Personnel Department Profile

The Personnel Department serves as a support function for the staff of PSL and SRC. The department guides employees through the policies and procedures of the university and facilitates a variety of functions, including: the employment process, payroll and benefits administration, job classification and promotions, performance evaluations, employee relations, and labor contract administration.

Primary duties for personnel manager Clay Vinje involve executing the employment process, creating and updating position descriptions, reviewing and preparing job classification and promotion requests, and responding to personnel issues. He enjoys finding the right candidate for job openings and assisting employees. Clay joined PSL in 1991, and spends his free time going to his daughter’s basketball games, caring for his cats, and gardening.

Payroll and benefits specialist Irene Sutcliffe has been with PSL since 1989. She takes care of the orientation and paperwork of new employees and keeps all employees advised of changes in benefits. Irene manages the payroll and helps the accounting department. She also answers phones, does the faxing and mailing for PSL, and organizes retirement celebrations and holiday parties. In her spare time, Irene enjoys knitting, outdoor sports, and spending time with her children.

Double Crystal Monochromators Delivered to Argonne

Early in the fall PSL delivered two unique double crystal monochromators to Argonne National Laboratory for use at the Advanced Photon Source (APS). The DCMs are the first in the world to operate at ultra-high vacuum.

Unlike conventional DCMs which operate at a lower vacuum, these instruments can be installed directly on a beamline without a protective window. The instruments are capable of achieving vacuum in the $1.0E^{-10} \text{ Torr}$ range because they are constructed entirely out of aluminum and stainless steel, without any high-torque or ferrofluidic seals and gaskets which contribute to the contamination of vacuum.

In addition to being UHV rated, the DCMs offer the advantages of compactness, ease of alignment and ease of access. The instruments offer full frontal access through hinged flanges. This allows access to the crystals, crystal mounts, XYZ stages, rotational stages, and all other internal parts without resorting to a system using precision tracks to remove the mechanism from the vacuum chamber. The lack of a track system simplifies alignment and significantly reduces the width of the instrument. The DCMs each take up less than one square meter of space, an important consideration given the confined space at most laboratories.

Over a range of $45^\circ$ the accuracy of
0.5 arc sec., PSL has developed techniques for understanding and correcting inaccuracy that may arise during any stage in the process of construction.

There is a good deal of interest in the synchrotron community for UHV monochromators which can operate at APS and future high energy rings.

After the DCMs were delivered, the process of calibration and verification began. Throughout October and November, PSL employes worked with researchers at Argonne to verify all of the performance parameters of the APS monochromator. Particularly important is the determination of crystal parallelism. The instrument is due to be installed on the beamline in December.

The second DCM, made for UNICAT, underwent an extensive process of verifying the extreme accuracy of calibration required of the instrument.

Happy Retirement!

PSL wishes a happy retirement to Art Penpek and Linwood Thomas who stopped working full time in July.

From his hiring in 1973 until 1993, Art served as project coordinator for the electrical division. In this position he controlled the day to day operation of the electronics shop, the electrical engineers, and the computer programmers. Linwood joined PSL in 1976 and worked as the project coordinator of the mechanical division until 1993. He was in charge of the instrument, vacuum and support shop, drafters, and mechanical engineers.

As project coordinators, Art and Linwood oversaw every stage of every PSL project from start to finish. They met with prospective customers, brought work into PSL, supervised the projects and the people, coordinated shipping and installation, and met with university, state and federal government agencies.

Since 1993 Art has been the project scheduler and expeditor and Linwood has been the product structuring specialist. Art produces timelines for proposals and major projects, tracks project status and critical purchasing orders, and provides expediting support. Linwood installed Macola software to help structure project manufacture, oversee scheduling and production, and produce reports. He also orders parts and contacts manufacturers and is the PSL safety director.

Although both men continue to work at PSL part time, they have already begun to enjoy their retirement. Art enjoys spending time at his house in Door County, golfing, visiting his grand children, and hopes to get involved in charity work at the UW hospital. Linwood spends his time fishing on the great lakes, woodworking, helping his children build a house, visiting his home in Maryland, and reading.
PSL Mass Produces Optical Modules

At the end of October, PSL shipped 230 optical modules to the South Pole where they will be lowered almost 2000 meters into the ice as part of the Antarctic Muon and Neutrino Detector Array (AMANDA) experiment to detect neutrinos, the most elusive particles in the universe.

