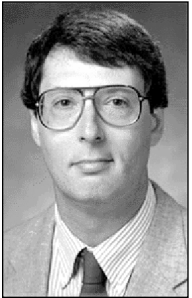


# NEWSLINE

Published weekly for employees of Lawrence Livermore National Laboratory

Friday, January 26, 2001

Vol. 26, No. 4



## FROM THE DIRECTOR'S OFFICE

Harry Radousky

### Institutes open doors to collaborative research

LLNL has five University/Lab institutes that operate under the auspices of the University Relations Program (URP). The objective of these institutes is to improve access to DOE's unique facilities, contribute to science education, strengthen existing LLNL programs, develop new initiatives and enhance access of Lab researchers to both UC and the larger university community.

As acting director of the University Relations Program, I would like to give you an overview of the history, goals and research directions of these institutes. *Newsline* will be running articles discussing the unique features of each institute, with the overall goal of making the Lab more aware of the institutes' functions and how they might be helpful to anyone interested in expanding university interactions.

The five University/Lab institutes fall in the middle of the spectrum of university collaborations at LLNL. While they are less formal than large programs such as the ASCI Alliances, they are much more structured than an individual one-faculty/one-staff member interaction. The general philosophy is to operate with a core permanent staff, while hosting large numbers of post-docs, students, visiting faculty, and Lab staff who participate in the institutes' activities. Each institute also hosts an active seminar series and collaborative research program, and provides a focus for communication between Lab researchers and the broad academic community.

The institutes form a centerpiece for the Laboratory's research collaborations with universities. The institutes are all strongly aligned with one or more of the directorates, and strive to have a high profile in the university community. These institutes are:

- The Center for Accelerator Mass Spectrometry (CAMS);
- The Institute for Geophysics and Planetary Physics (IGPP);
- The Institute for Laser Science and Applications (ILSA);
- The Institute for Scientific Computing Research (ISCR); and
- The Materials Research Institute (MRI).

The first University/Lab institute was IGPP, founded by Claire Max in 1983. Over these past 18 years, the number and impor-

See **DIRECTOR'S OFFICE**, page 7

**A closer look at CAMS**

—See page 3

## Hoya steps up NIF glass production

PUBLIC AFFAIRS OFFICE

A major technological milestone in optical glass melting has been achieved by Hoya Corporation USA, a laser glass manufacturer in Fremont. Hoya is using a novel continuous glass melting system (approximately 150 feet long and two stories high) to produce 20 tons of high quali-

ty laser glass per month.

The laser glass will be used in the National Ignition Facility,

To date the system has produced more than 600 neodymium-doped laser amplifier glass slabs for the NIF and 125 slabs for the Laser Megajoule pro-

See **GLASS**, page 8

## FSC analysis may seal 'angel's' fate

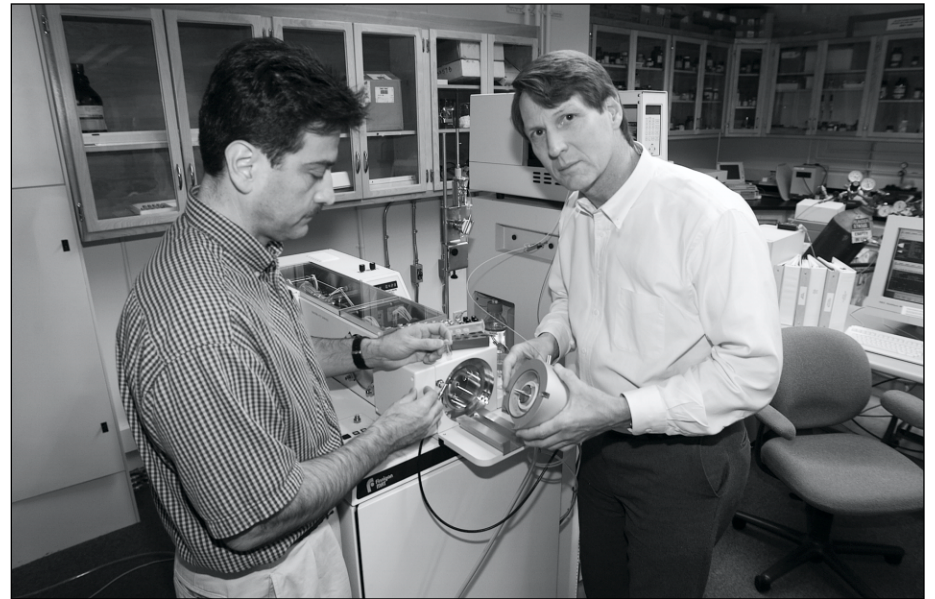
By Sheri Byrd

NEWSLINE STAFF WRITER

The re-arrest on Jan. 16 of Efrén Saldivar, the self-proclaimed "Angel of Death" and alleged killer of the terminally ill at a Glendale hospital, could not have happened without the assistance of the Lab's Forensic Science Center and its director Brian Andresen.

Special analyses by the center gave Glendale investigators the evidence they could use to arrest Saldivar and charge him with the murders of six patients.

Saldivar, a former respiratory therapist at Glendale Adventist Medical Center, was first arrested in 1998 following an investigation based on a tip from a fellow hospital worker. He confessed to killing between



JOSEPH MARTINEZ/TID

Armando Alcaraz and Brian Andresen inspect the electro spray assembly that is the heart of the advanced triple quadrupole mass spectrometry technology utilized to identify polar compounds in complex biological samples.

100 and 200 patients that he deemed "ready to die," but later recanted his confession, citing

See **FSC**, page 8

## Groundwork for extensive employee survey under way

A comprehensive survey of employee attitudes and concerns about workforce issues is to be conducted this spring at the Laboratory and is now under development.

The goal is to conduct the survey, assess the results and implement a full set of recommendations within the calendar year.

In his Jan. 12 *Newsline* column, Director Bruce Tarter said, "we need to maintain our highly skilled workforce as we prepare for the future. I want to ensure that the Lab is seen as a good place to work, 'an employer of choice.'"

International Survey Research (ISR), which conducted the 1995 diversity survey, will develop and conduct the new workforce issues survey. In addition to obtaining comprehensive information as to the con-

See **SURVEY**, page 4

## Kuckuck farewell Feb. 9; all employees invited

Director Bruce Tarter invites all employees to a special celebration in honor of Bob Kuckuck, the deputy director for Operations. The reception will be held 3:30 to 6:30 p.m. Friday, Feb. 9, in the West Cafe.

Kuckuck is retiring on Jan. 31, but will continue to work on special Lab projects, such as the upcoming employee survey. Kuckuck has worked at the Lab and University of California for more than 37 years, both in science, and operations and administration.

