Rigaku’s latest instruments for powder XRD, thin-film XRD and small angle X-ray scattering have been installed in the Jerome B. Cohen X-Ray Diffraction Facility at Northwestern University, Evanston, Illinois, USA. A 1970s vintage Rigaku powder diffractometer and Rigaku’s powerful high-intensity rotating anode generators are also installed in this same room. The equipment is well maintained by Jerry Carsello, facility manager, and all of the equipment is functioning well.

Students and researchers can use these instruments for their fundamental experiments in physics, as well as for complicated research.

Use of the instruments is not limited to the university’s students, faculty and researchers. Applicants from outside of the university are also able to use them. “More than 300 users are accessing this facility for the research of material science and physics,” said Prof. Bedzyk, facility director.

Several standalone rotating anode X-ray generators are combined with special optics and goniometers to simulate the experiments at the synchrotron. Northwestern is located near the Advanced Photon Source (APS), a third-generation synchrotron, so the Northwestern facility is used for hardware development and pre-measurement before going to the APS.

The research group run by Prof. Bedzyk is focusing on atomic scale views of interfacial and nanoscale processes with X-rays, using a combination of the instruments in this shared facility and APS.

The following recent research article, by Dr. Sumit Kewalramani in the Betzyk group, describes one example of how the group is using the X-ray diffraction facility. He measured GIXRD and XRR with a Rigaku ATX-G Thin-film XRD to generate the results presented in this paper.


In this article, the classic “buried interface” problem of organic thin-film transistor performance was explored. The results of this experiment are impressive.

There is also “iLab”, which is one of the most interesting elements of the educational program at Northwestern University. This remote online lab program for high school science is exceptionally popular among high school students and teachers. High school students can access the internet-based program anytime they want to study. They can also gain experience in analytical instrument operation. There is a fully functional educational program related to ICP, and more is planned.

According to Prof. Kemi Jona, the director of the high-school science program, more than 8,000 students and teachers around the world have used “iLab”. Users come from a broad range of geographies and backgrounds, including students from the US, Australia, Europe, South Africa and Asia. MIT and Sydney University have
Utilizing Benchtop Instruments in a Teaching Environment

Southampton University takes a hands-on approach to teaching diffraction to undergraduates.

Southampton University takes diffraction seriously. In this video you will see the high-powered lab that acts as the National Crystallographic Service in the UK, and hear about the use of benchtop instruments for teaching hands-on diffraction to third year undergraduates.

Click here to watch video