



The SER-CAT SPECTRUM

SER-CAT 10th Anniversary Special Edition

A Biannual Newsletter of the Southeast Regional Collaborative Access Team · Vol. 5, No. 1 · Summer 2007

Director's Message

Bi-Cheng Wang



Welcome to the Volume 5, special edition of *The SER-CAT Spectrum*. In this issue we celebrate SER-CAT's 10th year anniversary, and share with you information about our 4th Annual Research Symposium, recent Executive Board Meeting and other milestones and activities. We also provide you with exciting updates on our Membership, including the recent addition of two institutions.

Our 2007 SER-CAT Symposium and Board Meeting was held in Frederick, Maryland at the National Cancer Institute and hosted by Dr. Alex Wlodawer, and it proved to be another successful event. This year's meeting included a diverse group of researchers who shared their insight and expertise in an array of health and medical crystallography research at SER-CAT. Thanks to the warm hospitality of the NCI staff, we were able to provide guests with a meeting of truly "Interesting Structures, Methods and Approaches..." and we appreciate everyone who was able to attend.

Also, in this edition of the newsletter, we will highlight several individuals that have received awards and special recognition since the previous publication of the SER-CAT Spectrum. These include Dr. Gerold Rosenbaum, SER-CAT's Senior Beamline Scientist and previous Construction Manager as one of this year's recipients of the 2007 APS Compton Award by the APS; Mrs. Kathy Medina, SER-CAT Administrative Coordinator, for receiving a 2007 Franklin College Staff Excellence Award from the Dean of UGA's College of Arts and Sciences for her exceptional services to UGA and SER-CAT; SER-CAT Outstanding Science Award to Professor Michael Weiner, and SER-CAT Young Investigator Award to Dr. Ping Liu for their outstanding research and articles published in 2006 from data collected at SER-CAT; and a recent publication highlighted in the cover of *Nature* by one of our Members.

Overall, many great things have transpired at SER-CAT and we look forward to bringing you more scientific productivity and collaborative findings in the future.

On the personal side, I would like to express my sincere appreciation to the SER-CAT Executive Board and colleagues for giving me the first Golden Magnolia (SER-CAT's adopted flower) Award in recognizing my work with SER-CAT for the past ten years. It was a great honor to be recognized and to celebrate SER-CAT's 10th year anniversary with all of you.

We hope that you will enjoy our current issue with all of its highlights. Please feel free to share your comments and suggestions and visit us online at www.ser-cat.org. Thank you for your interest and have a terrific summer season!

The First Ten Years at SER-CAT



In June of 1997 the first organizational meeting was held at the University of Georgia to discuss the possibility of building a synchrotron beamline at the Advanced Photon Source (APS) for institutions in the southeast. More than 20 individuals from several southeast regional universities attended the meeting, which was aimed at responding to the APS' call for the organization of Collaborative Access Teams (CAT) to build beamlines at the recently completed APS storage ring (in 1996), where the brightest tunable X-ray source in the US was promised.

What began in September 1997, with an initial commitment of \$1.5 million dollars from the Georgia Research Alliance, grew into a multi-million dollar proposal in 1998 to the APS to acquire beamline space. A Memorandum of Understanding was signed between SER-CAT and APS on March 12, 1999, and on June 15, 1999 construction began for the first of two SER-CAT beamlines in Sector 22 of the

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facility. SER-CAT's ID beamline was declared operational in January 2004 and the BM beamline became operational in January 2006.

Since its origination, SER-CAT has worked hard to become one of the most premier beamlines in the country, and the world. While efforts to meet our early objectives have come to pass, we continue to focus on new initiatives that will provide better service to our users and members, such as increased data quality, accuracy and productivity, beamline efficiency, remote access, improved automation, and robotics.

As SER-CAT marks its tenth year anniversary, we would like to take this opportunity to thank everyone for their joint contributions over the past ten years, including member institutions and research groups, the construction, operations and administration teams, and the staff of the APS. Due to everyone's contributions, SER-CAT is no longer just a user facility, but an organization dedicated towards the advancement of both synchrotron and biological sciences. You each have played a part in making SER-CAT what it has become. We appreciate your support, and look forward to the next ten years and beyond. (B.C. Wang's presentation on "SER-CAT: The first 10 Years" may be found at www.ser-cat.org).

Fourth Annual SER-CAT Symposium and Award Winners



Alex Wlodawer & B.C. Wang share a laugh during the symposium.

