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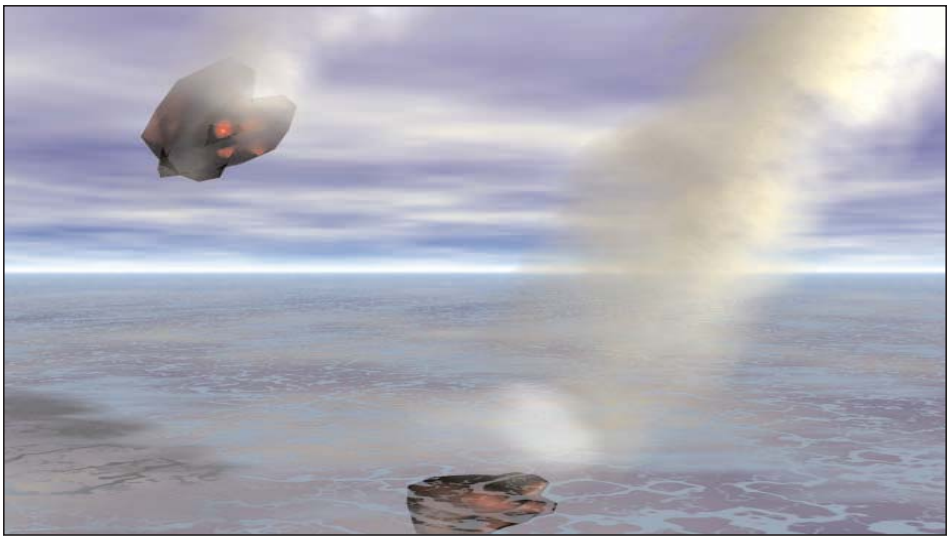
It rocked our world:

Researchers detect huge meteors while listening for clandestine nuclear tests

by James E. Rickman

Using a system designed to detect clandestine nuclear weapons tests, researchers at the Laboratory detected two large meteors that recently entered the atmosphere above the Pacific Ocean.

Using Los Alamos listening stations that can help alert international authorities to weapons tests by rogue groups or nations, researchers Rod Whitaker, Doug ReVelle and Peter Brown of Atmospheric and Climate Science (EES-8) detected two meteors entering the atmosphere on April 23 of this year and on Aug. 25, 2000. Data from orbiting space platforms confirmed the objects. The Los Alamos team waited until the space-platform data were released publicly last week before releasing their data.



The meteors were very large, measuring about six and 10 feet in diameter. They undoubtedly appeared as huge fireballs in the sky. Such large, fiery meteors are called bolides.

When a bolide enters the atmosphere — or when a large explosion is detonated — it creates a sound, or pressure wave, that at long range is below the levels of human hearing. This infrasonic wave travels through the atmosphere and can be detected by special microphones that are set up in an array. Los Alamos operates four arrays located throughout the United States. By looking at the time of arrival of the sounds at different array stations and at the frequency of the infrasonic signal, researchers can pinpoint the location of the source and determine the amount of energy that created it.

The April 23 meteor plunged into the atmosphere above the Pacific Ocean several hundred miles west of the northern Baja California region of Mexico. The August 2000 meteor entered the atmosphere off the coast of Acapulco, Mexico.

The pressure wave of a bolide entering the atmosphere is akin to a pressure wave created by an explosion. Because of this, ReVelle and Whitaker often speak of meteor size in terms of explosive yield — the larger the yield, the greater the diameter of the meteor.

The August 2000 meteor had an explosive yield equivalent of 2,000 to

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Inside

Director's News

Recently, I appointed Joe Salgado, deputy director for business administration and outreach, as principal deputy Laboratory director. In this capacity he functions as a chief operating officer and serves as acting director of the Laboratory in my absence. Salgado will continue to head the BAO Directorate for the time being. I appointed of Steve Younger, associate Laboratory director for nuclear weapons, as senior associate Laboratory director for national security to guide and oversee the Laboratory's participation in strategic and long-term national security policy and planning. Younger joins the Director's Office to assist me in formulating strategic directions for Los Alamos programs in stockpile stewardship, nonproliferation and nonnuclear defense, and will represent the Laboratory in high-level interactions with the National Nuclear Security Administration, Department of Energy, Department of Defense and the military services. Younger also will continue to head the Nuclear Weapons Directorate pending possible further changes.