*Newsline* will have more details on Kuckuck's career in the Feb. 9 edition



Bob Kuckuck



**CIO update:  
revisions to  
device registration**  
— Page 3



**Ergonomics  
now elementary,  
thanks to Lab help**  
— Page 5



## LAB COMMUNITY NEWS

### Weekly Calendar

#### Technical Meeting Calendar, page 4

Saturday  
**27**

There are two **scheduled power outages** this weekend from 7 a.m. to 3:30 p.m. On Saturday, the following areas will be affected: Bldgs. 160 and 161; and Trailers 1629, 1630, 1632, 1677, 1678 and 1680. On Sunday, power will be out in the following locations: Bldgs. 432, 433, 435, 436 and 446; and Trailers 4302, 4316, 4325, 4377, 4378, 4383, 4384, 4386, 4387, 4388, 4407, 4440, 4442 and 4475. Contact: Mark Cardoza, 3-0490.

Tuesday  
**30**

Want better relationships? **C o d e p e n d e n t s A n o n y m o u s** (CoDA) meets every Tuesday at noon in Bldg. 571, room 2016. The group offers 12 steps to recovery from codependency. The only requirement for membership is a desire to have healthy and loving relationships. Contact: Mike, 3-4827, or Jane, 4-4689.

...

John Souza of Autodesk will offer a seminar on "**Autodesk Inventor R4**" from 11 a.m. to 1 p.m. in the Trailer 6525 auditorium. Lunch will be provided. The system features full .dwg compatibility and native import of Pro E files. Contact: Janice Glassow, 2-0441.

Wednesday  
**31**

Former Lab employee and **motivational speaker Erna Grasz** will kick off this year's series of speakers presented by the Lab Women's Association with a talk at noon in the Bldg. 543 auditorium. Grasz will present "Dare to Be Different: True Leadership Happens at All Levels." Grasz is currently the vice president and general manager for the Automation Standards Division at KLA-Tencor. Previously, she spent 15 years at the Lab. Contact: Lara Daily, 2-6932.



Because area blood supplies have fallen to a critically low level, a **special O-type blood drive** has been scheduled at the Lab on Monday, Feb. 5, 9 a.m. to 3 p.m. in Bldg. 415. You may schedule an appointment in advance by calling Mandy Monk at 510-594-5211. The goal of the Red Cross staff is to complete the donation process for pre-scheduled appointments in 60 minutes or less. If your schedule does not permit you to make an appointment, the Blood Bank will work you in when you drop in. Donor eligibility questions should be directed to the American Red Cross, 1-800-448-3543.

...

A representative from **Fidelity Investments** will be onsite to meet with employees Feb. 7-8 and 21-22. Fidelity Investments are available to UC's 403(b) participants in addition to UC-managed investment funds. Appointments are required and may be scheduled by calling Fidelity's reservation system at 1-800-642-7131. Be sure to specify you work at LLNL.

## An alarming tour



JULIE KORHUMMEL/NEWSLINE

Lab Site Operations ombuds recently toured Safeguards & Security. **Bill Schwartz**, ombuds for the Environmental Protection Department, takes a closer look at the Protective Force Division's central alarm station (CAS) with dispatcher Monty Lowas. The ombuds also received an overview on the PFD, including a briefing on the Special Response Team by Russ Markishtum and a tour of the CAS by Vinnie Curran. Anyone interested in touring the PFD, should contact Curran at 4-5474.

## RETIREMENTS

### Ralph Warner

Ralph Warner of Plant Engineering is retiring after 24 years at the Laboratory.

A retirement celebration will be held in his honor on Friday, Feb. 2, from 11:30 a.m. to 1 p.m. at Poppy Ridge Golf Course Restaurant.

Total cost is between \$19 and \$22.50, depending on your menu choice.

RSVP by Tuesday to Janice Glassow, 2-0441 or glassow1@llnl.gov.

All money must be to Margy Belcher by Jan.31, at Bldg. 551E, room 2066.

## IN MEMORIAM

### Murray Goldberg

Services have been held for Murray D. Goldberg, a former physicist who died Jan. 1 in his Golden, Colo., home. He was 74.

Goldberg was born in Atlantic City, N.J., and attended the University of Maryland and the University of Rochester.

He worked in nuclear physics and solar energy at Brookhaven National Laboratory and LLNL. He headed the International Programs Branch of the Solar Energy Research Institute.

Goldberg was a member of the Colorado Cactus Club and Succulent Society. He participated in the Golden Earth Days Council and trail planning for Jefferson County.

Survivors include his wife, two sons, two daughters and five grandchildren.

### Ken Westerberg

Kenneth W. Westerberg, a chemical engineer, died Jan 1 following complications of acute lymphocytic leukemia. He was 35.

Westerberg was born in Shakopee, Minn., and earned his bachelor's degree in chemical engineering from the University of Wisconsin in 1987. He earned his Ph.D. from the University of Washington in 1992.

He began his association with LLNL during his Ph.D. work, and continued with two years of postdoctoral research here. After completing his postdoctoral work, Westerberg accepted a position at Aspen Technology in Boston, Mass. He returned to the Lab in 1996 where he worked in the ALVIS Program as a group leader in the Separator Section until that project ended. Westerberg was currently working in Energetic Materials and as part of the ALE3D ASCII Code Team.

In addition to his love of chemical engineering, Westerberg was an avid cyclist, and an active member of the Cyclotrons.

As a tribute to Westerberg's research and his life,

Aspen Technology has established the Ken Westerberg Memorial Prize for Excellence in Chemical Engineering Research at Carnegie Mellon University. This prize will be given each year to a senior who has shown exceptional promise for research in chemical engineering. Westerberg's father has been on faculty there since 1976.

Contributions may be made to this fund through the Department of Chemical Engineering, Doherty Hall 1105, Carnegie Mellon University, Pittsburgh, PA 15213.

Westerberg also requested that people register with the National Bone Marrow Registry. A simple blood sample at the local blood bank is all it takes. Additional information may be found at Ken's Web Page, [www.ndim.edrc.cmu.edu/ken/](http://www.ndim.edrc.cmu.edu/ken/), which is maintained by his father.

A memorial service will be held at 2 p.m. Sunday, Feb. 4, at the Asbury United Methodist Church, 4743 East Ave., Livermore.

## Newline

*Newline* is published weekly by the Internal Communications Department, Public Affairs Office, Lawrence Livermore National Laboratory (LLNL), for the information of Laboratory employees and retirees.

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**Distributor:** Mail Services

Public Affairs Office, L-797 (Trailer 6527), LLNL, P.O. Box 808, Livermore, CA

94551-0808

Tel: (925) 422-4599; Fax: (925) 422-9291

e-mail: [newline@llnl.gov](mailto:newline@llnl.gov)

Web site: <http://www.llnl.gov/PAO/Newsstand/internal-comm.html>



Printed on recycled paper

## AROUND THE LAB



# CAMS' research is more than 'dates for dollars'

By Elizabeth Campos Rajs

NEWSLINE STAFF WRITER

The Lab's Center for Accelerator Mass Spectrometry is world renowned for its precise isotope analysis and carbon dating capabilities.

Indeed, the center analyzes some 20,000 research samples annually — accounting for one quarter of the worldwide AMS analyses performed last year. Accelerator mass spectrometry is a sensitive technique for measuring concentrations of specific isotopes in very small samples.