"Interesting Structures, Methods and Advances in SER-CAT Facilities," was the theme of the 2007 Annual SER-CAT Symposium, which was held on March 16, 2007 in Frederick, Maryland, and hosted by Dr. Alex Wlodawer at the National Cancer Institute. As in 2006, highlighted were practical aspects of tools and improvements made at the SER-CAT beamlines from a user's perspective. The meeting served as an informative and interesting forum where users shared their recent significant crystallographic research discoveries. Also, attendees were graced with the bonus of a late snow storm, giving extra excitement to the meeting's activities.



Group photo of 2007 Symposium attendees at NCI in Frederick, Maryland

B.C. Wang receives the SER-CAT Golden Magnolia Award

The symposium opened with honors, as SER-CAT Director Bi-Cheng (B.C.) Wang was recognized by the SER-CAT Executive Board and colleagues for his ten years of dedicated service and conscientious guidance of the program from inception to SER-CAT's current status as one of the most productive beamlines in the nation. He then presented a talk, titled, "SER-CAT: The First 10 Years."



B.C. Wang receives the Golden Magnolia Award from the SER-CAT Board by John Rose.

Morning Session – Interesting Structures



Chris Davies stands in front of a slide screen during his presentation.

As first session chairperson, Dr. Xinhua Ji (National Cancer Institute at Frederick) opened discussions on the area of, "Interesting Structures." The session began with a talk by Christopher Davies (Medical University of South Carolina), titled, "Structural changes in gonococcal penicillin-binding protein 2 associated with antibiotic resistance," where he discussed his work in understanding the biological function of proteins in hopes of targeting them for therapeutic intervention.

Irene Weber (Georgia State University) then presented a talk entitled, "Targeting HIV-1 drug resistance: Darunavir complex with V32I mutant of HIV protease at 0.84 Å resolution," in which she discussed her research on anti-AIDS therapies and the molecular basis of drug resistance. In her work, she hopes to improve the effectiveness of drugs against multi-drug resistant variants.



Yong-Fu Li presents during the symposium.

Yong-Fu Li (National Institutes of Health, National Cancer Institute) spoke on, "Biogenesis of CFA/I fimbriae of enterotoxigenic E. coli," which utilized a solved crystal structures to help understand the common, but bothersome ailment of diarrhea. In his work he hopes to understand the mechanism of binding and provide preventative treatments for the sickness.

David Garboczi (National Institutes of Health, NIAID-LIG) presented a talk entitled, "Structural analysis of surface proteins of the malaria parasite," where he discussed how malaria parasites invade the tissues of hosts and specific cell-types. His research is geared toward designing drugs for anti-malaria vaccines and gaining a better understanding of the biology of the malarial parasite as a whole.



David Garboczi speaks during the symposium.

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Robert Rose (North Carolina State University) gave a talk on, "Small angle scattering as an approach to model a multi-protein complex on the insulin promoter." His work in diabetes research, and how insulin reacts to the beta cells will ultimately aid in diabetes drug therapies and a possible cure.

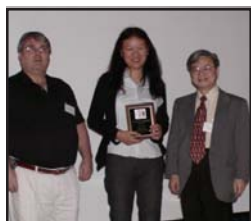


Robert Rose presents during the symposium.

Jacek Lubkowski (National Cancer Institute, Frederick) presented his work, entitled, "CCR-mediated chemotaxis of human B-defensins: structural basis," as it pertains to chemotaxis proteins and viral infections. His work is geared towards the treatment of immune disorders and improved drug therapies.

Young Investigator & Outstanding Science Awards

Before the afternoon lunch hour, acknowledgements for both the 2007 SER-CAT Young Investigator and Outstanding Science Awards were presented. For the third year, SER-CAT took the opportunity to recognize the outstanding achievements made by individuals at the SER-CAT facility.



Ping Liu receives the Young Investigator Award from B.C. Wang & John Rose.

Each year the young investigator award is presented to an individual who is at least two years away from their Ph.D. degree and have displayed an important technical or scientific accomplishment at, or of benefit to SER-CAT. For 2007, Dr. Ping Liu of Georgia State University received the Young Investigator Award for her work on the, "Crystal structure of the *Geobacillus stearothermophilus* carboxylesterase Est55 and its activation of prodrug CPT-11," which has also been published in the *Journal of Molecular Biology*.

