada under the job category of 'crystallographer', Larry and Cyril invited me

to join the department of Biochemistry provided I received a scholarship from the Medical Research Council of Canada (MRC) to support my research and salary. After being successful with this MRC application, I started my forty-year long career in the Department of Biochemistry in July 1968.

The first protein structure determined in Canada was done in my laboratory in Alberta. SGPB is the B Protease, a proteolytic enzyme from the soil bacterium, *Streptomyces griseus*; it is closely related in sequence and structure to α -lytic protease. The paper describing the molecular details of the 2.8Å resolution structure was published in *Nature* in 1975. SGPB had the same disposition of aspartate, histidine and serine residues, as did α -chymotrypsin. It also had the 2 beta-barrels that constituted the major fold of the molecule. SGPB and α -chymotrypsin were clearly related evolutionarily even though one was from a cow and the other from a bacterium. Other proteolytic enzymes from *Streptomyces griseus* that our group solved were SGPA and the trypsin-like enzyme, SGT. SGPA constituted the major part of the work that Gary Brayer did for his PhD and Randy Read did the work on SGT for part of his PhD research. Many other people played major roles in the early stages of our protein structural studies: Penny Coddling, Wendy Hutcheon, Masao Fujinaga, Louis Delbaere, Bill Thiessen, and the biochemists who isolated and purified the original enzyme preps, Lubo Jurasek, Larry Smillie, and Peter Johnson.

Other leading protein crystallographers in the Department at that time included my friends and colleagues Bob Fletterick and Wayne Anderson. Bob had done a post-doctoral with Tom Steitz at Yale, where he worked on the structure of hexokinase. When he moved to Edmonton he worked closely with Neil Madsen on the structure of rabbit muscle phosphorylase a. Two very capable post-docs helped Bob in this task; their names were Jurgen Sygush and Steve Sprang. Together this team solved the structure of phosphorylase a and used the structure to interpret many of the details of the catalytic mechanism. The sugar binding sites for the glycogen molecule were visualized and the pyridoxal phosphate bound to lysine was identified. This was a momentous achievement in those early days of protein crystallography. With 841 amino acids it was the largest enzyme to have its three-dimensional structure determined.

Wayne Anderson, who also graduated from Tom Steitz' laboratory in Yale, came to the MRC Group after a post-doc in Brian Matthews' lab in Oregon. Wayne brought a different interest to the department. He was part of the team that solved the structure of the DNA binding protein Cro repressor from phage lambda. This structure revealed a paradigm for protein-DNA interactions, that of an α -helix binding in the major groove of the DNA double helix. Interestingly, this binding mode had been predicted by Gordon Dixon, a biochemist at the University of Calgary. With Wayne's help we were successful in purchasing one of the first multiwire detectors from Ron Hamlin in San Diego. This was a huge advance in the data collection speed in Alberta and we used it to tremendous advantage. These past 40 years that I have been a member of the department of Biochemistry have been truly rewarding. I owe a great debt to all of those who have supported me during that time.

2009 ACA Warren Award to Shih-Lin Chang

Shih-Lin Chang was trained as an x-ray physicist and crystallographer from 1971 to 1975 in the well-known Fankuchen x-ray diffraction laboratory of the Polytechnic Institute of Brooklyn under the guidance of the late Benjamin Post. After his graduate study in the US, he went to Brazil to accept a faculty position at the State University of Campinas and stayed there for ten years (1975-1985). From 1981 to 1982 he spent one and a half years



at the Max-Planck Institute for Solid State Research as a visiting scientist, where he had access to the synchrotron facility at DESY, in Hamburg, Germany. During that period he proposed a multi-beam diffraction solution to the long-standing x-ray phase problem by using three-beam interference effects (*Phys. Rev. Lett.* **48**, 163 (1982)). That solution is valid for the determination of x-ray reflection phases for centrosymmetric crystals on a qualitative basis. This breakthrough has resulted in invited articles published in 'Action in Physics; of the *Physics Bulletin* of the Institute of Physics (GB) and in 'Aus der Wissenschaft' of the *Physikalische Blätter*, of the German Physical Society.