But dating samples, much of which is fee-for-service work, is not the center's primary purpose. "A lot of people think all we do is 'dates for dollars.' But I want to dispel that. We do provide fee-for-service work, but we are here for science," said CAMS director John Knezovich. "We have leadership in many areas of science and our staff members are recognized as experts in their fields. In many cases, university researchers choose to collaborate with us both because of the capabilities of CAMS as well as the expertise of our staff."

The center's scientists are participants in approximately 60 collaborative research projects with universities worldwide, including two campus/Lab collaborations through the UC Office of the President. They often appear as co-authors on published research made possible by the work performed at CAMS.

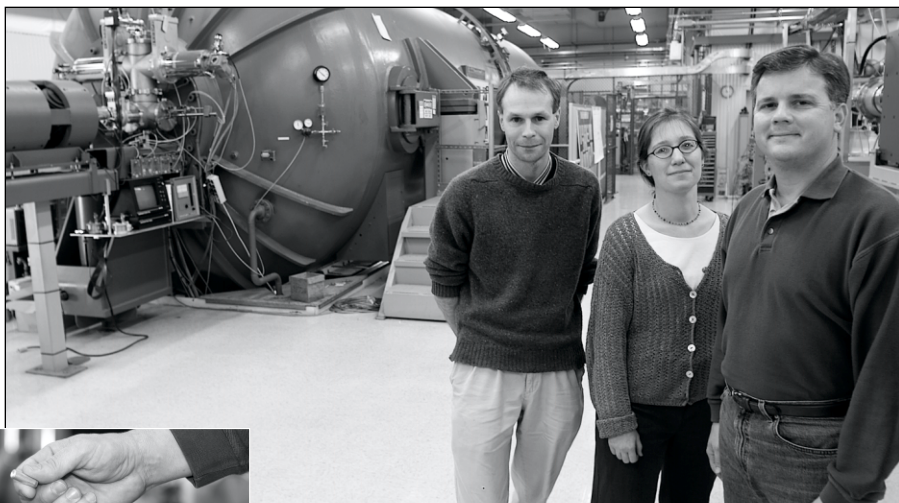
The range of study includes everything from archaeology to biomedical science to seismology, he noted. For example, one project is a collaborative effort with the U.S. Geological Survey and university researchers to date earthquake faults.

"Taking tiny bits of charcoal from a fault allows you to reconstruct the history of earthquakes. This approach is currently being used to assess the frequency of earthquakes on faults in California and around the world," Knezovich said.

In another collaborative project, scientists are analyzing corals taken across the middle latitudes of the Pacific Ocean and studying the levels of carbon 14 as a way of learning more about the carbon cycle as well as ocean circulation and the conditions that lead to El Niño weather patterns.

"Cores removed from corals can yield decades worth of data. You can use it to ask questions like how often did El Niño events occur in the past," he said, noting that one of the lead faculty members from Harvard participating in that study won a MacArthur Award last year for this work.

CAMS, established in 1988, is part of the Energy and Environment Directorate as well as the University Relations Program. It is one of five University-Laboratory Institutes which form a centerpiece of the Lab's research collaborations with universities. The



JOSEPH MARTINEZ/TID

other institutes are the Institute of Geophysics and Planetary Physics, the Institute for Laser Science and Applications, the Institute for Scientific Computing Research and the

Materials Research Institute.

"We build projects in the center that address national needs while enabling projects at universities," Knezovich said. "It's a nice marriage."

"One of the true strengths of CAMS is the way they can continually think up completely new ways to apply this technique, addressing problems which range from tracing toxins through our environment to tracing chemicals through the human body," said Harry Radousky, acting director of the University Relations Program.

CAMS provides an analytical capability that only exists in three other places in the country: Woods Hole Oceanographic Institute, Purdue University and the University of Arizona. Among these, CAMS is the most versatile due to the center's ability to measure multiple isotopes with high precision.

"This is the highest throughput center in the world," Knezovich noted. "What's impressive is the amount of science being done with the analyses. This was designed to be a facility that enables science. By most measures, we've done that exceptionally well."

"There is a growing need for isotope analysis capability and a lot of that need is at universities," Knezovich said. In most cases, university professors and their students carry out the majority of their research at their home institutions and come to the Lab for short visits to analyze their prepared samples.

"The field work doesn't happen here," he noted. "They may come here and learn how to prepare a sample, but they go back to their home institution to do the research."

A key benefit of using AMS is that the instrument has the ability to measure specific isotopes in very small samples, Knezovich said. Pulling a small vial out of his desk drawer, he pointed out that the sample size is only slightly larger than the head of a pin.

In contrast, the instrument that analyzes the samples is quite large. A 7,000-square-foot warehouse in the northwest corner of the Lab houses several acceler-

Graham Bench, Carrie Masiello and John Knezovich (left to right) in front of the main CAMS spectrometer. Bench was formerly a postdoc and is now a staff member in CAMS. Masiello is currently a postdoc in CAMS. Samples are placed in a small hole at the top of the aluminum holder, which is placed in a 64-sample wheel (inset).

ators. The largest, and original, accelerator is approximately 40 feet long and has an additional 100 feet of beam line and associated spectrometer equipment. The center recently added a much smaller spectrometer that is dedicated to analyses of carbon-14 for biomedical and environmental research.

In addition, the center operates a nuclear microprobe that has been used to develop pioneering applications in bioscience and environmental research. Most notably, the center was recently awarded a grant from the Army to assess the bioavailability of depleted uranium using this instrument.

"This project, which was the outgrowth of a successful LDRD-supported collaboration with scientists at the University of New Mexico, demonstrates how the center enables collaborative research that is in the nation's interest," Knezovich said.

In 1999, in conjunction with scientists from the Biology and Biotechnology Directorate, the center was awarded a five-year grant by the National Institutes of Health, which recognized it as the National Research Resource for biomedical applications of AMS. It's a distinction that makes not only the Laboratory, but also the University of California, proud.

At a recent UC Regents meeting, Bill Friend, chair of the UC President's Council on the National Labs, made special reference to CAMS, telling the Regents, "Livermore Lab has carved out areas of true excellence. Its Center for Accelerator Mass Spectrometry has become a magnet for biological research and has been selected as an NIH research resource."

"Bioscience has been a large growth area for us. The application of AMS to this field was created by scientists at Livermore," Knezovich said.

AMS is an ideal method for tracing the passage of chemicals through humans and animals without disturbing normal metabolic processes because the required doses and sample sizes are so small.

"Biomedical applications allow you to perform studies with humans that you couldn't do otherwise. Such biomedical science in humans was pioneered here," he said. "Biomedical science accounts for about one quarter of what we do right now, but it will continue to grow as our collaborations with the university community expand."

For more information about CAMS, go to the Website at: [www.llnl.gov/ees/cams.html](http://www.llnl.gov/ees/cams.html). An in-depth article about using CAMS for biomedicine was published in the July/August 2000 issue of *Science & Technology Review*.