Before being frozen in the polar ice cap, the optical modules pass through many stages of production. The heart of the optical module is a large diameter photomultiplier tube made by Hamamatsu in Japan. Photomultipliers work by amplifying light pulses so that they can be monitored by electronics. A single photon of light entering the photomultiplier produces one photoelectron which then strikes a dynode, thus producing a cascade of electrons. Each of these electrons strike the next dynode producing even more electrons. The photomultiplier tubes made for AMANDA have fourteen stages of amplification and allow one photon to create a signal containing about one billion electrons.

The tubes are shipped to PSL where they are tested for gain (how much the pulse is amplified), noise (how many signals does the tube produce when there are no photons present), and pulse delay (how long does it take the tube to produce a signal after being struck by a photon). For each of the tubes that passes the tests, PSL assembles a printed circuit board base and solders it onto the tube. When the optical modules are in place at the Pole and connected to the power source and electronic controls, the circuit board will power the tube with a high voltage (around 1900 V), pick up the signal produced by the tube and send the signal up the 2000 meters of cable to the control room on the surface.

After the boards have been connected, the tubes are potted in the bottom half of a clear glass sphere made by Benthos using an optically clear silicone gel. A connection to the outside is made through the upper hemisphere, then the two halves are joined, partially evacuated to just over half of an atmosphere of pressure, and finally sealed. The spheres, now sitting in metal harnesses, are packed and shipped to Port Hueneme, CA where they join other items being sent to Antarctica.

At the South Pole the optical modules are frozen in place with the tubes pointing down toward the center of the earth. The Earth acts a shield blocking out all radiation except for neutrinos which have no mass and no charge. Some of the neutrinos interact with the ice molecules creating a muon. As the muon races through the ice it creates a phenomenon known as Cherenkov light. The photons that make up this light strike the photomultipliers creating a signal that is communicated to the surface. From the data, researchers are able to determine from which direction the neutrino originated.

Between November 1996 and February 1997, 216 optical modules will be placed into six holes at 36 modules per string. If this season’s efforts are successful, PSL may be hired to produce as many as 400 modules next year and perhaps up to 1000 a year after that.

Assistant Director Honored

Esther Olson, Assistant Director at PSL and SRC, was inducted into the Volunteer Hall of Honor at the Central Wisconsin Center for the Developmentally Disabled on July 17, 1996. Olson was honored for her outstanding contributions to the Center and the Center’s Service Auxiliary during her 25 years of involvement.

The Center is a state institution that provides living services for the profoundly mentally and physically disabled. In addition to providing housing, food, and medical attention, the Center offers residents entertainment and educational programs, many of which are run by volunteers. The Auxiliary group participates both in hands-on activities and fundraising efforts. The group has provided over $400,000 in grants for special projects at the Center.

Olson claims that her biggest contribution to the auxiliary is as an advocate and troubleshooter. Through her work at PSL and SRC, Olson has gained skills in dealing with government agencies, in finding funding, in mediating and in problem solving that have been useful to her in her work with the Auxiliary.
Current Affairs:

After weeks of negotiation, PSL signed the first contract ever written between the University of Wisconsin - Madison and the Republic of China. The contract with the Synchrotron Radiation Research Center in Taiwan is for two spherical grating monochromators of standard PSL design. They are scheduled to be delivered in June 1997.

The National Institute of Standards and Technology awarded PSL/SRC the contract for design, construction, and commissioning for the Synchrotron Ultra-violet Radiation Facility (SURF III). PSL and SRC staff have started on the initial phases of procuring the magnet yolk. The entire project is slated to be done in the spring of 1998.

PSL shipped two integral shutter units to the Advanced Photon Source (APS) at Argonne in the early fall. The shutters are part of a safety shut-off system being installed at APS.

The vacuum chamber and one pair of coils for the HERMES experiment at DESY are finished. and waiting for the UW-Madison Nuclear Physics dept. to be ready for assembly.

Third Wave Technologies, a small Madison biotech company, has contracted PSL to build parts for a prototype instrument that will test a new method of DNA sequencing.

PSL is happy to welcome back Dan Wahl who joined the electrical engineering department in September. Dan had worked for PSL in the mid 1980s during which time he was extensively involved in the x-ray microbeam project.