Earlier this year I set before employees my expectation for the Laboratory in which the quality of our operations matches the quality of our science and technology. Key to this effort is the successful implementation of an integrated management approach at Los Alamos, and the actions I announced May 31 will help us strengthen and integrate management across the Laboratory.

Establishing these two new positions are important and necessary steps toward the goal of integrated management and a more unified work force. The end result will be an environment that better supports scientific productivity, which is at the core of this Laboratory.

In addition, I have initiated a 45-day organizational review of the Nuclear Weapons Directorate. Recommendations from this review committee could lead to other changes in our organizational structure.

Researchers detect …

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3,000 tons of TNT. The April meteor was much larger, with an equivalent explosive yield of 6,000 to 8,000 or more tons of TNT. Based on the energy and speed, ReVelle and Whitaker estimate the first meteor was six feet in diameter. The second meteor probably was at least twice as large.

Each year a number of large meteors enter the atmosphere and are detected by the Los Alamos arrays. ReVelle said that on the average, 10 or more meteors that are six feet in diameter enter the atmosphere each year. Larger bolides entering the atmosphere occur less frequently, but they do occur nevertheless.

Fortunately for people on the ground, most meteors explode into thousands of tiny pieces or burn up completely before they hit the surface. If the August and April meteors made it to the surface, they probably hit water — well away from any populated areas.

When they do hit the ground, their destructive power is unmistakable. The remains of a very large bolide collision with Earth can be seen at Meteor Crater, Ariz.

The Los Alamos infrasound arrays don't provide advanced warning of a meteor's approach because the infrasonic signature takes several minutes to hours to reach the stations. But the stations do have tremendous potential for detecting clandestine nuclear weapons tests and for forecasting the rate of large bolide entry into the atmosphere.

The meteors of April and August played an important role in helping nonproliferation technology efforts.

"Because those two events were detected by our four arrays and by five other arrays operated by the International Monitoring System, we are able to use the space platform data to calibrate our instruments, and analyses, to make them better able to pinpoint the exact location where these events occurred," Whitaker said. "Every time we hear a bolide, we learn something about this technology and are better able to fine tune it."

LANL

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Audit shows success, opportunities

by James Rickman

April's verification audit of how the Lab and the local Department of Energy Area Office have implemented Integrated Safety Management indicated that the Lab has many noteworthy ISM practices, but it also has some improvements to make.

April's audit by DOE was the second phase of audits focusing on ISM at the Laboratory and the DOE Los Alamos Area Office. The first audit occurred in October 1999.

Based on findings from the first audit, April's audit focused on how the Lab and LAAO perform hazard identification, how they implement work controls, how ISM feedback and improvements are managed and how the Lab coordinates its ISM efforts with DOE.

April's audit primarily focused on the Lab's Plutonium Facility, the Chemistry and Metallurgy Research facility and on the Dynamic Experimentation (DX) Division. In addition, auditors approached Lab workers and asked them questions related to the Lab's ISM guiding principle of "Management Commitment and Worker Involvement."

"Auditors reported that most employees were well versed on ISM principles and did very well when questioned by the auditors," said Hillard Howard, ISM Program manager. "Overall, the Lab did very well in the audit. The audit found that Los Alamos has made significant progress since the 1999 verification audit.

"Perhaps most exciting is that the auditors noted several Los Alamos ISM features that can be adopted by other facilities within the DOE complex," he said. "Of course, since ISM is a continuous process, there always will be opportunities for improvement, and the audit identified three in particular on which to focus."

Those three areas for improvement are the following:

• DOE noted that the Lab should continue efforts to improve its analyses of ISM-related data trends. In addition, the institution needs to improve communication processes to share ISM information and learning between internal and external organizations and entities.

• DOE has mandated that the Lab take steps to improve its conduct of operations. The review team found that the Lab could best meet this mandate, further ISM implementation and foster worker buy-in through increased management commitment to formality and increased worker involvement in planning for and achieving the appropriate formality (applying the Lab's First Guiding Principle of ISM: management commitment and worker involvement).