## LDRD kicks off the annual call for strategic initiative proposals

This week, Laboratory Director Bruce Tarter announced the start of the FY02 LDRD call for strategic initiative (SI) proposals cycle. Competition for the SI category is open to all Laboratory programmatic, scientific, engineering and technical staff.

SI proposals must be strongly aligned with the Laboratory's strategic directions and long-term visions, as defined by one of the Lab's four strategic councils, which define strategic directions and visions for the Lab's scientific and technical missions.

Detailed guidance and information about the call for proposals process, including information about the strategic councils and LDRD contacts for each directorate, are available on the LDRD Website, <http://lrd.llnl.gov/ProposalSubmittal> or

by contacting the Laboratory Science and Technology Office at 3-2810.

The FY02 process will begin with review of currently funded SIs that are eligible to continue in FY02. Full proposals for currently funded SIs are due in the Laboratory Science and Technology Office by close of business Feb. 23. Technical reviews of these proposals will take place during March and will be scheduled by the LSTO.

For new SI proposals, principle investigators (PIs) should submit to their directorate office a short one- or two-page preproposal and specify the appropriate strategic council. Each directorate has an LDRD contact, who can provide guidance on the process. The sponsoring associate director should submit SI preproposals to LSTO by close of business on Feb. 23. The LSTO will forward submitted preproposals to the

appropriate strategic council. Principal investigators of council-selected preproposals will be asked to submit a full proposal to the LSTO by March 30. Technical reviews of these new SI proposals will take place during April. See the LDRD Website for further information and guidance at <http://lrd.llnl.gov/ProposalSubmittal>.

The LDRD SI Oversight Committee reviews currently funded SIs and new SI proposals selected by the strategic councils. The evaluation criteria emphasize technical quality, project leadership, technical accomplishments for currently funded projects, return to the Laboratory, and the degree of alignment and consistency with the strategic objectives of the relevant council. In addition, external and internal specialists will be invited to participate in the review process for each SI.



## NEWS YOU CAN USE

# Revised policy for unclassified device registration

I am announcing today approval by LLNL's Computer Security Council of a revised Laboratory policy: "Registering a Device in the LLNL Unclassified Device Registration Database" (P-2019, v1.2). This is the latest in a series of new and revised policies designed to improve the protection of our computing resources.

This policy covers all devices that have an assigned LLNL Internet Protocol (IP) address and are attached to one of our unclassified networks. In its revised form, the policy clarifies the requirements for registering, recording changes to, and removing devices from the Device Registration (DevReg) database.

Keeping this database accurate and up to date is an important part of our defense against intrusion and compromise of our unclassified computing devices. If a computer is attacked or compromised by an unauthorized user, LLNL must have the ability to quickly locate the device and the personnel responsible for that device in



CIO  
UPDATE  
Dave Cooper

order to secure it. An incomplete or inaccurate database would represent a significant threat to our ability to respond to potential incidents. Computers with an IP address are particularly at risk from attack and this policy requires that they be accurately registered in the DevReg database.

### Statement of policy

This policy revision requires that each device must be registered when it is placed into service on one of our unclassified networks. As

changes are made to a registered device, like a change of location, a new ISSO, or removal from service, those changes must be recorded promptly. The full text of the revised policy, including the database fields to be filled in for each device, are available on the Web at: <http://www-r.llnl.gov/cso/Pubs/updates/P2019.doc>

### Implementing the policy

In order to keep the Device Registration database accurate, it must be updated at the time any change is made to a system covered by this policy. We expect programmatic organizations to authorize persons who make substantive changes to systems to update the Device Registration database immediately. The Annual Compliance Checkup will provide the quality assurance for the accuracy of the database.

*Dave Cooper is the Lab's AD for Computations and chief information officer.*

## SURVEY

*Continued from page 1*

cerns of Lab employees, the firm will be able to benchmark such data against similar institutions in Silicon Valley and the DOE complex.

The survey is being conducted to identify work environment and related issues the Laboratory must address to more effectively recruit and retain highly skilled scientists and engineers as well as other skills necessary to maintain a world-class research laborato-

ry. It will also serve as a follow-up to the diversity survey conducted five years ago.

As part of the development process, ISR representatives will be seeking feedback from diverse groups across the Laboratory by interviewing many different focus groups. Some randomly selected employees may already have received invitations earlier this week to participate in these groups. Interviews will begin next week.

While diversity will be an important element of the new survey, the major intent will be to focus more

broadly on all aspects of the present and desired future work environment at the Laboratory.

Tarter urges employees to "devote serious thought" to the survey questions when they receive them. "We need your perspective to succeed."

Additional information about the survey and the survey process will appear in upcoming issues of *Newsline*.

Employees may also send comments and/or suggestions about workforce issues to the director via e-mail at [workforce2001@llnl.gov](mailto:workforce2001@llnl.gov).

## Technical Meeting Calendar

Friday  
**26**

### BIOLOGY & BIOTECHNOLOGY RESEARCH PROGRAM

"Life Technologies and the Rule of Law," by Franklin Zweig, Einstein Institute for Science, Health and the Courts. 1:30 p.m., Bldg. 361 auditorium (uncleared area). Diana L. Bradbury, 2-1746.

### MACINTOSH TECHNICAL SEMINAR SERIES

Two presentations: Alan Oppenheimer, of Open Door Networks, will give a presentation on Macintosh security and the evolution of the AppleTalk network system. Michael Mills, Apple senior consulting systems engineer, will give an update on the software and hardware products announced at MacWorld. Michael Mills, 9:30-10:30 a.m.; Alan Oppenheimer, 10:30 a.m.-noon. Bldg. 543 auditorium. Contact: Becky Frank, 3-2879.

### INSTITUTE FOR GEOPHYSICS & PLANETARY PHYSICS

"Evolution of Early-Type Galaxies at  $z < 1$ : Results From DEEP," by Myungshin Im, UCO Lick Observatory. Noon, Bldg. 319, room 205 (open area). Contact: Joanna Allen, 3-0621.

Monday  
**29**

### SYSTEMS & NETWORK DEPARTMENT

"An Introduction to Office 2001 Software for the Macintosh," by Microsoft technical representa-

tives. A demonstration of the Microsoft Office Suite, including Entourage, Word, PowerPoint and Excel. 10 a.m. Bldg. 543 auditorium. Contact: Candace Gittins, [gittins1@llnl.gov](mailto:gittins1@llnl.gov), 4-4952.

### UC DAVIS, DEPARTMENT OF APPLIED SCIENCE

"Very High Resolution Simulation of Compressible Turbulence on the IBM-SP System," by Arthur A. Mirin, Center for Applied Scientific Computing, LLNL, 4 p.m., Bldg. 661 (Hertz Hall), room 13 (open area). Refreshments served at 3:30 p.m. for a "meet the speaker" session before seminar and at 5 p.m. after the seminar. Contact: Estelle Miller, 2-9787.

