Reflections

Los Alamos National Laboratory

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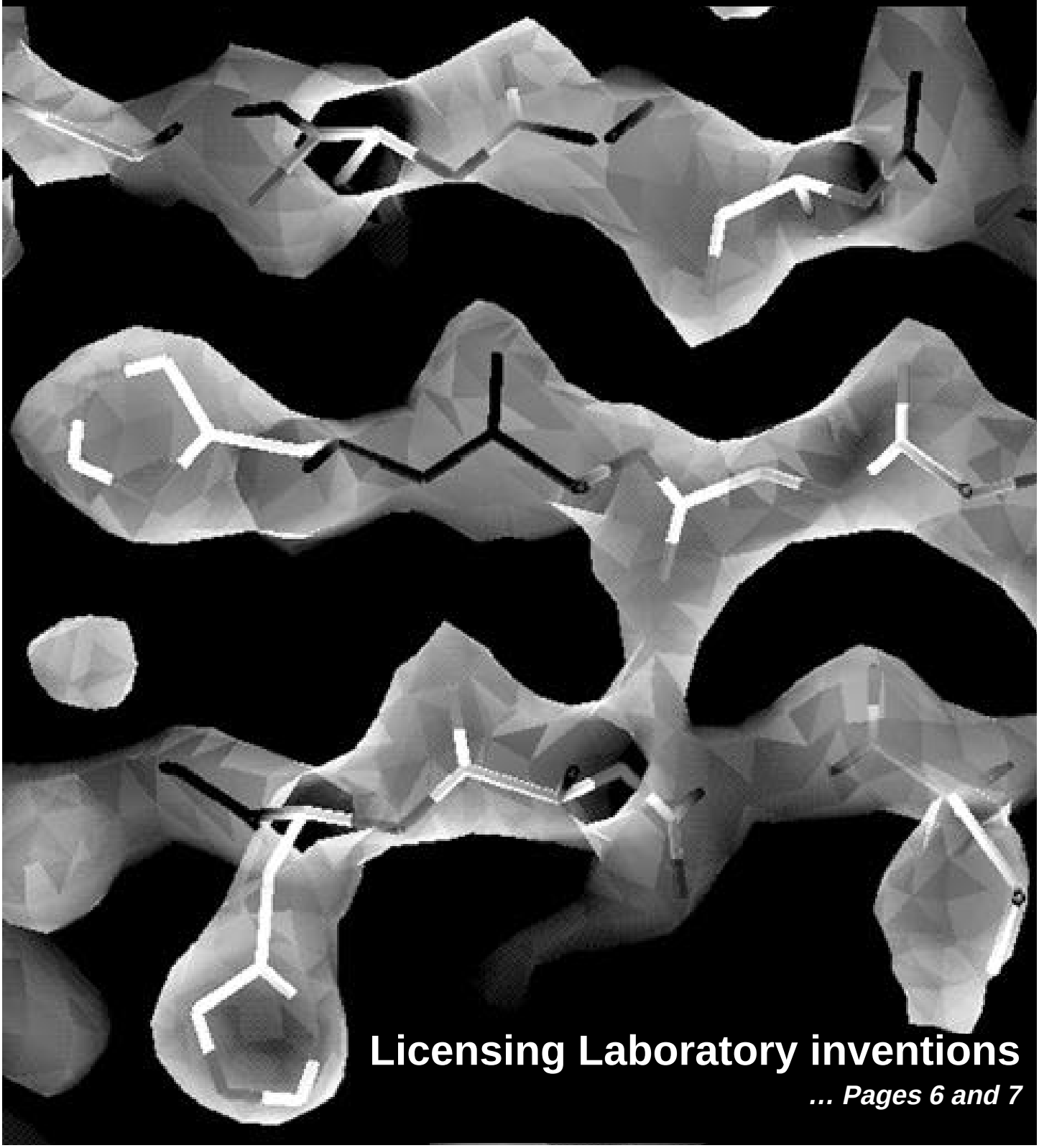

Licensing Laboratory inventions

... Pages 6 and 7

A Department of Energy/University of California Laboratory

About the cover ...

