Profile of Support Staff

Lab facilities director is simply the latest of many titles Carl Baumann has had during his 40 years with MURA/PSL. Carl began working with the Midwestern Universities Research Association (MURA) in 1957 as an engineering aid. He was involved in designing and building all the model accelerators, the site, and helping write proposals for a large accelerator to be built in Stoughton.

When MURA became PSL, Carl and a number of other employees worked hard to ensure the success of PSL through marketing and personal contacts with researchers on campus. Carl was involved with all the projects undertaken by PSL during the 1970s and 1980s but especially with the cosmic ray experiment in Colorado, the SURF I accelerator for the National Institutes of Standards and Technology, and the Aladdin accelerator here at UW-Madison.

Since then Carl has spent most of his time working on PSL projects, maintaining the Aladdin ring, overseeing lab upgrades, repairs and remodeling. He spent some time as the lab safety director and he now coordinates the fire alarm testing for all KRC buildings.

When not at PSL, Carl devotes a great deal of time to the Boy Scouts and Girl Scouts. He also enjoys collecting and restoring old gasoline engines, watching classic movies, working outdoors, and traveling with his wife.

Wes Severson began working for PSL's precursor, the Midwestern Universities Research Association, in 1960. He worked as an electronics technician and instrument calibration and repair technician designed by PSL mechanical engineer Lee Greenler using the ANSYS program. Machining of the magnet and vacuum chamber was done at PSL and the UW Physics instrument shop.

In order to verify the field value and uniformity and to determine the shims needed to adjust the magnet poles, PSL produced precise, computer-controlled

(continued on page 2)
SRRC SGMs awaiting final vacuum testing at PSL.

SRRC SGMs

In October PSL delivered two spherical grating monochromators to the Synchrotron Radiation Research Center (SRRC) in Taiwan. Last fall PSL began working on the monochromators after signing the first contract ever written between the University of Wisconsin-Madison and the Republic of China.

The monochromators are similar to two SGMs built by PSL and sold to SRRC several years ago. Among the major differences are the scan range and number of gratings. The new Wide Range SGM can hold up to 6 gratings, more than any previous SGM built by PSL. It has a 20 degree scan angle range.

The High Flux SGM has the largest scan angle ever built by PSL, scanning over a 30 degree range. Having such a large reproducible scan range required greater accuracy of parts than on previous models. Both instruments are uncooled and are ultra-high vacuum compatible.

The grating index mechanisms on these instruments feature PSL's new adjustable limit stop assembly. The new limit stop is precise and more robust than the commercial limit stops used in previous monochromators, and also features built-in electrical limits.

Laser interferometer tests show the new energy scan mechanisms to have excellent accuracy, approaching the measuring limits of the laser interferometer.

Design engineer Bill Mason and instrument maker Ron Smith traveled to Taiwan to set up the instruments at SRRC.

Support (continued from page 1)

In the 1970s he also got involved with the operation and maintenance of the IBM 704 and the DEC computers.

Since 1994 Wes has been in charge of quality control. In this capacity he maintains calibration records and materials tracing information. He also works with department heads to decide which commercial instruments need to be certified and how often. He oversees the process of sending out electronic and mechanical instrumentation for certification and repair.

Wes developed a database using the computer program Access to keep track of all of the mechanical and electrical lab instruments. He also developed a database for repair parts.

In his spare time, Wes enjoys participating in Civil War reenactments and teaching martial arts to a group of Vietnam combat veterans.

Don Holly is the physicist on staff. He has been with PSL for 16 years. He is in charge of the final testing for most PSL projects, including all monochromators. This involves testing and calibration using a variety of optical, electronic, and mechanical techniques. Don's other main area of expertise is plasma physics and diagnostics. This involves design, construction, and testing of laser, optical infrared, x-ray, high voltage and high power systems. In his free time he is an aspiring maker of mechanical clocks and he collects and restores Gravely garden tractors.

PSL Observer Staff

David Huber, Director
Farshid Feyzi, Assoc. Director
Esther Olson, Asst. Director
Rebecca Kinrade, Newsletter Editor

For additional copies, please contact:
Nancy Dopkins
Physical Sciences Lab
3725 Schneider Dr.
Stoughton, WI 53589
Telephone (608) 877-2251
Cones for Purdue

In September, PSL finished the prototype of a copper cone for the CLEO III Silicon Detector. The cone was one of the most challenging projects ever undertaken by the PSL instrument shop.

The cone provides cooling for the electronics of the detector and acts as support and locator for the silicon detectors.

In the past, these types of cones have been made in pieces and assembled. The Purdue physicists in charge of the project decided to have the cone machined from one piece of copper in order to achieve better integrity.

However, the design was extremely complicated and required precise machining. In addition, pure copper is a very difficult material to work with, making the entire process more complex.

The first step of the process was to obtain the large (10 inch diameter) piece of high purity, oxygen free, high conductivity copper, which proved somewhat difficult. Then the large Autocad file provided by Purdue had to be integrated into PSL's Mastercam system.

After the copper arrived, the lathe was used to roughly shape the inside and outside, resulting in the removal of about 150 pounds of material. Next, the copper was moved to the CNC Hermle milling machine. CNC Specialist Bill Koenig machined 18 facets on the inside of the cone and 230 tapped holes, some tiny and at difficult angles.

The machining, which took over six weeks on the CNC Hermle, was possible only because of the 4-axis capability of the Hermle. The machining went very well with no breakage or problems with distortion. According to Bill Koenig, one of the toughest challenges was verifying the tool paths using Mastercam.

After the machining on the Hermle was done, the shaping of the cone was completed on the lathe. The cone was then sent out to have the wire EDM done. In September the cone was sent to Purdue for examination, then it was returned to PSL to have the cooling tubes soldered in.

PSL will be making at least one more cone for Purdue with the possibility of additional units.

Magnet

(continued from page 1)

magnetic field maps of the magnet chamber.

The field maps verified the accuracy of the design. The ANSYS design analysis predicted the field shape so accurately that no shimming of the pole faces was necessary to meet the magnet specifications.
CURRENT AFFAIRS:

UNICAT Update

PSL has proposed several modifications to the double crystal monochromator delivered to UNICAT in the fall of 1996. During testing, researchers at UNICAT discovered that they needed modifications from their original designs because they are using a different crystal geometry than planned.

The modifications will require disassembly and some new parts. PSL hopes to continue working with this group in the future.

NIST Update

The improvements being done to the SURF II synchrotron for the National Institute of Standards and Technology by PSL/SRC are proceeding on schedule.

The new steel pieces are currently being machined by Ranor, Inc. PSL began winding the coils in August. Work is progressing on the magnet mapper and its controlling software. PSL and SRC are working together on a new control system for the magnet.

Installation is expected to begin in December or January and the control system should be in place by February.

Veterinary Science

In September, PSL spent a week investigating a project for the UW-Madison veterinary science department. The project was to devise a way to non-invasively measure bone growth in animals without using radiation. Phil Robl and Ken Kriesel suggested implanting tiny bar magnets into the bone and using a Gaussmeter to pinpoint their locations. Feasibility studies of this system have been completed and the project is awaiting funding for developing the full system.