### CHEMISTRY & MATERIALS SCIENCES

"Elucidating Structural Trends in the Phosphorus-Sulfur-Selenium Glass System by Multiple-Phase  $^{31}\text{P}$  and  $^{77}\text{Se}$  NMR," by Paul F. Mutolo, 10:30 a.m., Bldg. 151, room 1209 (uncleared area). Contacts: Robert Maxwell, 3-4991, or Bonnie McGurn, 3-2764.

Wednesday  
**31**

### MATERIALS RESEARCH INSTITUTE

"Developments in Biological Analyses With the LLNL Nuclear Microprobe," by Patrick Grant, LLNL. Bldg. 219, room 163, 3:30 p.m. (open area).

Contact: John Molitoris, 3-3496, [molitoris1@llnl.gov](mailto:molitoris1@llnl.gov) or Miriam Rinnert, 2-7369, [rinnert1@llnl.gov](mailto:rinnert1@llnl.gov)

Thursday  
**1**

### MATERIALS RESEARCH INSTITUTE

"On Quantum Effects in Condensed Matter at High Pressure," by Sergei Stishov, Institute of High Pressure Physics, Troitsk, Russia. 3:30 p.m., Bldg. 219, room 163 (open area). Contact: Bill Nellis, 2-7200, or Miriam Rinnert, 2-7369.

### MATERIALS SCIENCE & TECHNOLOGY

"Characterization of Reactions in Ni/Al and CuOx/Al Reactive Multilayer Foils," by Kerri Blobaum, John Hopkins University. Post-Doctoral Applicant Seminar, 10 a.m., Bldg. 235, room 1090 (uncleared area). Technical Contact: Adam Schwartz, 3-3454, or Joanne Maxwell, 4-4344.

Friday  
**2**

### PHYSICS & ADVANCED TECHNOLOGIES

"Big-Bang Nucleosynthesis: Precision Nuclear Astrophysics," by Carl Brune, University of North

Carolina. 1:30 p.m. Bldg. 211, room 227 (uncleared area). Contacts: Dennis Slaughter, 2-6425, or Pat Smith, 2-0920.

### CHEMISTRY & MATERIALS SCIENCE

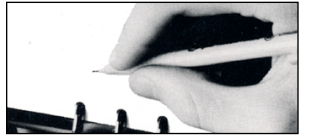
"Investigation of an Amorphous Polymer Under Active Deformation, the Study of Aminato and Propanolato Aluminum Clusters as Models for Possible Methylaluminum Structures, and the Determination of a Niobium(V) Complex Using Solid-State NMR," by Pamela Bryant, Massachusetts Institute of Technology, 10:30 a.m., Bldg. 151, room 1209 (uncleared area) Contacts: Robert Maxwell, 3-4991, or Bonnie McGurn, 3-2764.

### MATERIALS SCIENCE & TECHNOLOGY

"A Chemical Bonding Model for the Prediction of Thermodynamic and Other Properties of Lanthanide and Actinide Alloys," by Leo Brewer, UC Berkeley. 10:30 a.m., Bldg. 235, room 1090 (uncleared area). Contact: Patrice Turchi, 2-9925, or Nancy Pullen, 2-4321.

**Deadline for the next calendar is noon, Wednesday, Jan. 31.**

- Address e-mail to [tmc-submit@llnl.gov](mailto:tmc-submit@llnl.gov) or fax to 2-9291.
- Mail listings to Technical Meeting Calendar, L-797.
- Telephone ext. 2-9709 for information regarding the printed calendar.



# Ergonomics is elementary in Livermore schools

By Sheri Byrd

NEWSLINE STAFF WRITER

Lab ergonomist Cheryl Bennett is concerned that school children in Livermore, and around the world, may be suffering both long and short term ergonomic-related injuries as they spend more and more time on computers.

Although adult repetitive stress and other ergonomic injuries are well documented, Bennett said, "We don't know what's going to happen to kids — younger bodies are more forgiving — but could it lead to serious disabilities later in life?"

In conjunction with the International Ergonomics Association (IEA), Bennett recently organized the Ergonomics for Children and Educational Environments Technical Committee, with ergonomists from 11 countries. Though computer use has spread rapidly through schools in the last 10 years, Bennett's committee reports that virtually no instruction has been passed on to teachers or students concerning ergonomics.

"We need to provide more children's ergonomics information to educators, researchers, administrators and parents," Bennett said.

In pursuit of that goal, and as a parent of an Almond Avenue School student, Bennett and fellow Lab ergonomist Lois Halunen have been volunteering with the school for the last three years to help the school provide more ergonomic arrangements for computer students.

"When we started to observe the students, we saw some really contorted postures," said Halunen. "Schools tend to place a computer on any horizontal surface, using whatever tables that are available.

"It was important as a part of these projects for the teachers to have a review of good ergonomics to more easily recognize incorrect postures," said Bennett. "We have also sent information home for parents."

Kim Schuetz, computer technician at Almond, incorporates Bennett's suggested ergonomics into her typing and computer lessons for students.



COURTESY OF CHERYL BENNETT

## A Granada High School shop student makes an ergonomic footrest for a school computer lab.

"We've raised the table heights and made various other adjustments, depending on grade level and size of the students," Bennett said. "Another significant improvement is taking place now with the addition of kid-sized adjustable footrests."

Once Bennett had pointed out that the footrests would be a helpful addition for the students, Almond Avenue principal Sheryl Howser thought of the Wood Technology students at Granada High School in Livermore, where she was formerly vice principal. After working with Bennett on the design, instructor Kent Hammonds enthusiastically agreed to help the high school students manufacture the footrests.

The Almond Avenue Parents and Teachers Association donated funds for the materials, and the GHS class has now made over 100 ergonomic adjustable footrests to accommodate smaller students. A future project for the school is to provide cushions to further help adjust the students' postures.

Livermore Superintendent of Schools Lorraine Garcy said of the project, "This is the best thing you can see in a school district. This is what happens when parents and teachers clearly identify a problem and come together as a team to create a solution."

Another member of the IEA committee, Professor Alan Hedge of the Cornell Human Factors and Ergonomics Research Group (CHFERG) in the Department of Design and Environmental Analysis at Cornell University, recommends the following guidelines on his Website ([ergo.human.cornell.edu](http://ergo.human.cornell.edu)) for children working on computers, at school or at home:

- Back supported by chair (sitting back in chair with back at more than 90 degrees and well supported).
- Chair seat should not compress behind the knees.
- Feet firmly on a surface for support (floor/footrest).
- Head balanced on neck (not tilted back or too far forward).
- Popliteal angle, behind the knees, should be greater than 90 degrees.
- Upper arms close to body and relaxed (not abducted to the side or flexed forward).
- Elbow angle should be greater than 90 degrees (forearm below horizontal).
- Wrist neutral at less than 15 degrees (wrist/hand level with forearm).

A simple supply of cushions, boxes and large books to booster smaller children can easily adjust workstations that must be used by children of various sizes. Parents and educators interested in low or no cost items to improve children's ergonomics, as well as other ergonomic information for schools, can visit the Computer Ergonomics for Elementary School

# Groups focus on fine tuning Laboratory's ISM system

The Laboratory's responses to comments and suggestions made during recent Integrated Safety Management (ISM) post-verification focus groups were reported to participants in a December meeting hosted by Den Fisher, associate deputy director for operations.