One of the major success stories in licensing Laboratory technology over the Internet involves SOLVE 1.0, a new technique for producing three-dimensional images of protein molecules. The images, such as the one shown on the cover, are in high demand in the biotechnology and health-care fields.

Inside this issue ...

Reflections

Reflections, the Laboratory monthly publication for employees and retirees, is published by the Public Affairs (PA) Office. The staff is located at TA-3, Building 100, and can be reached by e-mail at *newsbulletin@lanl.gov*, by telephone at 7-6103, by fax at 5-5552 or by regular Lab mail at Mail Stop C318. The individual telephone numbers are listed below.

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editor's journal

This year's hot topic

As many of you may recall, a couple of weeks ago there was a major fire at a construction site in Atlanta, and a crane operator was trapped hundreds of feet above the ground on a concrete scaffold. With raging flames and metal-melting heat consuming the structure below, a desperate rescue effort was set in motion. An expert helicopter pilot, who had performed similar rescues during the Vietnam war, maneuvered a rescue helicopter into position over the stranded worker, while a seemingly fearless firefighter, attached to the helicopter by a cable, dangled in the air looking for the right moment to land on the scaffold. After a few passes, the firefighter was able to set down on a far end of the scaffold, where the crane operator had retreated from the heat and flames. Calmly hooking up the stranded worker, the firefighter signaled the helicopter pilot to fly them to safety.

Watching this daring rescue on the evening news was both exciting and eye opening. It was exciting because the rescue was straight out of an action movie; eye opening because it really brought home just how fast fires can spread and the heights to which the men and women who fight them will go to save and protect. It also made me think about the dry winter we have had in Northern New Mexico and the very real potential for wildfires that looms before us as we approach the summer months.

This potential danger has not been lost on Lab officials and employees, community leaders, public safety organizations, the U.S. Forest Service, the National Park Service, and the like.

On April 19, the Lab; the American Red Cross, Del Norte Chapter/Los Alamos; Los Alamos County Emergency Management; Los Alamos Fire Department; the U.S. Forest Service; the National Park Service; Bandelier National Monument; and the U.S. Geological Survey partnered to present an interactive informational program on wildfires and fire safety. The program originated from the Los Alamos County Council Chambers and was shown on Los Alamos Public Access Channel 8 and aired on KRSN AM-1490, a local radio station.

During this program, a wealth of information was exchanged about fire prevention and fire-safety issues, including plans for notifying and evacuating Los Alamos county residents in the event of a threatening wildfire.

To help make employees more aware of the very real fire dangers this year and to help them prepare for and deal with a fire-related emergency, the Lab's Environment, Safety and Health (ESH) Division also has provided important information on wildfire safety (see the March 23 and the April 15 Newsbulletin, available on the Web through http://www.lanl.gov/newsbulletin). The Newsbulletin articles have included a number of links to organizations, such as the Red Cross and U.S. Forest Service, that offer detailed information on how to help make your home safer and what you should and shouldn't do to prepare for a wildfire-related emergency.

The Lab is surrounded by magnificent forests and woodlands. While these surroundings make the work environment especially enjoyable, there is the downside of forest fires. That's why it behooves all of us to take the time to become informed about wildfire dangers and what we can do to help prevent them and protect ourselves and our families.

For more information, check out these two Web sites:
http://www.redcross.org/disaster/safety/fires.html and
http://www.firewise.org/pubs/fwc/.

Lab to host third annual Hazmat Challenge

by John A. Webster

Emergency response teams from across New Mexico, plus two from neighboring states, will be at the Laboratory June 23 through 25 for the third annual New Mexico State Hazmat Challenge.

Thirteen teams, whose members specialize in handling hazardous materials, are participating in this year's event at Technical Area 49. It is more than three times the number of teams in the first Hazmat Challenge in 1997.

"We conduct training sessions across the state," said Bill Flor, group leader for Hazardous Materials Response (ESH-10), "and the more training we've done in communities, the more they want to join in the challenge."

The annual challenge, during which teams respond to a variety of emergency scenarios, also ties in with the need for emergency responders from different organizations to work together efficiently, Flor said.

"There's more awareness that we all are in this together," he said. "The challenge helps us to know each other's capabilities and strengths, as well as personally."