The SER-CAT Outstanding Science Award is given to a researcher or research group carrying out important and beneficial experimental work at SER-CAT. This year, Professor Michael Wiener of the University of Virginia received the award for his paper entitled, "Outer membrane active transport: Structure of the BtuB:TonB complex," as it proved to have the highest scientific impact of papers received. Both awardees gave a 20-minute talk on their recognized works at the symposium.

We would like to again congratulate our award winners on their honors and thank everyone who submitted nominations.



Michael Wiener receives the Outstanding Science Award from B.C. Wang & John Rose.

Afternoon Session – Interesting Methods and Approaches

After lunch, a poster session and remote access demonstration was provided, followed by a plenary lecture by Professor Cynthia Wolberger (Johns Hopkins University) entitled, "Mechanisms of lysine modification: The Sir2 deacetylase and Lys63-linked polyubiquitin chain assembly." Dr. Wolberger presented an insightful presentation on proteins in cellular function and gene expression.



Cynthia Wolberger presents during the symposium.

The second symposium session was chaired by Dr. David Waugh (National Cancer Institute at Frederick) and continued with the topic of, "Interesting Methods and Approaches." Jiawei Wang (National Cancer Institute, Argonne National Laboratory) began the session with a talk on, "Statistical distribution of Bijvoet differences," where he discussed the varying distribution of bijvoet ratios in structural crystallography research for improved results.

Wladek Minor (University of Virginia) presented a talk entitled, "HKL-3000 - Towards the Future of Protein Crystallography," where he gave an interesting demonstration of the HKL-3000 capability in solving protein structures.



Denny Mills presents during the symposium.

Denny Mills (Argonne National Laboratory) followed with a talk entitled, "The Advanced Photon Source – Now and in the future," where he highlighted the accomplishments and future goals of the APS facility.

John Chrzas (UGA/SER-CAT) discussed, "The SER-CAT Virtual Home Facility," and the possibility of taking home SER-CAT results in a virtual capacity.

Zheng-Qing (Albert) Fu (UGA/SER-CAT), followed with a talk entitled, "The SER-CAT on-site Data-to-Structure capability," where he spoke on the advances at SER-CAT for users to obtain the structural models of the data collected while still at SER-CAT. The meeting closed late in the afternoon with more conversations and shared experiences.



Zheng-Qing Fu (l) and John Chrzas (r) present during the symposium.

The day was filled with insight, expertise, and a wealth of information for those who attended. We would like to thank all of our attendees, as well as our host Dr. Alex Wlodawer and his staff for their hospitality and assistance, in making this year's meeting a success. If you would like additional information on this year's event, including more photos, please visit us online at www.ser-cat.org.

Welcome New SER-CAT Members!



We are proud to announce the addition of two organizations into the SER-CAT Membership: Scripps Florida, a state-of-the-art biomedical research institute of The Scripps Research Institute, located in Jupiter, Florida, and the rejoining of the Georgia Tech Research Corporation in Atlanta, Georgia. Please join us in welcoming both institutions to SER-CAT.

More information may be found on both institutions at their individual web sites, www.scripps.edu/florida and www.gatech.edu.

Publications for 2006 & Covers for 2007

It was another productive year in 2006 for SER-CAT in terms of structures and publications. Though we are still receiving updates, we are happy to report that as of April 24th, SER-CAT's 22-ID beamline has been acknowledged in **130 publications** for 2006 – the highest number of publications by any APS beamline! We are thrilled to acknowledge our scientific productivity. With the help and recognition of our users, SER-CAT has proven, once again, to be a result oriented and successful research facility.

SER-CAT hopes to make 2007 another productive year. As a start towards accomplishing this goal, we would like to congratulate two of our users, Dr. Tongqing Zhou and Dr. Peter Kwong, on their recently published cover article in the February 15, 2007 edition of *Nature Magazine*. Their article is entitled, “*Structural definition of a conserved neutralization epitope on HIV-1 gp120,*” and may be located on page 732.



SER-CAT would like to thank each of the users who have properly acknowledged our facility in 2006 and 2007. Since our success is judged upon the number of properly acknowledged publications submitted, we would like to encourage you to visit SER-CAT's website at <http://www.ser.aps.anl.gov/new/acknowledge.html#how%20to> to review the correct wording needed for acknowledging the APS and SER-CAT in your published works. Also, please be sure to continue to acknowledge SER-CAT in your PDB submissions, journal articles, and other types of works, such as theses, meeting presentations, and posters.