The purpose of the meeting was twofold. First, to be sure that comments from focus group participants had been accurately captured, and second, to explain what actions would result from their feedback.

The focus groups included 33 employees representing most directorates. Included were responsible and authorizing individuals, facility-points-of-contact, facility managers, program leaders, and members of the ES&H Teams.

Three groups met in late October to provide feedback on the types of problems employees were encountering in their daily use of ISM procedures. Now that ISM verification has been successfully completed, Fisher wanted to know the following: What aspects of ISM do you find to be hindrances to doing your work? What are your recommendations for improvement? What was working well?

Fisher's ISM Rollout Implementation Team (RIT) sponsored the focus groups and developed the action plan in response. He said all of the action items would be tracked to make sure "nothing falls in a crack." Over 20 action items resulted from the groups, centering on three main areas: the Integration Work Sheet (IWS), procuring outside services, and the position of facility-point-of-contact (FPOC).

According to Fisher, the groups made several suggestions regarding the IWS. Some examples include the following: Improve ability to track changes on the electronic form, reduce the number of

signatures required, streamline the process, and remove impediments to making rush repairs. Fisher said IWS issues have been assigned to various people or committees for resolution, and that proposals are due by the end of February.

Difficulty in procuring outside services while complying with ISM regulations was another issue raised by the groups. In response, Fisher reported that Business Operations would be working with the legal office, Risk Management, the University and the RIT to improve the procurement process.

The third area, FPOCs, involves their training and availability, and what Fisher described as the "overall maturing of this new position." The groups said that additional qualified FPOCs were needed, that the focus of their training needed sharpening, and that they are often difficult to locate. Fisher said the RIT is to make proposals on these and related concerns by March.

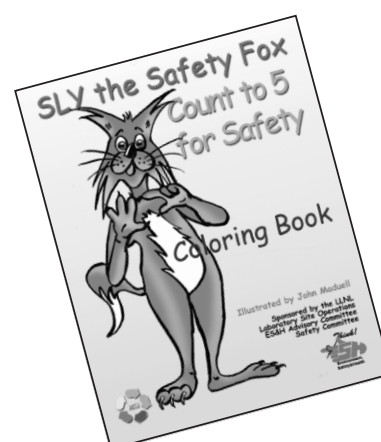
In regard to "what's working," Fisher said there was broad consensus among all groups that one of the main impacts of ISM has been a sharp increase in employees' safety awareness. People said this resulted from the frequent communications but also because senior management showed sincere support of the program. Another important improvement, according to the groups, is in overall communications regarding ES&H work-relat-

ed issues.

Before closing the meeting, Fisher explained that much work remains to ensure ISM at the Laboratory continues to mature in an effective manner. He said the RIT is still coordinating responses to corrective actions that came from the verification. It is also working on items that weren't completed during the initial ISM implementation, as well as addressing the focus group issues.

Fisher concluded the meeting by reporting that the Laboratory's safety performance had improved sharply since ISM implementation began. He used a chart to show LLNL's safety cost index had been cut in half since 1997.

## Let Sly the Safety Fox teach our children about ISM



ISM is based on the idea that safety should be fully integrated into all aspects of our lives. With that in mind, the Laboratory has developed a safety coloring book that employees can take home to their children. The coloring books are free and allow employees to open a dialogue with their children about safety. The ISM coloring book is available at the Visitors Center and in the LLESA Store. Pick one up and give your child the gift of safety.



Friday, January 26, 2001

**DIRECTOR'S OFFICE***Continued from page 1*

tance of the institutes has grown, along with LLNL's need to recruit from and engage with the best faculty and students in universities across the country and around the world.

The institutes interact with over 80 universities worldwide. In addition, approximately 50 institute students or post-docs have gone on to faculty positions. Students play a particularly strong role in the institutes, since they are often the "glue" that holds together a research collaboration, as well as adding greatly to the intellectual vitality of the institute environment. Over the years, more than 144 Ph.D. theses have been completed based on institute research. In addition, roughly one quarter of all LLNL publications can be associated with one or more of the institutes. Fifty-five LLNL new hires have involved people who have had an institute experience.

Four specific goals of the institutes include establishing long-term research collaborations on a national scale, assisting the Lab in accomplishing its mission, enhancing the Lab's ability to recruit top research talent, and investing in future national decision makers. A particular strength of the institutes is their ability to involve the university community with the Lab's unique experimental and computational facilities, such as LLNL's accelerator mass spectrometers, the nuclear microprobe, LLNL lasers and target chamber diagnostics, ASCI visualization tools, high pressure experimental facilities, LLNL adaptive optics, robotic telescopes, and the positron annihilation facility.

One service the institutes can offer is to provide white space to foster interactions with the academic community. These open areas are used by LLNL programs as places where students, faculty and Lab staff can work together. This has been a particularly important feature of the institutes over the past 18 months.

While the individual *Newsline* articles will discuss each institute in detail, I want to give some flavor of the unique nature of each one, their general areas of expertise, and some examples of their high profile research projects:

**IGPP**

IGPP has two centers, one in astrophysics and a

second in geosciences. IGPP at LLNL is actually a branch of a UC Multi-campus Research Unit that began operation in 1946 with a charter to further research in the earth and planetary sciences.

Branches of the IGPP also exist at UCLA, UC-San Diego, UC-Riverside, UC-Santa Cruz and at LANL. The acting director of IGPP is Kem Cook.

Two examples of research in the IGPP Astrophysics Center at LLNL include the MACHO (Massive Complex Halo Objects) project, which is an experimental search for dark matter in the Milky Way Galaxy and the TAOS (Taiwanese American Occultation Survey) project, which is searching for asteroids in the outer reaches of our solar system. An example from the Geosciences Center is the use of geospeedometry to trace the uplift of the Himalayan Mountains.

**CAMS**

CAMS continues to lead the development and application of isotopic abundance measurement and ion-beam analytical techniques that support LLNL missions while enhancing and enabling university research. CAMS is involved in a wide variety of research topics that range from understanding carbon sequestration and global climate change to biological tracing of chemicals in humans and animals. One particular use of CAMS that has always intrigued me has been the ability to use salmon scales, archived by fisheries over the past hundred years to develop a record of radiocarbon in the oceans for the 20th century. The director of CAMS is John Knezovich. The specific article on CAMS appears in this issue of *Newsline* on page 3.

**ISCR**

ISCR has as its mission to foster collaborations between LLNL and academic researchers in the areas of scientific computing, computer science, and computational mathematics. ISCR is also part of CASC (Center for Applied Scientific Computing). A particular example of ISCR research is the terascale visualization technique used on the three-dimensional Richtmyer-Meshkov instability simulation on ASCI Blue that led to the 1999 Gordon Bell prize for peak performance. A second example, on the development of data mining techniques, highlights one of the many interactive projects between the institutes. The data used as a test for the new data mining tech-

niques was an extremely large astrophysical data set developed by a UC Davis professor working in IGPP. The Acting director of ISCR is David Keyes.

