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A word from our president

I must confess that I still love rock and roll. I'll be one of those guys that get wheeled into the last Eric Clapton concert on a gurney. Last weekend Carlos Santana played in The Woodlands and for once I was not traveling and could attend a good, local concert. The amazing thing about this musician is that he still continues to produce great new music - perhaps even better than his initial work (I never thought I would admit that). He has definitely aged better than a lot of old rock stars (say the Stones for example) and continues to expand his horizons as an artist. He is a driven, creative genius who hasn't begun to peak.



(c) Tim Owen

This may seem like a crazy analogy but I feel that Rigaku is much like Carlos Santana, not content to rest on its "greatest hits" but continuing to push the boundaries of technology and expand its corporate vision and mission. With this issue we announce a change in the "band's" name—same great group of people but now better organized to accomplish our goal of serving our customers with excellence.

Over the last ten years, Rigaku has acquired or started a number of companies in order to strengthen our technology portfolio for the analytical X-ray market. During this period of growth, the groups have retained their individual corporate identities, while at the same time working together to provide the best total solution to our customers. We now want to solidify our various groups under a common "Rigaku" banner.

On September 1st Rigaku's various companies outside of Japan began to operate as a single company. We will identify ourselves in all marketing and advertising material as "Rigaku". The new, combined organization is called Rigaku Americas Corporation ("RAC"), and our London organization will operate as Rigaku Europe. RAC includes Rigaku, Osmic, RoboDesign, Molecular Images, Electronic Imaging Technologies, Molecular Metrology, and the Vacuum Products division. ActiveSight, our contract research organization (CRO), servicing the pharmaceutical and biotech markets, will continue to operate as a separate entity.

From a legal and formal standpoint, the transition will take place over the next few months with the completion targeted for March 1. From a marketing standpoint, the transformation has already commenced. The purpose of the transition is to help us, as a single unified group, better focus our energies on providing the best solutions for our customers' needs and problems. Our goal has always been to provide leading innovations with a customer-friendly approach and this change will help us satisfy our corporate mission in a more effective manner.

Paul N. Swepston

Calendar of events

Rigaku will be attending the following conferences in fall 2005:

- [UK-SE Symposium on Structural Genomics and Proteomics of Membrane and Metalloproteins](#), Athens, GA, Oct 14-18
- [GSA](#), Salt Lake City, UT, October 16-19
- [32nd Annual SSRL Users/ Meeting](#), Menlo Park, CA, Oct 17-18
- [BCA Industrial Group Winter Meeting](#), Birkbeck College, London, Oct 18-19
- [Gulf Coast Conference \(GCC\)](#), Galveston, TX, Oct 18-20
- [Get-Phases 2005](#), Beijing, China, Oct 30-Nov 3
- [PSDI XIII](#), Cambridge, England, Oct 31-Nov 1
- [SESW Regional ACS meeting](#), Memphis, TN, Nov 1-4
- [Pittsburgh Diffraction Society \(PDC\)](#), Argonne, IL, Nov 3-5
- [TICPS](#), Beijing, China, Nov 4-6
- [BHT](#), Hamilton, Ontario, Canada, Nov 4
- [VII Meeting of Venezuelan Chemical Society](#), M?rida, Venezuela, Nov 6-10
- [Sociedad Mexicana de Cristalograf?a](#), Guanajuato, Mexico, Nov 13-18
- [CLS User Meeting](#), Saskatoon, Saskatchewan, Canada, Nov 19
- [MRS](#), Boston, MA, Nov 29-Dec 1

Conference report: IUCr 2005

Rigaku was once again a proud sponsor of the [XX Congress of the International Union of Crystallography](#) (IUCr 2005), held in Florence, Italy during the last week of August. The meeting was kicked off with a compelling address by Nobel Laureate Prof. Roald Hoffmann on the relationship between crystallography and the chemical bond. Set in the beautiful and historic (constructed in 1534) Fortezza da Basso, and featuring almost 600 speakers alternating at the podiums of 98 microsymbiosia distributed across 7 parallel sessions, the congress appeared to be very heavily attended.