In 1986, he returned to Taiwan to help start the Taiwan synchrotron project in Hsinchu, while teaching at Tsing Hua University. At Tsing Hua he continued working on the x-ray phase problem and developed in 1988 a quantitative phase determination method (*Acta Cryst.* **A44**, 1065; 1073 (1988)) for non-centrosymmetric crystals such as proteins. The first experiment of quantitative phase determination for large macromolecular crystals was reported in 1991 using synchrotron radiation (*Phys. Rev. Lett.* **67**, 3113 (1991)). With the energy tunability of synchrotron radiation he also developed a surface three-beam resonance diffraction technique, that is capable of determining x-ray phases of surface in-plane reflections from layered materials and thin films (*Phys. Rev. Lett.* **80**, 801 (1998)). Owing to this achievement, he was invited to write an article for the book "Crystallography Across the Sciences" on the occasion of celebrating the 50th anniversary of the IUCr.

In 2001, taking advantage of the continuous spectra of synchrotron radiation, he developed a three-beam resonance diffraction technique in which he tuned x-rays to excite a constituent atom of a crystal while measuring the phase shift due to electronic transition (resonance) via three-beam interference (*Phys. Rev. Lett.* **86**, 2926 (2001); *Phys. Rev. B* **64**, 085406 (2001)). This quantitative phase-determination technique can be, in principle, used to investigate detailed electronic structures of solids. In the same research direction, the static and dynamic phases of charge-density-waves (CDW) (*Acta Cryst.* **A60**, 209 (2004); *Appl. Phys. Lett.* **88**, 241916 (2006)) have been measured using this three-beam diffraction technique. Additional structural information related to the transport properties of CDW and similar material systems can

be extracted from this phase-sensitive method. In addition, to overcome the difficulties encountered in the data analysis of the DAFS (Diffraction Anomalous Fine Structure), he developed a new method to link the real and imaginary parts of the atomic form factors by the phases measured from multiple diffraction experiments. This so-called multi-beam DAFS is much more atomic-site and wave-vector sensitive than the conventional DAFS for atomic and electronic structural analysis (*Phys. Rev. Lett.* **97**, 185502 (2006)).

In x-ray optics, x-ray Fabry-Perot resonators have long been proposed and pursued for decades. Very recently he has designed an ultra-high resolution diffraction experiment from micron-sized silicon crystal cavities and successfully demonstrated the first Fabry-Perot resonator for hard x-rays using x-ray back diffraction. Interference fringes due to cavity resonance have been observed (*Phys. Rev. Lett.* **94**, 174801 (2005); *Phys. Rev. B.* **73**, 134111(2006)). This is the first evidence in the literature unambiguously showing resonance fringes for hard x-rays. This observation extends the spectral range of Fabry-Perot interferometers from the visible spectra to hard x-rays.

To facilitate phase measurements using multiple diffraction, he designed an eight-circle x-ray diffractometer for hard x-rays and constructed an HV-compatible six-circle kappa diffractometer for soft x-rays for synchrotron radiation (*Nucl. Instrum. Methods, A* 466569 (2001)). Among many other honors, he has been given a life-term National Chair in Natural Science, been elected a member of the Asian-Pacific Academy of Material Science, a fellow of the American Physical Society, and Chair of the Foundation for the Advancement of Outstanding Scholarship.

David Eisenberg Honored with the Harvey Prize

David Eisenberg, a Howard Hughes Medical Institute Investigator and professor at the Univ. of California, Los Angeles, received the 2008 Harvey Prize in Human Health from the Technion - Israel Institute of Technology. The prize was given for his research on how proteins interact with each other and how these interactions are related to disease.

Eisenberg, who is also director of the UCLA-DOE Institute for Genomics and

Proteomics, studies protein interactions using x-ray crystallography, computational analyses, and biochemical methods. He has a long-term goal of understanding and manipulating the functioning of cells through the interactions of their constituent proteins. The crystallographic projects of Eisenberg's lab fall into two groups: understanding the structures that underlie the pathologies of amyloid and prions; and studying the structural biology of *Mycobacterium tuberculosis*, with particular focus on protein-protein complexes.



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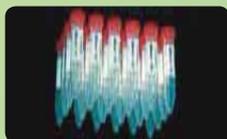


Nucleotides and their Analogs



Macromolecular Crystallography

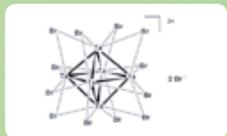
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Abstracts: March 31, 2009

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Advance Registration: May 31, 2009

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Workshops

JANA Incommensurate Crystal Structures

Friday - Saturday July 24-25, 2009

Chairs: Jim Kaduk and Olivier Gourdon

Handling Twinning in Macromolecular Crystallography

Saturday July 25, 2009

Chairs: George Sheldrick, Garib Murshudov, Peter Zwart

Award Symposia

Buerger Award in honor of Michael James

Chair: Emil Pai

Warren Award in Diffraction Physics in honor of Shih-Lin Chang

Chair: Bruce Noll

Margaret C. Etter Early Career Award in honor of Svilen Bobev

Chair: Robert Huether

Transactions Symposium

Phase Transitions - covering the whole range of phenomena from soft materials and proteins to hard materials and alloys, etc.