**ILSA**

ILSA has as its mission strengthening research collaborations in the area of high-power lasers and their applications. One of its main objectives is the training of the next generation of laser-matter interaction scientists who will use the National Ignition Facility (NIF) when it is completed. ILSA research programs include: Parametric Instabilities in Laser Plasmas, Short Pulse Interaction Physics, Computational Methods for Fast Ignitor Physics, Particle-Photon Interaction Physics, Laser Accelerators and X-ray Lasers and Imaging for Biological Applications. The director of ILSA is Hector Baldis.

**MRI**

MRI is the newest of the institutes, and has focused on the areas of optical and electronic materials, metals and organics, and biomaterials. I had the privilege of being the founding MRI director for 1997-2000. Having an institute in the area of materials science has unique challenges/advantages in that this discipline at the Lab is spread over many of the directorates. In recent months, MRI has increasingly become a focus for the Lab's efforts in nano-technology and laser-matter interactions, running very successful workshops in both areas. Some examples of research in MRI include fundamental studies of laser damage in NIF-related optics, and determining the structure of bio-materials interfaces using third generation synchrotron-based X-ray diffraction. The director of MRI is Michael McElfresh.

**Future opportunities**

In summary, my hope in writing this column is to give everyone at the Lab a better understanding of how the institutes function, and what they can do for LLNL researchers and the directorates. As part of my goal to improve communications with both Lab researchers and the university community, a newsletter listing funding opportunities at LLNL has just been published; it includes information on responding to upcoming calls for proposals from the five institutes (<http://www.llnl.gov/urp/fco/>).

See Newsline on the Web at  
<http://www.llnl.gov/PAO/Newsstand/internal->

**CLASSIFIED ADS****RIDESHARING**

Express your commute, call 2-RIDE for more information or visit the web site at <http://www.r.llnl.gov/tsmp/> for more information

Danville Vanpool needs driver for homeward bound leg and vacation-relief. Fare would be reduced to \$30/mo with tax incentives available. 925-837-4097 (2-6234)

San Jose - South San Jose-Commuter Partner Leave SJ 8:00am return 6:00pm Work Hours are flexible 408-779-7854, ext. 3-3063

Palo Alto/Menlo Park/Mountain View - flexible,occasional 650-838-9451, ext. 3-3330

Danville - van pool 8-4:45 \$55/mo. There are county, State and Fed incentives which can make the first 3 months almost free. 925-837-4097, ext. 2-6234

Lafayette - LaMorinda (also Walnut Creek stop at Rudgear Rd) luxury Vanpool (reclining seats, reading lights) 8-4:45, \$115/mo (pretax reduction available) David 925-376-5346, ext. 2-3005

Modesto - WORKING 4-10 WEEKLY SHIFT? Lets get together and start a vanpool. 6-4:30 monday

thru friday. 209-667-2365, ext. 2-8321

Modesto - Commuter Partner Wanted, Lab Hours 8:00 a.m. till 4:30 p.m. M-F. From Vintage Fair Mall. A209-529-0431, ext. 2-8828

San Jose & Fremont-Mission - Space is available from San Jose and Fremont-Mission areas. Work hours: 7:30-4:30. 408-238-1909, ext. 3-3057

Oakland-Monclair District - SEEKING NEW RIDERS; relax, enjoy your commute, come ride with us! Dependable, prompt and courteous service. 510-834-6405, ext. 4-5173

Discovery Bay - Looking for additional driver/rider from Discovery Bay, 7:30-4:15. 925-634-5754, ext. 3-5481

**SERVICES**

Quality Childcare Available - close to lab, ages 2 and up. 925-371-0620

Expert painting, interior/exterior. Professional painter, many years experience. Free estimates. 925-828-6190 925-634-0560

TUTORING in high school and college chemistry and math. 925-443-2095

Hauling Service. Estate cleanouts, Attics, Garage, Shed & Barns. Misc... 925-373-9540

Handyman for hire, fix it or replace it. Sprinkler specialist, plumbing, sod lawns, drain cleaning. 209-847-6623

**TRUCKS & TRAILERS**

1992 - Ford Ranger, 4-speed, 84K miles, air. Nice condition. Call evenings. 209-823-3606

1995 - RV 36 feet Residency diesel pusher; many extras; excellcondition, call for details. \$77,700.00. 925-449-0430

1995 - Chev. 4x4 Silverado 1500x Cab, 8 ft. bed, Leer shell, Lund BDS, AM/FM/CD, Sec. system, 29K mi, \$17,750, clean 925-449-4788

2000 - Dodge Dakota SLT King Cab, Automatic, Air, Power, Cruise, Line-A-Bed. \$17,500 obo. 925-373-9680

1987 - Class C MH 22ft. Ford 460cc, ps, cc, ac, CD, 70k miles. Solar panels, meter, 25 gal. tank, tub/shower, self-contained, nice, sleeps 6, \$9,500/obo. 408-499-3312

**VACATION RENTALS**

SOUTH LAKE TAHOE - 3 Bedroom 2Bath Chalet, nicely furnished, all amenities, quiet area, close to all skiing, Few weekends left, Reserve Now! 209-599-4644

Twain Harte - Fully furnished.2bdr 2full bath.Cable TV,VCR, washer,dryer, microwave,dishwasher and more.Close to Dodge Ridge ski area.\$150wknd \$300wk 925-443-2808

Maui, HI - Kahana Reef oceanfront 1BR/1BA condominium. Beautiful two-island view, oceanside pool, and BBQs. Low LLNL rates for year-round reservations. 925-449-0761

**WANTED**

Artificial silk plants wanted, one or two medium size ficus or similar, will pay reasonable price. 925-736-7799

HOUSECLEANER WANTED: Someone who can clean a <2000 sq ft house in Livermore to a high standard of cleanliness. Once per week. 650-291-8884

I need bodies to practice my energy massage on. Very relaxing work, light pressure. Tri-Valley area. Fully clothed. No cost! 510-791-8623

Wanted: used drum set for

teenage boy. Nothing fancy. 925-443-1828

MAVIS BEACON TEACHES TYPING - older version that does not require Power Mac 925-443-4918

3-inch pipe for posts. About 60 feet. 925-455-0486

CAMPER SHELL that can fit onto a 1991 Toyota standard bed pickup truck. 510-581-4609

Wanted: Acoustic Electric Guitar for my 11 year old son. Will pay reasonable price. 925-833-0186

Wanted- Tent Trailer to buy. Newer model preferred. 925-449-8757

Want licensed electrician to help move and add some lites to ceilings of home. 925-447-0844

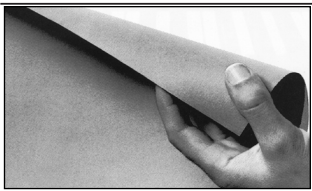
WANTED: old wind up phonograph all or parts. Also interested in anything from 1950s or older 925-449-0388

Host families for Japanese exchange students in the Modesto/Oakdale area for one weekend in March. 209-527-0495

Wanted someone with FFL to handle a mail-order for me. 925-876-1046

Bosch universal mixing machine, 925-846-3592

**Employees are responsible for ensuring the content of their ad is accurate.**



## THE BACK PAGE

### GLASS

*Continued from page 1*

ject (LMJ), a French government facility currently under construction near Bordeaux, France.