The first day of the challenge will be devoted to orientation, safety training and other basic preparation. Competitive events will be held June 24 and 25.

Four teams participated the first year, while eight joined in last year. The Laboratory has hosted the challenge each year. In addition to Flor, Hazmat Team Leader Paul Nelson and Hazmat Training Center Coordinator Dave Volz, both of ESH-10, are involved in planning the event, along with representatives from other participating teams.

This year, teams from the Laboratory, Raton, Gallup, Carlsbad, Farmington, Hobbs, Santa Fe, Las Cruces, Rio Rancho and Intel (two teams) are expected to participate, along with teams from Sedona, Ariz., and El Paso, Texas.

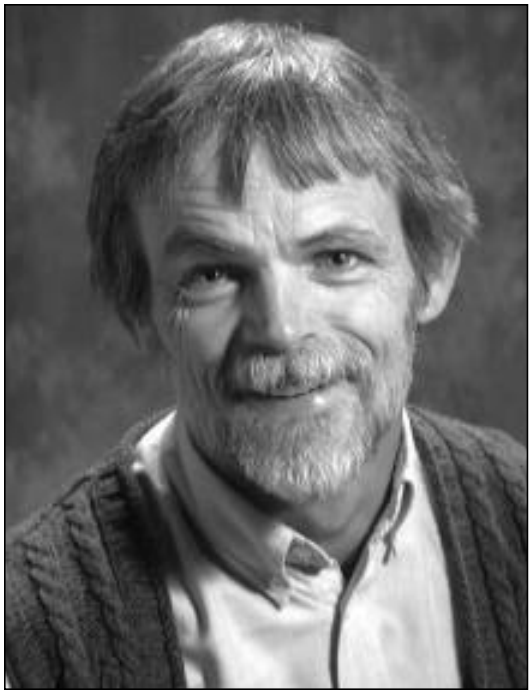
Thirteen teams are entered in the 1999 Hazmat Challenge, which will be held at Technical Area 49 June 23 through 25. Some highlights from last year's event, in which eight teams competed by responding to a variety of emergency scenarios, are shown here. In the upper left photo, the Los Alamos Hazmat Team maneuvers a 450-pound barrel near the finish line of the obstacle course. At lower left, emergency reponders work to stop a simulated gasoline leak from an overturned tanker, and above, a simulated accident victim is treated. The team from Farmington won last year. *File photos*

Lab team volunteers to help in crisis

by David Lyons

It's every parent's worst nightmare. In early March, a bus full of school children returning from a daylong ski trip to Santa Fe Ski Area goes out of control, crashing into an embankment, seriously injuring many of the students on board and ultimately resulting in the deaths of one student and an adult chaperone.

While television clips and headlines played out the horror, most people at the Lab likely didn't know that the Lab's Critical Incident Stress Management (CISM) Team was activated in the wake of the crash. In fact, the head of that team, Dr. Tom Locke, believes that most employees probably do not even know that such a team exists.



Dr. Tom Locke, head of the Lab's Critical Incident Stress Management team.

Critical incident stress management strategies were developed in the early 1980s, primarily out of concern for the health of "first responders" — paramedics, firefighters and police forces. According to Locke, "CISM was designed to help first responders cope with critical incidents — defined as a crisis event with the capacity to overwhelm a person's normal coping strategies." Examples of critical incidents include situations involving multiple or mass deaths, the death of a child or a line-of-duty death.

Mental health professionals noted that first responders were sometimes "secondary victims" of a disaster; the mental health of those responders was often overlooked during crises. Everyone focused on the victims of the incident, rather than considering what the impact might be on the caretakers. No one asked the critical question, "Who cares for the caretakers?"

What is CISM?

Locke explained that the basic idea behind CISM is that if a well-trained team can intervene with first responders immediately or soon after a critical incident, there is less of a risk of the individual developing negative side effects, such as burnout, depression, sleeplessness, lack of appetite or Post Traumatic Stress Disorder. CISM is not counseling. Rather, it is usually conducted in what is called a "debriefing" or "defusing" session, giving the person who has experienced a trauma the opportunity to discuss what they have gone through, how they are thinking and feeling, and what concerns or worries they may be experiencing.