As usual, the meeting was a showcase for new instrumentation. Having the exhibit's largest booth allowed us to showcase the current state-of-the-art in single crystal diffraction technology. In a dramatic introduction, the crystallography world was presented with the world's first benchtop small molecule diffraction system, the SCXmini™. This compact, self-contained instrument represents a new paradigm in routine automated structure determination, emphasizing affordability, reliability, ease-to-use, and low cost-of-ownership. Specifically engineered to provide colleges, universities, and industry with access to definitive molecular structure determination, the SCXmini system was designed to allow single crystal diffraction to become a routine laboratory method and teaching tool in the same way that NMR and FT-IR did more than a decade ago.

Also introduced was the first commercially available dual wavelength microfocus source, the FR-E+ SuperBright™. This system was developed to provide a cost effective path to enhanced home lab SAD phasing (Cr Ka radiation) while retaining traditional data collection capabilities (Cu Ka radiation). As the world's brightest rotating anode source, the FR-E DW SuperBright provides homelab *de novo* structure solution capabilities at a fraction of the price and cost-of-ownership of a beamline. It was also announced that existing FR-E SuperBright owners may upgrade their generator and optics to the new "DW" specification.

Other highlighted products of note included the Proteros Free Mounting® System (FMS) and the RoboDesign CrystalMation™ platform. Both of these innovations are concerned with the front end of the macromolecular crystallography process. A fully integrated and automated platform for protein crystallization, the complete CrystalMation system was on display in Florence. The FMS, a humidity control tool designed to enable macromolecular crystallographers to optimize individual crystals with respect to their diffraction characteristics, was featured as the only commercially available product to reproducibly enhance good crystals and salvage marginal ones.

In spite of the compelling excitement of new products to see and discuss, participation by our company was not just limited to the exhibit hall. Rigaku staff presented papers or posters on a variety of topical subjects, including: teaching crystallography, SAD phasing, curved imaging-plate detectors for small molecule crystallography, a high-speed solid-state area detector for general purpose diffraction work, and the automation of crystal mounting for multiple diffraction systems. Our scientists also co-authored a number of other papers. In all, IUCr 2005 was considered to be a great success. From old acquaintances renewed to participation in vibrant scientific discussion, there is no venue quite like the IUCr Congress in the heart of birthplace of the Renaissance.

Ultima #100

Rigaku has completed the installation of the 100th Ultima III X-ray Diffraction System. This

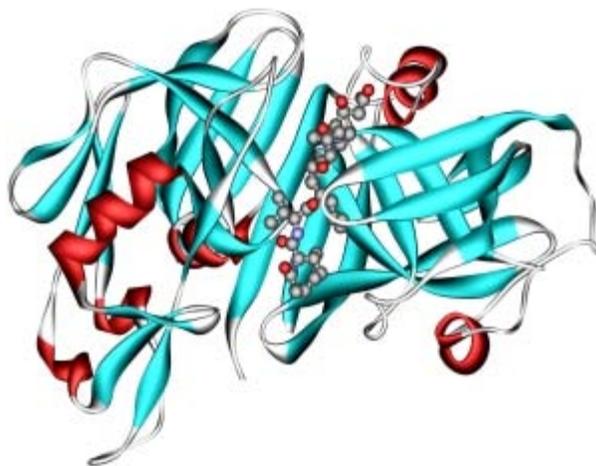
ActiveSight now offers renin

ActiveSight, the contract

system was installed at TerraTek in Salt Lake City for the analysis of geological materials. Specific applications include both qualitative and quantitative analysis clay based drill core materials.

The Ultima III was introduced in 2003 to cope with the changing world of materials analysis. The Ultima III extends the capability of a "standard" XRD system with its ability to perform SAXS and in-plane X-ray scattering measurements. This versatile system provide users with an enhanced tool set focused on the diverse requirements of researchers studying nanomaterials and other advanced materials.

crystallography arm of Rigaku Americas, has added renin, a cardiovascular target, to the Protein Portfolio of co-crystallization-ready proteins. Renin joins the "ready to go" collection which also includes PDE-4, the kinase Aurora-A, the nuclear hormone receptors FXR and PPAR delta, Hsp90, fructose-1,6-bisphosphatase and the bacterial enzyme DNA Gyrase. The crystallizable human renin is provided by [Proteos](#) of Kalamazoo, Michigan.