• DOE also found that the Lab and LAAO need to improve the flow of safety information between each other. To do this, the two entities must develop more trusting relationships and better partnerships to accelerate continuous improvement in ISM.

But auditors also called attention to some noteworthy ISM practices at the Lab. April's audit found that the Nuclear Materials Technology (NMT) Division's Process Hazard Analysis and Hazard Control Plan processes are noteworthy because they provide a mechanism by which people involved directly with the work play a hand in developing ISM processes, from work procedures all the way up to Final Safety Analysis Reports. This mechanism ensures that actual worker procedures coincide well with facility-level procedures and that all work is done within a credible safety envelope.

Moreover, auditors concluded that DX Division's Hazard Control Plan processes ensure that workers are directly involved in development and review of such plans. The division uses a team approach when developing plans and invites broad participation — including participation by new workers

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Appendix O meshes with Lab's 10 institutional goals

by Shelley Thompson

Appendix O of the University of California contract with the Department of Energy is not just another bureaucratic burden with which employees have to comply.

In fact, the performance improvement initiatives in Appendix O are well aligned with the institutional goals recently presented by Director John Browne (see the March 8 Los Alamos News Letter).

"Every employee has a stake in the institutional goals and a contribution to make in helping the Lab achieve them. These goals tell us what the Laboratory's priorities are. They are the means by which we will integrate requirements of the UC contract, especially Appendix O. If our employees focus on the institutional goals, we will be well on our way to letting the world know that we are one unified Laboratory with a single identity, a clear mission and a determination to excel," said Browne.

Appendix O details management commitment to DOE to achieve performance improvement in five areas: management accountability; safeguards and security management; facilities safety; critical skills, knowledge and technical capabilities; and project management and construction project management.

The Quality Improvement Office has developed a "crosswalk" between Appendix O and the institutional goals and found considerable alignment.

The Appendix O initiatives reflect the National Nuclear Security Administration's expectations while the institutional goals reflect Browne's challenge for the Lab to be more customer-focused.

"The institutional goals turn out to be a really good road map for the Lab to address the requirements coming from our customer. It is reassuring that the institutional goals — based on our own self-examination — capture the key expectations of our customer of where we need to improve," said Bill Wadt, QIO Director.

Regents rescind SP-1 and SP-2, affirm commitment to diversity

The University of California Board of Regents at their May meeting unanimously adopted a resolution that rescinds SP-1 and SP-2 and reaffirms the university's commitment to a student body representative of California's diverse population.

"This action sends a clear and unequivocal message that people of all backgrounds are welcome at the University of California," said Regent Judith L. Hopkinson, who introduced the resolution.

The regents' action underscored the university's commitment to K-12 outreach programs that aim to improve the educational preparation of California's elementary and secondary school students to pursue a college education. The resolution also commits the university to retention programs to assure that UC students succeed and complete their education.

As part of UC's various efforts to expand the pathways to UC, the resolution commits the university to undertake new initiatives to improve the transfer process for community college students. One of those initiatives includes the president's "dual admissions" proposal that would simultaneously admit eligible high school students to both UC and a community college.

SP-1 and SP-2, the regental policies that prohibited the use of preferences in university admissions, employment and contracting practices, were approved in July 1995. While eliminating SP-1 and SP-2, the university still is governed by a similar ban incorporated into the California Constitution through Proposition 209, the state measure passed by California voters in November 1996.

UC Regents approve new vice president for laboratory management

by James E. Rickman

The University of California Regents recently approved the appointment of John P. McTague as vice president for laboratory management — a new UC position that has primary responsibility for oversight of the three UC-managed national laboratories, including Los Alamos. McTague began his duties June 1.

John P. McTague

McTague has extensive experience in industry, as a scientist, in academia and with the national laboratories.

"I was extremely pleased to hear of the selection of John McTague as UC's vice president for laboratory management," Laboratory Director John Browne said. "His background experience is not only impressive but highly relevant for this new position. I also know he is familiar with and appreciative of Los Alamos National Laboratory and the Department of Energy complex in general. Having worked with John over the years, I personally look forward to his help and guidance as we work with UC, National Nuclear Security Administration and the DOE on our journey to sustain excellence in scientific achievement and in the operation of our Laboratory."