"Although the outcome data are mixed, there is evidence that people who receive help from a CISM team are able to adjust more easily and are typically able to return to work more quickly," Locke said. He noted that as CISM programs became more common, practitioners began to see the value in applying the same methodology to anyone who has experienced a critical incident — not just to first responders.

CISM only very recently became a formal reality at the Lab. Established in 1997 and headed by Locke of Occupational Medicine (ESH-2), the Lab CISM team is a cross-cutting organization with members from ESH-2, the Human Resources (HR) Division, Emergency Management & Response (EM&R), Protection Technology Los Alamos Inc. (PTLA), the Los Alamos Police Department, Los Alamos Fire Department and ministers from Los Alamos churches.

"The idea was to bring together a group that could be rapidly mobilized to respond either on- or off-site," said Locke. In an actual emergency, Locke would be contacted by one of the Lab emergency managers, and a decision would be made as to whether the CISM should be mobilized. Locke said that the team would be called into action during any mass-casualty incident, any violent death in the workplace or any other incident that was deemed critical by emergency personnel and Locke.

Role in Santa Fe bus crash

Although the Lab's CISM team is focused on the Lab, Locke was quick to volunteer the team's help during the recent crisis in Santa Fe. On that afternoon back in March, as soon as Locke heard news of the bus crash, he called Deb Boehme, program coordinator for New Mexico's Crisis Response Network and CISM team, and asked if there was anything that he or the team could do to help.

Boehme asked Locke and members of the CISM team, which included James Barber of ESH-2 and Mary Beth Stevens of Employee Relations (HR-ER), to immediately come to St. Vincent's Hospital in Santa Fe to help

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Lab team ...

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with the numerous family members who had gathered in the wake of the accident. "The scene at the hospital, as you can imagine, was disorganized. About 200 friends and family members were crowding the facility, waiting for news about the children on the bus." Unfortunately, Locke explained, the situation was so chaotic and lacking in central coordination that his team was underutilized that first night.

The next day that changed, however, when Locke was contacted by the Santa Fe Public School system at 5 a.m. They wanted the Lab CISM team's help in conducting "debriefing" sessions at all four elementary schools that had students on the ski trip. Locke, Barber and Stevens again headed to Santa Fe and reported to Tesuque Elementary School at 7:30 a.m. "The next day was much more positive for everyone," said Locke. "Organization was greatly improved, and we were really able to help."

Locke, Stevens and Barber were teamed up with a school nurse and a member of the Santa Fe Crisis Response Team and were dispatched to a class of fifth through sixth graders. They spent the entire day with the kids, circulating through the class, talking to the children in a group and individually.

"Dealing with the loss of a friend or schoolmate is very traumatic. With anyone, and especially with kids, it's very helpful to get them to open up and start talking about their feelings and what happened. The problem, though, is that kids often have a very hard time talking about these things. With this in mind, we set up activities that got them dealing with some of these issues, but in a nonverbal way. We had them make cards for the kids still in the hospital, draw pictures and write."

Locke said the school principal at Tesuque was "very appreciative" of their efforts. Locke's team was glad they could help. "Not that we've fixed everything, but hopefully we've helped some of these kids understand better what's happened, and hopefully be able to cope better."

> ***' ... hopefully we've helped some of these kids understand better what's happened, and hopefully be able to cope better.'***

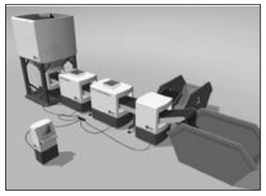
The CISM team wasn't finished with this incident, though. Locke, Barber, Amy Anderson (ESH-2), and Cheryl Bequette (EM&R) returned to Santa Fe later in the same week and conducted sessions with teachers from the Santa Fe schools that were impacted.

Once a crisis like this has ended, what does the CISM team do? "In addition to our regular work responsibilities, we train, and train, and train," said Locke. "You can never fully simulate a crisis, but we have to know that we are as prepared as possible to step in to help caregivers and victims alike in any future crisis."