Ribbon diagram of human renin provided by Les Tari, PhD, of ActiveSight.

ActiveSight's contract services are centered on lead optimization co-crystallography, and feature gene-to-structure capabilities.

Inquiries are welcome: email info@rigaku.com or call Joy Silen at (858) 455-6870 x105.

Training sessions

Rigaku is pleased to announce the following training sessions for 2005-2006:

- XRF:
 - November 8-10, 2005
 - February 28-March 2, 2006
 - July 11-13, 2006
 - November 7-9, 2006
- XRD:
 - October 12-13, 2005 (MiniFlex™)
 - December 7-8, 2005 (MiniFlex)
 - ~~January 11-13, 2006~~ (JADE) FULL
- Macromolecular:

Introducing: FR-E DW SuperBright

Rigaku has developed a dual wavelength source solution that provides a cost effective path to enhanced home lab single wavelength anomalous dispersion (SAD) phasing while retaining traditional data collection capabilities. Anomalous scattering with soft X-ray radiation opens new possibilities in phasing for macromolecular crystallography leading to structure solutions that were previously not possible in a home laboratory environment. The use of Cr K α radiation for SAD has been reported in scientific literature.



The Rigaku FR-E SuperBright is the only microfocus rotating anode

March 6-8, 2006 (makeup for hurricane cancellation)

- March 8-10, 2006
- September 27-29, 2006

laboratory X-ray source featuring software controlled wavelength selection. Based on the Rigaku FR-E SuperBright, the brightest commercially available home lab source, the FR-E SuperBright provides the definitive solution for macromolecular crystallographers requiring the highest level of performance while having the choice of either Cu Ka or Cr Ka radiation.

With flux comparable to a second-generation beamline, the FR-E SuperBright affords maximum performance when fitted with optimized VariMax optics. For macromolecular crystallographic applications, this system has several possible VariMax options. Each of the two generator ports may be fitted with a single-wavelength swappable optic. When switching between optics, the resulting beam is displaced only about 1 mm at the crystal, making realignment trivial. Target selection is controlled automatically.

Technology Development Group news

It has been an exiting year so far for Rigaku's Technology Development Group in Tucson. Early in the year the first of the redeveloped Mercury cameras left our facility and ACA brought the announcement of the successor to the popular Saturn camera series. Whilst the Saturn name remains to recognize the heritage of the new line of detectors, the "92" and "70" versions of the camera become the "944" and "724" reflecting the increased image areas the cameras provide but more importantly the fact that a new 4 port CCD is at the heart of the new camera design. With four times the readout speed the benefits or higher throughput are obvious, but there are a host of other new features included in the new design to bring a range of benefits in terms of performance and user friendliness to the user, whilst at the same time retaining the high reliability and superb data quality that Saturn owners have come to expect. Details of the new cameras are available from your local Rigaku representative. Get 'em while they're hot!

XRF in 2005/2006

Rigaku's XRF group has had a very successful year in North America. Our expansion into the marketplace has been unprecedented compared to past years. This trend shows us that our XRF instrumentation is gaining more and more support by scientists and analysts who require both quality and reliability in their analytical instruments.

Rigaku Americas launched a number of new instruments this year. The ZSX Primus system has now been complemented with the tube-above Primus II. Both systems offer the same quality software that was first introduced with the ZSX 100 series as well as mapping/microanalysis and the popular 30 μm tube window. With this combination there is no other system available that can match sensitivity and adaptability to various sample types and sizes.

The next generation of our benchtop WDXRF systems has hit the market. The new *Primini* is an even more compact version of the ZSXmini II. With an analytical capability of Fluorine to Uranium using WDXRF, this system is unrivaled in resolution and sensitivity compared to any EDXRF unit available today.