Much of McTague's experience is directly relevant to Los Alamos. During the mid 1970s through the early 1980s, McTague worked as a consultant to the Lab's Physics (P) Division. He later was active in helping lay the foundations of the Pulsed Neutron Source, which he praised as a useful tool for advanced science.

McTague, a physical chemist who holds a doctoral degree from Brown University, also was a founding co-chairman of the DOE National Laboratories Operations Board and has served as an adviser to DOE affairs in a number of other capacities.

McTague said his first order of business in his new position will be meeting with people at Los Alamos, Lawrence Livermore and Lawrence Berkeley national laboratories.

Characterizing himself as a "people person" who enjoys face-to-face contact, McTague says he plans to meet with a diverse group of employees during his initial visits to Los Alamos.

Such contact will help him more effectively carry out the responsibilities of his new job — which was conceived last year after several high-visibility security and project management issues led the NNSA to restructure DOE's contracts with UC to operate Los Alamos and Livermore. Under the modified contracts, the university agreed to put in place a number of measures designed to strengthen oversight and operations of the two Labs. The modifications were incorporated in Appendix O, and these oversight and operations milestones will be reviewed regularly by the DOE. Failure to perform under Appendix O can jeopardize potential UC discretionary funding and renewal of the contract itself.

June 'Safety Days' are here again

by Fran Talley

Adhering to its commitment to promote worker safety "on and off the job," the Laboratory is finalizing plans for the third annual community "Safety Days" event in the Metzgers parking lot at Central Avenue and 15th Street from 8 am – 2 pm on June 21. The Laboratory's Community Relations Office also fronts on this parking lot.

A six-year-old Northern saw-whet owl, named Reese, watches last years Safety Days activities from his perch.
Photo by Michael Carlson

With an estimated 35 to 40 Lab, county and state exhibitors, this year's community Safety Days event is the largest and promises to have something for everyone. There will be a variety of wildlife exhibits, maps and information about county and Lab hiking trails, and an on-site stress management class.

Blood pressure and glucose checks also will be offered. "Ergo Care" will focus on sports and home activities for all generations. Ergonomic products, fire ecology, defensible space, county emergency equipment, and traffic and driver safety information are also planned.

Visitors to the Safety Days event are invited to enjoy refreshments at an open house sponsored by the Laboratory's Community Relations Office (CRO). And KRSN radio will broadcast live from the Safety Days event.

"Safety Days was started in 1996 to raise awareness and remind Laboratory and subcontract personnel of the need to practice safety on the job," said Environment, Safety and Health Deputy Director Phil Thullen. "In 1999, we expanded the idea and began working with county, state and federal agencies to coordinate the event to coincide with National Safety Month," he said.

According to Thullen, "This year's Safety Days events will help us focus on the people of our Laboratory and our community. The value that we have for one another should be constantly reflected in the care we take in our work at Los Alamos and our activities at home."

For more information about Safety Days activities, go to *www.lanl.gov/orgs/pa/News/SafetyDays2001.html* online or contact Fran Talley at 7-5225 or by electronic mail at *flt@lanl.gov*.

Partnership seeks to benefit area students and families

They call themselves "ENLACEROS" and they're on a mission recently in California aimed at improving educational opportunity for students in Northern New Mexico and increasing the number of those students who attend and graduate from college.

The four visiting New Mexico educators are members of state's ENLACE Project. Meaning to "weave together" in Spanish, ENLACE stands for Engaging Latino Communities in Education. The statewide project won funding recently from the Kellogg Foundation. Organizers in Northern New Mexico seeking models and best practices for the new venture have forged what they think will be a valuable link with University of California Riverside campus.

They were on campus for a series of activities designed by Riverside's
Early Academic Outreach Program and sponsored by the UC Northern New Mexico Office. Working cooperatively to contribute to the quality of education in northern New Mexico is part of UC's community commitment as the manager of Los Alamos National Laboratory for the National Nuclear Security Administration.

The Northern New Mexico component of the ENLACE Project is a collaboration of Santa Fe Community College, New Mexico Highlands University and Northern New Mexico Community College. The goal of the northern project is to establish a cohort of students and increase the college graduation rate 20 percent over the course of the project. ENLACE organizers eventually hope to form partnerships with Northern New Mexico schools such as Española, Pojoaque, Penasco and Las Vegas.