The Laboratory's Critical Incident Stress Management Team helps emergency response personnel and victims cope with stressful events, such as this hostage situation that was simulated in a Department of Energy training exercise last year. *File photo by Fred Rick*

Licensing Laboratory inventions

by Ternel N. Martinez



These photos show some of the innovative technologies developed at the Laboratory that have been successfully licensed to private industry. Top photo: The Lab holds six patents for a technology called swept frequency acoustic interferometry, which has been licensed to Interferometrics Inc. of Austin, Texas, to build portable, hand-held biomedical sensors capable of performing a variety of analyses. The photo shows a detector checking a single drop of liquid held between two transducers. Middle and bottom photos: The Laboratory's long-range alpha detection technology was licensed to BNFL Instruments, an international company with an office in Los Alamos, in 1997. The technology was developed for environmental monitoring and nuclear decontamination and decommissioning. The middle photo shows a conveyor system that monitors soil and building rubble, permitting it to be categorized as either low-level waste or material suitable for unrestricted release. The bottom photo shows a large-sample monitor that measures the contamination levels of large and complex objects, such as processing equipment.

Laser-induced breakdown spectroscopy. Swept-frequency acoustic interferometry. Long-range alpha particle detector. Supercritical carbon dioxide. SOLVE 1.0 software.

They are vastly different technologies, with vastly different applications. Yet, they all share one common element: They are some of the more recent Laboratory inventions that Los Alamos has licensed for research and commercialization to the private and public sectors, from local start-up businesses to universities to well-established industry giants. Some licensed products are fee-based; others generate annual royalties for the inventor(s) and the Laboratory.

Why does the Lab make the effort to license those technologies and software it feels have commercial value? What's in it for the Laboratory? Perhaps more important, what is intellectual property, and why should the Laboratory be concerned about how its intellectual assets are managed?

In the broadest sense, intellectual property is anything tangible or intangible that arises from knowledge and understanding. IP thus includes know-how, patents, copyrights and commercially valuable data and information. IP management simply denotes how institutions such as the Laboratory manage and control IP.

The Laboratory manages its IP and licenses technology and software to develop research and funding opportunities and to allow other researchers and companies access to research results.

Licensing Team Leader Jerome Garcia of the Civilian and Industrial Technology (CIT) Program Office's Partnership Agreements Office said the Lab actively seeks to strategically license its technologies to leverage its intellectual property and attract companies to collaborate with the Lab through such venues as cooperative research and development agreements, or CRADAs, and funds-in agreements (those in which the companies pay the Laboratory to conduct research and development).

"These agreements help the Laboratory achieve its programmatic objectives because the partners we selectively choose bring added expertise in design, manufacturing and other areas to help us solve problems and strengthen our core capabilities," Garcia said. "You can license technology to the first company that shows interest in it, but that rarely gives the Lab added value. You have to pick those companies that you feel would best serve the Lab's mission and objectives."

Currently, most strategic licenses are derived from multi-agreement packages that usually include research agreements such as a CRADA or funds-in agreement, Garcia noted. These agreements give industry partners the option of receiving a license for those technologies once they have been developed. "Industry partners usually exercise these options, which result in additional royalty-bearing licenses," he said.

The Lab also strategically licenses its technologies and software to enhance the U.S. economy. Licensing particularly plays an important role in Northern New Mexico, where the Lab engages in a variety of programs designed to increase economic development. And of course, any Lab-developed technology or copyright that industry or academia utilizes further demonstrates the Lab's impact and contributions to both and adds to its attractiveness, said Garcia.

"When a company looks for a partner to help it solve a problem or get a product out to the market, one of the first things it does is look at the patent portfolios of other institutions to see which ones possess the necessary expertise," said Bill Eklund of the Business/Patent Law Office (LC-BPL), which works closely with CIT in negotiating agreements. "The more the Lab's patent portfolio grows, the more we're able to position ourselves as the partner of choice."

The Lab's licensing efforts over the past few years certainly have yielded significant results and improvements. In fiscal year 1995, for example, the Lab generated about $82,500 in royalty income from licensed technologies. That figure jumped to about $679,400 in fiscal year 1998, an increase of more than eight-fold. About $40,000 of that figure was derived through a pilot program that allows outside users to test and receive licenses for noncommercial, Lab-developed software via the Internet.