Organizer: Ross Angel

Sponsored by the Powder, Materials, Service, Small Molecule and General Interest SIGs

Plenary Lectures

Ted Baker and Philip Coppens

Panel Discussion

Professional Directions on Academic and Industrial Careers

Sponsored by the Industrial and YYSIGs

Microsymposia - Organized by SIGS**Biological Macromolecules**

- Crystallization Methods - Chairs: Alex McPherson & Aled Edwards
Exciting Structures - Chairs: Zhe Yang & Ladislau Kovari
Vaccine Design - Chairs: Peter Kwong & Ian Wilson
Chromatin Remodeling - Chairs: Jinrong Min & Jan-Francois Couture
Carbohydrate Recognition - Chairs: Ken Ng & Stephen Evans
"Green" Biochemistry - Chairs: Carrie Wilmot & Bernie Santarsiero

Industrial

- Application of New Technologies - Chair Matt Peterson

Small Molecule

- Cool Structures - Chair: Peter Müller

Small Angle Scattering

- Characterization of Surfaces & Interfaces - Chairs: D. Schaefer & B. Lee
SAS Modeling & Simulation - Chairs: G. Beaucage & J. Llavsky
Advances in Small Angle Scattering - Chairs: Ken Ng & Stephen Evans
Structure of Nanophase Materials - Chair: Tad Koga

Joint SIG Symposia*Neutron & Materials*

- Shape - Memory Materials - Chair: Steve Shapiro

Small Molecule & Industrial

- Supramolecular Chemistry - Chairs: Christer Åäkeroy & Gary Enright
Synchrotron, Small Angle Scattering & BioMac

- Complementary Methods for PX - Chairs: Hiro Tsuruta & Wah Chiu
Membranes & Associated Proteins - Chair: T. Weiss

Industrial & Powder

- Accuracy & Standards in Powder Diffraction - Chair: Pam Whitfield
Energy Related Materials - Chair: Ashfia Huq

Synchrotron & BioMac

- Structural Enzymology - Chairs Emil Pai & Felix Vajdos
Diagnostics During Data Collection - Chairs: Michel Fodje & Ernst Bergmann

- Instrumentation: Sources, Optics - Chairs: Marc Allaire & Craig Ogata

- Instrumentation: Detectors - Chairs: Marc Allaire & Craig Ogata

Powder & General Interest

- Educational Outreach in Crystallography - Chair: Cora Lind

Materials & Neutron

- Ferroic & Multi-ferroic Materials - Chair: Peter Gehring

- Superconducting Materials - Chair: John Mitchell

Service, General Interest & Small Molecules

- Tips & Tricks of the (Computing) Trade - Chair: Xiaoping Wang

- Problem Structures - Chair: Richard Staples

- Would you Publish This - Chairs: Carla Slebodnick & Peter Müller

- Large Small Molecules - Chairs: Christine Beavers & Ilia Guzei

BioMac and Young Scientists

- Refinement (Computational) - Chairs: Edward Collins & Peter Horanyi

Powder, Neutron, Materials & Synchrotron

- Diffraction Studies & Mechanical Properties of Engineering Materials - Chair: Ron Rogge

BioMac & Industrial

- Structure-Based Drug Design - Chairs: Duncan McRee & Eddy Arnold

Neutron & Powder

- Cooperative Phenomena in Magnetic Materials - Chair: Ovidiu Garlea

ACA Toronto - July 25-30, 2009

Going Green:

This year we will be distributing the full set of abstracts only on CDs with a hardcopy Program Schedule. We will not have a new meeting bag so if you would like one you should remember to bring your favorite from an earlier ACA meeting. In addition to making the meeting more 'Green' these measures will be more cost effective allowing us to continue offering morning and afternoon coffee breaks as well as food at the opening reception and snacks at the poster sessions without a major increase in registration costs.