Strategies to accomplish this goal will include providing mentors for ENLACE student participants and coaching them on effective study habits, teacher preparation, engaging family and community in student activities, leadership training, test preparation and familiarizing students with the college environment.

Audit shows ...

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— in the development process.

DOE's audit team also found a noteworthy practice in management walk-arounds conducted by personnel in the DX, NMT, Chemistry (C) and Physics (P) divisions and in the Los Alamos Neutron Science Center. Managers in these organizations bring line workers along during the walk-arounds — a practice, auditors noted, that heightens safety awareness throughout the work force as well as demonstrates worker involvement in, and management commitment to, ISM.

Lab and LAAO officials will provide DOE's Albuquerque Operations Office with reports each quarter that discuss the progress that the entities have made in resolving the three opportunities for improvement identified during the most recent audit.

"We are pleased with the progress we have made in the ISM process," said Howard. "It is important that our ISM processes continuously improve and that we don't become so focused on the three opportunities for improvement that we lose sight of the bigger picture. We all have a stake in ISM."

Newsmakers

Phil Thullen

Phil Thullen, Environment, Safety and Health (ESH) Division deputy director, was recently recognized in a letter from Defense Nuclear Facilities Safety Board Director Joseph DiNunno for his role in implementing Integrated Safety Management at the Laboratory. "Ensuring safety of fellow employees, the public and the environment is a cause worthy of our best efforts," DiNunno wrote. "I extend to you this personal note to commend you for your dedicated efforts to make the Los Alamos National Laboratory and its surroundings a safe place to work and to live," he said. Thullen led the ISM initiative from its inception in 1996 until assuming the job of deputy division director in August 2000 and continues to be strongly involved in its improvement.

Avigdor Gavron has been appointed special assistant to Deputy Laboratory Director for Science, Technology and Programs Bill Press. Gavron most recently was acting deputy division director for Nonproliferation and International Security, and before he was the

Avigdor Gavron

Safeguards Science and Technology group leader. He will provide Press with assistance in such areas as staffing and human resources issues, work with division review committees, sister laboratory collaborations and handling issues related to Laboratory-Directed Research and Development. Gavron has a doctorate in nuclear physics from the Weizmann Institute of Science, Israel.

Bruce Matthews has been named the new Advanced Accelerator Applications (AAA)

Bruce Matthews

Program director. Matthews has been working on aspects of the AAA Program while serving on change-of-station at the University of California, Santa Barbara. Before his work at UCSB, Matthews completed a special assignment on safeguards and security for Laboratory Director John Browne and served as division director of Nuclear Materials Technology (NMT) Division from 1993 to 1999. He first joined the Laboratory in 1980, specializing in nuclear fuels for space and terrestrial reactors.

Benefits Buzz

Los Alamos ranks third in New Mexico in the number of physicians per capita, behind Bernalillo and Santa Fe counties. Long-term trends show that the number of physicians in Los Alamos County on a per capita basis has maintained the same relative level of service that is found nationally.

Scholarship fund continues to deliver on its promise

by Steve Sandoval

Thirty-eight high school seniors and college students recently were recognized as 2000-2001 Los Alamos Employees' Scholarship Fund recipients.

Top among the scholarship recipients are Jeffrey Franken of Las Vegas Robertson High School in Las Vegas, N.M. Franken will receive a four-year, $10,000-a-year scholarship.

In addition, Rebecca Hammon of Los Alamos High School and Ayla Matanock of Santa Fe Preparatory School will receive $2,500-a-year scholarships for four years.

"The Los Alamos Employees' Scholarship Fund continues to deliver on its promise to help deserving students in the area to get a great education and a great summer job experience at the Laboratory and, at the same time, help the Laboratory prepare a work force for tomorrow," said Al Sattelberger, Chemistry (C) Division director and president of the Laboratory Foundation board of directors.

Twenty-nine other scholarship recipients will receive $1,000 one-year renewable scholarships, while six students are receiving one-year $2,000 Compaq Corp. scholarships. Compaq Corp. is supplying the new supercomputers that will be housed in the Laboratory's Strategic Computing Complex under construction at Technical Area 3 and has agreed to contribute $60,000 over five years to the Los Alamos Employees' Scholarship Fund drive.