In fact, the number of noncommercial licenses issued leaped from 45 in fiscal year 1997 to 131 in fiscal year 1998. The number of active patent license agreements also increased from 34 in fiscal year 1997 to 47 in fiscal year 1998.

Income received from licensed technologies and software is shared between the inventors and the Laboratory, with the Lab's portion to be used either for research and development, education or tech transfer purposes, in accordance with the Department of Energy/University of California management contract. The current policy is available online at http://www.lanl.gov/partnerships on the Web.

"As strategic licensing results in additional programmatic funding, full-cost recovery research funding and supplemental income for the divisions, the technical staff begins to recognize the substantial role that licensing and IP management can play in satisfying the Lab's mission and objectives," said Garcia.

For all the recent licensing successes, however, there are some areas of concern, Garcia noted. For one, strategic license agreements tend to take longer to complete because the Lab is more selective in its choice of licensees, he explained.

Eklund echoed that concern, saying it sometimes takes up to 10 months for BPL to file for patent protection, even though some of this work is outsourced to outside law firms. "Part of the reason why it takes so long is that our patent attorneys are spending more and more of their time reviewing license executives' negotiated agreements," he explained. "Ideally, we would like to reduce the filing time to no more than about three months."

In addition to writing patent applications, BPL staff work with CIT on all types of research agreements, assist with procurements and subcontracts, review publications and perform other duties. The number of inventions that BPL ultimately has filed for patent protection annually over the past five years averages 83.

This filing time takes on more significance if scientists and engineers present potentially patentable technical information — either through publications or submitted papers at conferences — without disclosing the technology to CIT and BPL first. Disclosure is a formal notification and description of an invention and is the first step in the patenting process. "Technological information that is not disclosed before it is presented or published automatically loses foreign patent rights, and we have no more than a year from the time of publication or presentation to file for U.S. patent protection," said BPL's Ray Wilson.

There also is a need to convince some scientists and engineers of the value of the concept of intellectual property and the role it plays at the Laboratory. "This is understandable to a degree," said Eklund. "Licensing is a business function, whereas Laboratory scientists live in an academic world that measures their success in part by the papers they publish in science journals and interactions with their peers"

Wilson noted that while there may be a built-in tension between the scientists' need to obtain project

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How did we get here?

The first legal mechanism to transfer technology from the national laboratories to the private and public sectors was the Stevenson-Wydler Act of 1980. This legislation, among other things, required federal laboratories to take an active role in technical cooperation with outside entities and established offices of Research and Technology Application at major federal laboratories. That same year, the Bayh-Dole Act allowed universities, nonprofit organizations and small businesses to obtain title to inventions that were developed with governmental support.

The next significant step in the evolution of licensing authority came in 1984 with the passage of the Trademark Clarification Act, which permitted:

- government-owned, contractor-operated labs, such as Los Alamos, to make decisions regarding who received licenses for patents;
- contractors to receive patent royalties for use in research and development, awards or education;
- all private companies, regardless of size, to receive exclusive licenses from the labs; and
- laboratories run by universities and nonprofit institutions to retain title to inventions, with some restrictions. Up to that time, the Department of Energy owned title to all Lab inventions.

The Federal Technology Transfer Act of 1986 furthered clarified the roles and responsibilities of the federal labs by:

- making tech transfer the responsibility of all federal laboratory scientists and engineers;
- mandating that tech transfer responsibility be considered in employees' performance evaluations;
- establishing the principle of giving royalties to inventors and set up a reward system for other innovators;
- allowing government-owned, government-operated (GOGO) labs to enter into cooperative research and development agreements, or CRADAs, and negotiate licensing agreements; and
- allowing GOGO labs to make advance agreements with companies regarding titles and licenses resulting from CRADAs.

The National Competitiveness Act of 1989 extended the authority to enter into CRADAs to GOCOs. It also provided a technology transfer mission for the nuclear weapons laboratories.