Traveling to Canada:

Porter Airlines is going to start flights from Chicago (Midway) to Toronto downtown (Island) airport. This would be a good option for anyone coming from Chicagoland or surrounding areas

Non-US nationals working in the US should be able to attend the meeting and return to the US but they are advised to fully understand the travel restrictions associated with their US Visa and to be sure to get any re-entry documents that might be needed.

Please read "Traveling from the United States" on the US National Academy of Sciences website

www7.nationalacademies.org/VISAS/Traveling_from_US.html

Exhibit Show 2009

An exhibition of the latest instruments and techniques for sample isolation, purification and preparation, crystal growth and data collection, computer software for data storage, retrieval analysis, graphics systems, databases, and books, journals and other materials essential to modern crystallographery is scheduled to begin on the evening of Saturday, July 25 in conjunction with the Opening Reception. The 2009 Show will run through Tuesday evening July 28th. The exhibit show will be closed on Wednesday July 29th but posters will remain accessible. The Advertising and Exhibits Div. of the American Inst. of Physics is managing the show. For further information contact Bob Finnegan, AIP, 2 Huntington Quadrangle, Suite 1NO1, Melville, NY 11747, rfinneg@aip.org, ph. (516) 576-2433; fax (516) 576-2481. ACA Corporate Members will receive 10% off one booth fee. Not a member? Join now!

Not-for-profits groups are eligible for a discounted booth fee of \$400 for one booth. Booth rental is \$1,400 for all others.

[Register online at www.AmerCrystalAssn.org](http://www.AmerCrystalAssn.org)

Registration fees

Fee	Advance	Late
	(before May 31)	(after May 31)
Regular Member	\$400	\$600
Retired Member	\$160	\$240
Post doc Member	\$200	\$300
Student Member	\$160	\$240
Nonmember*	\$600	\$900
Post doc Nonmember*	\$300	\$450
Student Nonmember*	\$240	\$360
Guest**	\$ 50	\$ 50
WK.01 (fee includes lunch)	\$130	
WK.02		
(2 days - fee includes lunches)	\$250	
Mentor/Mentee Dinner		
Mentor	\$35	
Mentee	\$25	
Banquet	\$60 (\$30 students)	
YSSIG Mixer	Free for students and post-docs	
	\$20 for all others	

* The nonmember registration fee includes a complimentary membership to the Association for 2009. Those registering as nonmember post docs or nonmember students must include documentation of this status with registration form.

**Guest registration includes Opening Reception, Exhibit Show and Get Together on Sunday morning.

Register on-line or download forms to register by fax or mail

www.AmerCrystalAssn.org
 Questions: aca@hwi.buffalo.edu



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FEBRUARY 2009

- 25-27 **Workshop : Neutrons and Xrays Meet Biology:** Helmholtz Zentrum Berlin für Materialien und Energie. www.helmholtz-berlin.de/events/biology/.

APRIL 2009

- 5-8  **The 19th West Coast Protein Crystallography Workshop.** Asilomar, CA (www.wcpcw.org). The abstract deadline is February 8, 2009. All presentation topics are welcome but an emphasis on methods is encouraged, consistent with the idea that WCPCW is an instructional workshop. Ideas for session and open-discussion topics are welcome. The schedule will be dominated by oral presentation by students and postdocs.

MARCH 2009

- 4-6 **2009 NIGMS Workshop - Enabling Technologies for Structural Biology,** Natcher Conference Center, NIH, Bethesda, Maryland. The primary focus of this workshop will be the technical issues affecting the speed, cost and success of protein structure determination. The 2009 meeting will address a wide range of topics that are applicable at all scales of effort from the individual bench scientist to high throughput research centers. The program will include oral platform and poster presentations and pedagogical sessions emphasizing the methods and technologies for protein structure determination for all classes of proteins from uncharacterized hypothetical proteins to membrane proteins and protein-protein complexes. The deadline for the submission of abstracts is February 11, 2009. meetings.nigms.nih.gov/index.cfm?event=general&ID=4931

- 9-12  **17th Annual Meeting of the German Crystallographic Society,** Hannover, Germany. www.conventus.de/dgk2009. Josef-Christian Buhl, Conference Chair. Contact Mareike Schandor, tel. 0049 3641 35 33 27 01, mareike.schandor@conventus.de.