The six Compaq Corp. scholarship recipients are Maria Alvarado of McCurdy School in Española, Amanda Chavez of Taos High School, Bettina Jaramillo of Mora High School, Sara Montoya of Pojoaque High School, Vanessa Bustos of West Las Vegas High and Samuel Phillips of Los Alamos High School.

Lions, no tigers and bears, oh my

Critters on Lab lands call for caution

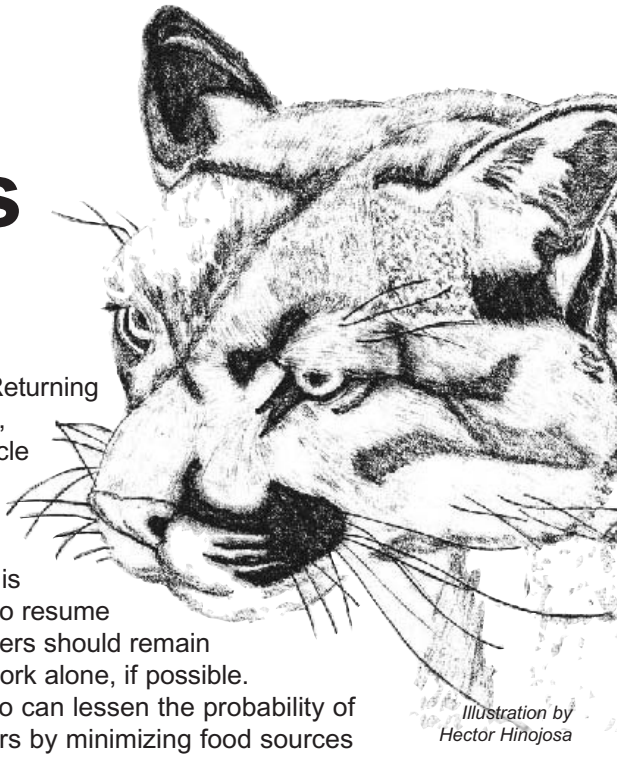


Illustration by Hector Hinojosa

by Steve Sandoval

With the onset of summer and warmer weather, the propensity to take part in outdoor activities such as hiking, walking and jogging increases. It also means people may encounter potentially dangerous animals.

Earlier this spring, a mountain lion was reported crossing the R Site road between Technical Areas 9 and 14, for example.

And because of last year's Cerro Grande Fire, wildlife have been displaced from their habitat, and while searching for food, they are more likely to encounter humans, according to Ecology (ESH-20).

According to wildlife biologist James Biggs of ESH-20, the area in and around the Laboratory always has been home to mountain lions and a host of other large wildlife species such as bears. Because animals and humans cross paths, Biggs is urging people to be cautious — for their own safety and for the safety of the animals.

Ecology issued a general notice about black bear and mountain lion encounters. It can be found on the ESH-20 Web site at *http://www.esh.lanl.gov/~esh20/Wildlife.html* online (PDF file, Adobe Acrobat Reader required).

According to the notice, if Lab workers encounter mountain lions or black bears they shouldn't run or turn their backs on the animal. They should back away slowly and remain calm. Returning to a safe place, such as a vehicle or building is advised. Once the animal has left the area, it is probably safe to resume work. But workers should remain alert and not work alone, if possible.

Humans also can lessen the probability of such encounters by minimizing food sources around buildings; black bears, for example, are attracted by food thrown in the trash. Humans also shouldn't approach black bears or mountain lions; they will feel threatened, which may provoke an attack.

Lab workers should call 911 if attacked and in need of medical attention. If mountain lions or bears are seen in an area become a nuisance, contact ESH-20 at 7-0730. Workers who feel immediately threatened by a mountain lion or black bear should contact Emergency Management and Response (S-8) at 7-6211.

Also, see the Aug. 6, 1999, and June 4, 1997, issues of the Daily Newsbulletin online at *www.lanl.gov/newsbulletin* for additional information about wildlife sightings and what to do when encountering wildlife.