SER-CAT Passes a Milestone

In February 2007, the 500th SER-CAT structure was released by the PDB: The structure of the carboxyl terminal domain of rat 10-formyltetrahydrofolate dehydrogenase, PDB entry 2O2R.



See: Tsybovsky, Y., Donato, H., Krupenko, N.I., Davies, C., Krupenko, S.A. Crystal structures of the carboxyl terminal domain of rat 10-formyltetrahydrofolate dehydrogenase: implications for the catalytic mechanism of aldehyde dehydrogenases. *Biochemistry* v46 pp.2917-2929, 2007.

Congratulations to Tsybovsky, et al. and the Department of Biochemistry and Molecular Biology, Medical University of South Carolina for their successful accomplishment in crystallography.

Gerd Rosenbaum Receives Compton Award

We are pleased to congratulate Dr. Gerold Rosenbaum, SER-CAT's Senior Beamline Scientist and previous Construction Manager, on being chosen as one of this year's recipients of the 2007 APS Compton Award by the APS Selection Committee. The Award was presented to Dr. Rosenbaum on May 7, 2007 during the APS User's Meeting at the Argonne National Laboratory. It was given in recognition of his pioneering contributions towards the development of biological synchrotron X-ray diffraction, and for his contributions towards APS science through his design and construction of beamlines, such as the SER-CAT's 22ID and 22BM, SBC-CAT's 19ID and 19BM, and others around the world.



Gerold Rosenbaum receives the Compton Award

Please join us in applauding Gerd for his outstanding contributions to biological synchrotron X-ray diffraction, and for providing the community with excellent beamlines at the APS and elsewhere. More information on the award may be found on the APS web site at http://www.aps.anl.gov/News/APS_News/2007/20070402_b.htm or on SER-CAT's website at www.ser-cat.org.

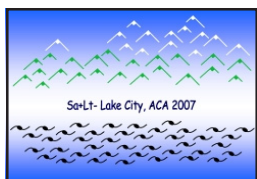
Kathy Medina receives 2007 Franklin College Staff Excellence Award



Kathy Medina (r) receives her award from Dean Garnett Stokes (l).

Kathy Medina, SER-CAT Administrative Coordinator, was recognized by the University of Georgia's College of Arts and Sciences as one of this year's recipients of the 2007 Franklin College Staff Excellence Award. Kathy was selected based on her dedicated service to UGA, and creativity in developing the financial and management aspects of the SER-CAT program. She was presented with a crystal engraving during a Staff Awards Reception on May 9, 2007 by Dr. Garnett Stokes, Dean of the University of Georgia's College of Arts and Sciences.

The 2007 ACA Meeting in Salt Lake City, Utah



Once again, SER-CAT is ACA-bound! For the sixth consecutive year, SER-CAT will be hosting a booth at the 2007 American Crystallographic Association Meeting in Salt Lake City, Utah. The meeting will take place at the Salt Palace Convention Center, July 21-26, 2007. If you are at the meeting, please stop by our booth, #114, and say, "Hello!"

Staff Departure

It is with sadness that we announce the retirement of Marie Graham, SER-CAT's User Support Coordinator on site at the APS. Marie will be leaving us on May 31, 2007 to enjoy other wonderful activities with her family. While we are excited for her and her future plans, we want her to know that we will sincerely miss her at our beamline facility. Please join us in thanking Marie for her dedicated service and wishing her all the best in her future. ■



Marie Graham

The SER-CAT Spectrum is the biannual newsletter of the SER-CAT group. Additional information about SER-CAT and the Advanced Photon Source at Argonne National Laboratory can be found at our website www.ser-cat.org or by contacting the SER-CAT Administrative Office at 706-542-3384.

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Bi-Cheng Wang *Director/Editor*
Sylvia White *Assistant Editor*

SER-CAT Administration

Bi-Cheng Wang, Director
John P. Rose, Assistant Director
Gerold Rosenbaum, Senior Beamline Scientist
Kathy S. Medina, Administrative Coordinator
Jackie Taylor, Accountant
Sylvia White, Administrative Assistant

SER-CAT Operations

John Chrzas, Sector Manager
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SER-CAT Administrative Offices
University of Georgia
B202 Life Sciences Building
Athens, GA 30602-7229

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