- 18-22 **ASBMB'09 Meeting,** New Orleans, LA. www.asbmb.org/Page.aspx?id=146. Note: **Eliz Getzoff, Tina Iverson,** and **Ya Ha,** will be presenting in the *Structure & Enzymology of Membrane Proteins* symposium. **Ada Yonath** will speak in the *Ribosome Structure & Function* session, and **Chris Hill,** will speak in the *Proteasome Structure and Function* session.

MAY - JUNE 2009

- 30-3 **Small Molecule Workshop at the 92nd Canadian Chemistry Conference.** Hamilton, ON, Canada.

JUNE 2009

- 4-14 **High Pressure Crystallography: From Novel Experimental Approaches to Applications to Cutting Edge:** Erice, Italy. www.crystalerice.org/2009.htm.

JULY 2009

- 9-14  **XXV European Crystallographic Meeting.** Istanbul, Turkey. ecm25.ecanews.org/

- 25-30  **ACA Annual Meeting - Toronto, Ontario - Canada** *Program Chair: Jim Britten,* britten@mcmaster.ca.

JULY 2010

- 24-29 **ACA Meeting - Chicago, IL.**

ACA Small Molecule Summer School

June 22 - July 1, 2009

The 10-day intensive course will be offered at the Indiana University of Pennsylvania - ~ 80 miles east of Pittsburgh, PA. The course will cover both single crystal and powder diffraction and will consist of lectures in the morning, hands-on workshops in the afternoon and computer tutorials at night. While some advanced topics will be introduced (Structure solution from powder data, advanced probability methods, solving difficult structures), the curriculum will mostly emphasize fundamental crystallography and no prior crystallographic experience will be assumed. There will be at least 12 experienced teaching faculty. Attendees are encouraged to bring their own single crystal or powder samples for data collection and are expected to have completed at least undergraduate courses in chemistry, physics and mathematics and are advised to read in advance "Crystal Structure Analysis: A Primer", by Jenny P. Glusker and Kenneth N. Trueblood, Oxford Univ. Press (1985).

Some scholarships, consisting of a waiver of tuition and living costs, will be offered. The awards will be based on the student's (1) scientific ability, (2) expected benefits from the course and (3) skills in English. We encourage applications from Latin America.

Instruments at IUP include two Bruker-Nonius CAD4 single diffractometers, a Bruker D8 Advance and a Rigaku Miniflex powder diffractometer. In past years, Rigaku-Americas brought a SCXmini x-ray crystallographic system to the IUP laboratory. Students will also have access to the Duquesne University x-ray Facility (Bruker APEX II single crystal diffractometer and a PANalytical X'PertPro powder diffractometer). Each student will have access to an individual computer during the nightly tutorials. Access will also be available to the CSD and the ICDD powder diffraction data base. The software used will be Bruker-Nonius SHELXTL, Rigaku Americas CrystalClear, GSAS/EXPGUI, FullProf, CRYSFIRE and CRYSTMOL.

Information on fees, housing and registration forms can be found at www.hwi.buffalo.edu/ACA/. Completed forms must be received before May 15th, 2009 by Charles H. Lake, Chemistry Dept, Indiana Univ. of Pennsylvania, Indiana, PA 15705 or electronically lake@iup.edu. Further information will be updated on the web site or can be obtained from lake@iup.edu or craven@icubed.com

2009 Art in Crystallography Prize

ACA *RefleXions* Editors are accepting entries to the **2009 Art in Crystallography** contest in the form of images emailed to either Editor (conniechidester@earthlink.net or flippen@rcsb.rutgers.edu). Entries should be accompanied by a paragraph explaining the science and the method of producing the image. A photo of the artist would be appreciated but is not required. Prizes consist of a small monetary award and a banquet ticket at the annual meeting. Winning entries will be posted on the web and will be displayed at the ACA Meeting. (Winners are not required to attend the meeting). We will also feature images in *ACA RefleXions* from time to time. Please let us know if you are interested in being a judge.

Nominations for 2010 ACA Awards

The **Elizabeth A. Wood Science Writing Award**, established in 1997, is given periodically to authors of books or articles that bring science to the attention of a general audience. Nominations are due by May 1, 2009.

Nominations for both the **Isadore Fankuchen Award**, and the **Kenneth Trueblood Award** are due by May 1, 2009.

Nominations for the **Margaret C. Etter Early Career Award** are due by May 1, 2009.