Symposium aims to prepare students, postdoctoral appointees for careers in science

by Michael Carlson

Graduate and undergraduate students from the Los Alamos, Sandia and Lawrence Livermore national labs will showcase their research at Symposium 2001 on Aug. 5 and 6 at the Santa Fe Community College.

The Lab-sponsored event will provide a unique opportunity for college students and postdoctoral appointees to present their scientific research to their peers, Laboratory mentors, technical staff, and representatives from industry, academia, government agencies and professional societies.

The intent of the symposium and career fair is to prepare students and postdoctoral appointees for careers in science by broadening their experiences. "This is an excellent forum to network and make personal contacts," said Student/Mentor Liaison Carole Rutten of the Education Programs Office (STB-EPO).

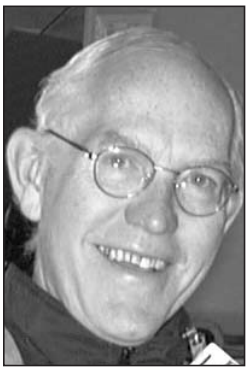
A technical-paper poster session also will be held at the symposium. Technical staff from the Lab as well as representatives from professional societies will provide feedback on posters pertaining to the fields of bioscience, chemistry, computing, space sciences engineering, materials science, as well as mathematics and physics.

The poster session is designed to run concurrently with the symposium's career fair.

Registration and fees must be received at the Lab's Protocol Office by June 25. Registration forms are available online at *http://www.set.lanl.gov/symposium*. The registration form can be downloaded as an Adobe PDF and faxed to 7-7530 or mailed to Marion Hutton at the Laboratory's Protocol Office, MS P366. For more information, contact Carole Rutten at 5-5194.

Enjoying a good jab every now and then

by Michael Carlson



Tom Hill

Twelve years ago, a childhood fascination with swords inspired then 38-year-old Tom Hill to pursue fencing, a growing sport that has people of all ages trading their remote controls for foils, epees and sabres.

A Lab physicist in the Thermonuclear Applications (X-2) group, he coaches fencing on Tuesdays at the YMCA in Los Alamos and is a "lunch buddy" at Chamisa Elementary School in White Rock. He enjoys working with adults, preteens and teenagers who are learning about the sport or are getting back into fencing.

Hill originally wanted an activity for his then-seventh-grade son. But after watching him complete the beginning program at the YMCA in Los Alamos, the older Hill decided to take the same course the next time it was offered.

Hill now competes in tournaments all over the country and teaches the beginning fencing course that he once took.

"I started teaching fencing two years ago because the organization [YMCA] needed somebody. He said he didn't feel qualified but filled a need because there is a great group of people in the program.

He competes in sanctioned U.S. Fencing Association tournaments all over the country and has participated in the renowned fencing tournament in Las Vegas, Nev., called "Duel in the Desert." He also is nationally ranked in the 50- to 60-year-old age group.

An epee is the type of weapon that Hill uses. It is a descendant of the dueling sword but heavier and has a stiffer blade. Other swords available to fencers are the foil and sabre. The foil is about 35 inches long and weighs less that one pound, while the sabre is the modern version of the slashing cavalry sword, similar in weight and length to the foil.

Fond of the camaraderie, Hill describes the American fencing community as close knit.

"You can run someone through and then go out for coffee afterwards," he said.

He also enjoys the company of children, explaining his involvement in the "Lunch Buddy" program that brings Laboratory employees into the elementary schools as mentors.

"With both of my kids out of the house, I miss the contact I used to have with children," said Hill.

He is coached by veteran fencer North Carey who took up the sport while an undergraduate at Notre Dame. A team leader for weapons analysis and a 15-year veteran of the Laboratory, Carey teaches intermediate and advanced fencing at the YMCA, assisting Hill with the beginner class from time to time.

Even though fencing has become harder and more developed since his college days, Carey believes the sport still appeals to the nontraditional athlete. "It isn't muscle against muscle; it's speed against speed," said Carey. "You don't have to bulk up. It's a sport where one can be lean and wiry. Most of all, you must be able to think on your feet."

For more information about fencing in the Los Alamos area, check out the Los Alamos Fencing Club's Web site at *http://geocities.com/lafencingclub/*.

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