We have also unveiled the Mini-Z Sulfur Analyzer. This small unit has the power to deliver a LLD of 0.3 ppm S in fuel oils and satisfies many of the approved sulfur analysis method requirements, including ASTM 2622. Like the other Mini systems, this unit is also benchtop and requires no external cooling.

Rigaku Americas has also rolled out three new coating analyzers: the Mini-Z Ni Analyzer, the Mini-Z Zr Analyzer, and the Mini-Z Si/Al Analyzer. All benchtop, all low powered WD, and easy-to-use systems.

Lastly, we have seen a heightened interest in our Ultra Carry. This small liquid absorbent filter allows LLDs into the low PPBs from a 4 kW WDXRF system, and into the fraction of PPMs in the smaller benchtop units.

We are anticipating that 2006 will produce even more activity than this banner year, so we have beefed up our staff to help serve you better and faster. Customers' needs have always been the driving force behind this company and will continue to be so in the future.

FMS installation

We are pleased to announce that the Rigaku Americas application lab will be installing its own FMS (Free Mounting System™) in

Introducing: SCXmini

November. The FMS is an integrated solution for optimization of protein crystals used in the collection of X-ray crystallographic data. Used in real-time conjunction with an X-ray diffractometer system, a protein crystal is mounted in a cryo-loop at room temperature and positioned in the center of a stream of gas for which the humidity and temperature are precisely controlled and adjustable. With this system, it is possible to manipulate the crystal in different ways and simultaneously analyze diffraction behavior to optimize the crystal for the best possible diffraction resolution. The FMS was developed in Professor Robert Huber's laboratory¹ at MPI-Martinsried and [proteros biostructures GmbH](http://www.proteros-biostructures.com), also of Martinsried, Germany.

We look forward to demonstrating the effectiveness of this method on new samples over the next few months and ask you to help by providing samples that might benefit from dehydration. Please feel free to contact us at the address below to schedule a demonstration.

¹Kiefersauer, R., Than, M. E., Dobbek, H., Gremer, L., Melero, M., Strobl, S., Dias, J. M., Soulimane, T., Huber, R. *J. Appl. Cryst.* (2000). **33**, 1223-1230.



Rigaku announces the SCXmini, the world's first benchtop small molecule crystallography diffraction system. The SCXmini represents a new paradigm in small molecule crystallography: affordable, reliable, easy-to-use, low cost-of-ownership access for routine automated structure determination. Specifically engineered by the world's leading analytical X-ray instrumentation vendor to provide colleges, universities, and industry with access to definitive molecular structure determination, the SCXmini system allows single crystal diffraction to become a routine laboratory method and teaching tool in the same way that NMR and FT-IR did more than a decade ago.

In addition to routine structure determination by non-crystallographers in industry, the SCXmini was developed to address two clear-cut needs within the higher education environment. First was to offer an affordable, low maintenance, low cost-of-ownership crystallography system for teaching. The SCXmini was designed for undergraduate labs at major universities as well as for science departments at predominantly undergraduate institutions. Second, was the need within research departments to expand X-ray structure determination capability beyond the realm of professional crystallographers. Inorganic and organometallic graduate students as well as postdocs can now obtain definitive structures on an instrument that they can easily operate themselves.

This newest member of Rigaku's small molecule line of integrated solutions was designed to offer outstanding performance, in a small package and at a fraction of the price and cost-of-ownership of a conventional single crystal X-ray diffraction system. It features the combination of the new advanced Mercury 2 CCD detector with a simplified goniometer, a sealed-tube X-ray source, and automated software to makes the SCXmini perfect for either routine structure determination by non-crystallographer researchers or as a teaching tool.

Service tip

Clean chiller water can help to extend the operation and life of rotating anodes.

Rigaku is committed to providing our customers with the highest quality hardware and expert support. To this end, Rigaku engineers cycle through the home office for periodic training on newly released systems or

the latest
developments in
software.

Thom Hendrixson
(left),
CrystalClear™
Project Leader,
trains a group of
Rigaku service
engineers



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