Each laser glass slab, which measures 790 mm by 440 mm and is 45 mm thick, is carefully fine annealed and extensively tested and inspected in Hoya Corporation's new 32,000 square-foot laser glass manufacturing facility in Fremont. The glass produced by Hoya's continuous melting system has successfully achieved all of the stringent glass specifications required for NIF and LMJ. In particular, the glass contains essentially no microscopic platinum particles that could cause laser-induced damage within the glass at NIF and LMJ's high operating fluence. In addition, the "water" (OH) content in the glass is less than 200 ppm thus minimizing Nd fluorescence quenching. Finally, the optical homogeneity surpasses the transmitted wavefront specification by about a factor of two.

"Hoya's work in this area is outstanding," said Ed Moses, NIF project manager. "Along with the glass slabs produced by Schott Glass Technologies, roughly half of the total glass slabs needed for NIF have been produced. This technological achievement is signifi-



**Lynn Yankiling, a quality assurance inspector at Hoya, examines the most recent batch of laser glass. The glass slabs will be used in the National Ignition Facility.**

cant. Our goal was for Hoya to produce 500 glass slabs during their current melting campaign — they've exceeded that by 50 percent."

Hoya's current continuous glass melting campaign, which began in June, will end as planned in February. Beginning this summer, Hoya will begin to produce the remaining laser glass needed to supply their 50 percent share of the amplifier slabs required for NIF and LMJ. Schott is to provide the other 50

percent. It is anticipated that between Hoya and Schott, approximately 1,500 slabs will be produced annually. The combined amount needed for NIF and LMJ is about 8,000 laser slabs.

"We appreciate the opportunity to work with LLNL and the French Government on these very important projects," said Gerald Bottero, president and chief executive officer of Hoya Corporation USA. "We've worked with this special glass since 1973 and we commend our employees for their dedication and commitment to perfecting this technology."

Hoya was founded in 1941 as Japan's first specialty manufacturer of optical glass. The company is the world's leading supplier of molded aspheric lenses for cameras, VCRs and DVD players, and operates a state-of-the-art melting facility in Akishima, Japan. In addition, Hoya offers glass magnetic disks, semiconductor photomask blanks, eyeglasses, contact lenses and a variety of other products through 46 subsidiaries in 22 countries.

Hoya is headquartered in Tokyo, Japan.

The National Ignition Facility, currently under construction, is one of the cornerstones of the DOE's Stockpile Stewardship Program. NIF will use the world's largest laser to heat fusion fuel to thermonuclear ignition.

The experiments will help scientists sustain confidence in the nuclear weapons stockpile without actual testing. NIF will also produce additional benefits in basic science and fusion energy. Further information can be found at <http://www.llnl.gov/nif>

### FSC

*Continued from page 1*

depression and a desire to receive the death penalty.

In his original confession, Saldivar detailed his use of two paralyzing drugs, Pavulon and succinylcholine chloride, injected into the IVs of patients. After withdrawing his confession, he was released as the investigation continued, although his therapist's license was revoked.

Andresen recalls that Michael Peat, then president of the American Academy of Forensic Sciences (AAFS), contacted him in early 1999.

"Peat was initially approached for support and he recommended the Lab's Forensic Science Center to perform the toxicology analysis on exhumed tissues," Andresen said. "Glendale police did not have the capabilities to perform this type of toxicology work.

"Peat knew that the Lab had the right combination of highly sensitive and sophisticated equipment and also the knowledge-base to handle these types of unusual samples," said Andresen. "He knew me through the AAFS, and in March 1999, I got my first outline of the case at the Glendale Taskforce Headquarters."

Of the 171 deaths at Glendale Adventist that occurred on Saldivar's shift in the last two years of his employment, the 20 "most mysterious" cases were given to the Los Angeles County coroner's office, which began exhuming the bodies during the last week of May 1999.

Andresen traveled to Los Angeles, where he assisted in the first four autopsies. He prepared and demonstrated the proper sampling equipment for the coroner's office personnel and showed them how the evidence needed to be retrieved and preserved.

"Over the next 16 weeks, the remaining exhumations and sample collections were done, and I received them here at the Lab," Andresen said.

Because succinylcholine chloride breaks down very quickly into chemicals normally found in human tissue, Andresen concentrated his testing on Pavulon, a potent, synthetic muscle relaxant often administered

to patients on artificial respiration. This compound is very powerful and is usually given at very low levels. It was previously thought to dissipate quickly in the body.

"I was very surprised at first that I found anything," Andresen said. "I went in to this with a totally open mind."

After six positive hits for Pavulon, he made his preliminary presentation to the Los Angeles District Attorney's office in December 1999, after which all of his results were double-checked by their outside sources.

On Jan. 5, Deputy District Attorney Al MacKenzie and the Glendale Taskforce reviewed a final presentation at the Los Angeles Coroner's Office that outlined all of the toxicology findings and outside reviews.

"The district attorney felt it was time to act," said Andresen, "and they went ahead with the arrest, based primarily on my Pavulon findings in six patients out of the 20 exhumations."

MacKenzie commented that Andresen had invented "a new scientific protocol, which I hope will be of use in future investigations."

Overall, reflected Andresen, "It was very exciting. I applied some of the best tools and equipment for this type of work available at the Lab. Our biological toxin analysis for other similar investigations and nonproliferation activities are now all set up, should a similar need arise."

The Forensic Science Center is dedicated to teaching, developing new forensic methods of analysis, designing and building advanced laboratory and field-portable analysis hardware, and providing unique problem-solving capabilities, all combined in a security facility. The FSC provides support for a variety of investigations concerning new field collection methods, the characterization of total unknowns, firearms examinations, drug analysis, chemical fingerprinting of suspect materials, and the development of new analysis protocols.

Over the years, FSC scientists have provided forensic support to such notorious cases as the World Trade Center explosion, toxic fumes in a Riverside hospital emergency room, the UNABOMER, and the

Fremont serial bomber. They also characterized a shipment from Japan, which federal agents suspected was heroin, and identified tetrodotoxin (TTX), a deadly biotoxin derived from the pufferfish.

Most recently, the FSC supported the Democratic National Convention by providing a mobile forensic laboratory capability. They are also on call for emergency analysis, such as in the case of a Livermore man who committed suicide by ingesting Malathion.

Andresen notes that although the FSC's primary mission is to support U.S. nonproliferation and counterterrorism programs, the FSC's capabilities can be used to assist law enforcement where there are special needs, such as unusual analyses or new protocols. "We're not in the business of routine police lab work, but if you've got something particularly tricky, difficult, or out of the ordinary, give us a call."



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