Full details describing the criteria for all ACA awards can be found on the website (www.AmerCrystalAssn.org). All Nominations should be sent the ACA office (marcia@hwi.buffalo.edu)

2009 Dues are Due

Please renew promptly and remember to support your favorite ACA Award Funds. **NOTE: It is now possible to renew online at www.AmerCrystalAssn.org**

Nominations for ACA Offices for 2010

In the fall of 2009 we will elect a new Vice-President, Treasurer and one person to each of the ACA Standing Committees (Continuing Education, Communications, and Data, Standards and Computing). Suggestions (due by February 1, 2009) should be sent to [Alan Pinkerton](mailto:Alan.Pinkerton@uoft02.utoledo.edu) (apinker@uoft02.utoledo.edu).

Summer 2009 Travel Funds Available

Rigaku Americas Corporation will award summer travel bursaries (to be used for travel to a scientific conference) in the amount of US \$500 each to the five (5) post-doctoral fellows who provide the most compelling explanation as to how they intend to pursue a career in structural biology. Applications must be received by May 4, 2009 (www.rigaku.com/protein/postdoc.html).



What's on the Cover



Text proved by MNG James: The big crystal in the picture is Hen Egg White Lysozyme. My student Natalie Strynadka worked on aspects of the HEWL mechanism for her PhD. I chose it to put a photo of my present group inside of it because it is a huge crystal that was grown by one of the undergraduate students in our senior undergrad lab course. We all fit too! Perry used it for the cover page. Perry has been here at the Biochemistry Department longer than I have. I think he tops in at 41 or 42 years. His full name is Perry d'Obrenan and he is in charge of the DNA sequencing lab.

The people in the front row left to right are: Mridula Swayampakula, Vera Jbanova, Maia Cherney, Sarah Witholt and Ramasamy Sankaranarayanan. Second row: Leonid Cherney, Rita Whitford, Grace Garen, Bindu Pillai and Chunying Niu. Third row: Michael James, Nobuhiko Watanabe, Sheraz Khan, Craig Garen, Jiang Yin and Kathy Bateman

The small crystals are little cubic crystal of SGPB, the first protein structure solved in Canada in 1974 (to 4.5 Å) was of the Orthorhombic crystal of SGPB in 1975 (to 2.8 Å).

The structure shown on the upper left is SGPB from the Nature paper: Delbaere LTJ, Hutcheon WL, James MNG, Thiessen WE, *Nature* **257**(5529):758-63 (1975). The structure on the bottom right is of the Arginine Repressor bound with its co-repressor Arginine and the 20 base pair operator Arg-box from *Mycobacterium tuberculosis*.

Contributors to this issue

Cele Abad-Zapatero, Ellie Adman, Jim Britten, Breann Brown, Charlie Carter, Sterling Cornaby, David Critton, Louise Dawe, Theresa Detrie, Howard Einspahr, Anna Gardberg, Illana Goldberg, Jack Gougoutas, Mitchell Guss, Marv Hackert, Jon Herricot, Matthew Hudson, Ronny Hughes, Allen Hunter, Medora Huseby, Mike James, Richard Jones, Jim Kaduk, Judy Kelly, Karah Knope, Marianne Lee, Jeff Lee, Ray Liu, Efstratios Mylonas, Jim Pflugrath, Thomas Proffen, Helen Rho, John Rose, David Rose, Larry Sieker, Alex Smith, Robert Spitale, Ron Stemkamp, Hugh Stout, Shiho Tanaka, Paul Tongwa, Crystal Towns, Keith Watenpaugh, Carrie Wilmot, Corey Wischmeyer, Kathleen Wood, Clare Yannette, Victor Young, Vladimir Zhurov

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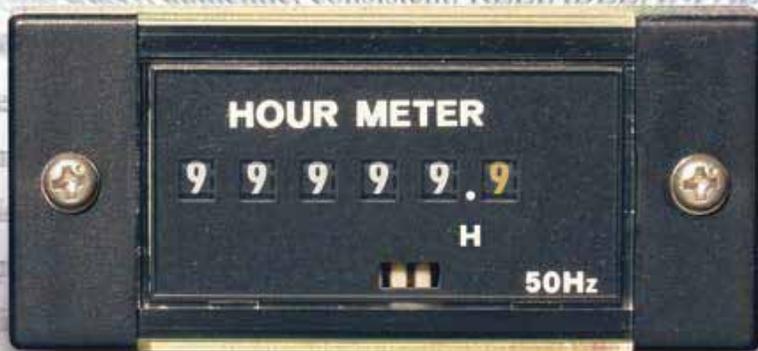
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