MrSID is an innovative software program used for such applications as geospatial imaging, publishing, document imaging and medical-devices manufacturing. It was licensed by the Lab to LizardTech, a former New Mexico company now based in Seattle.
Image used by permission of LizardTech

Kocks elected to National Academy of Engineering


Fred Kocks

Fred Kocks, a Laboratory Fellow in the Materials Science and Technology (MST) Division, recently was elected to membership in the National Academy of Engineering. Kocks was elected for his lifelong work in advancing the theory of materials strength, kinetics of plasticity of metals and texture analysis.

"This is a great honor," said Kocks. "I am very pleased both for myself and the Laboratory. I believe the Laboratory, through the Center for Materials Science, has played a crucial role in fostering the research that has been honored with this award."

Kocks was born in Germany and studied at the universities of Stuttgart and Gottingen. He earned his doctorate from Harvard University in 1959 and after six years on the Harvard faculty moved to Argonne National Laboratory. Kocks came to the Laboratory in 1983 as a founding member of the Center for Materials Science and became a Laboratory Fellow in 1986. He retired from the Laboratory in 1997, but remains active as an Associate Fellow. Since 1958 his work has been supported by the Department of Energy's Basic Energy Research Division and its predecessors.

In addition to being elected to NAE, Kocks is a Fellow of the Minerals, Metals and Materials Society and ASM International. He has held scholarships from the Humbolt Foundation of Germany and the Japan Society for the Promotion of Science. He has held a visiting professorship at the Technical Universities of Munich and Aachen as well as at MacMaster and McGill universities in Canada.

Kocks is one of 80 American engineers and eight foreign associates elected to membership in the National Academy of Engineering this year. The Academy's total U.S. membership is 1,984 members with 154 foreign associates. Kocks joins former Director Sig Hecker, Acting Deputy Laboratory Director Warren "Pete" Miller and former Laboratory Deputy Director Jim Jackson in this accomplishment.

Martinez selected to participate in national program


Loyda Martinez

Laboratory employee **Loyda Martinez** of the Project Management (PM) Division has been selected as one of 20 women nationally to participate in the 1999 National Hispana Leadership Institute Fellowship program.

The program prepares selected Hispanic women who have demonstrated leadership at the local level for positions of national influence and public policy impact.

Martinez was selected because of her community service achievements.

"The National Hispana Leadership Institute will prove most valuable with meeting other Latina leaders from across the country and working with them to improve the status of Hispanics in America today," Martinez said of her selection. "Living in a multicultural nation rich with culture and tradition, we can strengthen and sustain the cultural values of this great nation. Our cultural heritage, language and continued empowerment are priceless."

The National Hispana Leadership Institute was founded in 1989 and provides participants with a comprehensive four-week program at the John F. Kennedy School of Government at Harvard University, as well as at one of three Centers for Creative Leadership around the country, and in Washington, D.C., and San Juan Baptista, Calif. Its 14-member board of directors includes national Hispanic leaders, corporate executives, elected officials and presidents of national organizations.

A resident of Chimayo, Martinez has worked at the Laboratory 21 years. She earned a bachelor's degree in computer science from the College of Santa Fe and is currently a candidate for her master of business administration degree with a concentration on management information systems, also from CSF.

Ruminer new leader for CIC-1


Kit Ruminer

Kit Ruminer is the new group leader for Communication Arts and Services (CIC-1). For five years, she was CIC-1's deputy group leader for central operations, and she served for one year as acting group leader of Media (CIC-17).

Ruminer joined the Laboratory in 1978 as a phototypesetter at the Los Alamos Meson Physics Facility (LAMPF) and joined CIC-1 as a writer-editor in 1984, where she initially worked on assignment to the Yucca Mountain Project in Nevada. Recently, she worked on assignment to Information and Records Management (CIC-10), providing support for Laboratory document control and records management, and for the LANL-Xerox Information Management Project. She has a bachelor's degree in English literature and a master's in business administration from the University of New Mexico.

Licensing ...

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funding and the need to keep Lab information protected, the feeling of indifference toward intellectual property is steadily decreasing. "I think most scientists now realize that licensing has a place in academia. Besides, patents are morale boosters, a measure of the success of individual scientists," he added.

CIT recently has begun a new initiative designed to assist Lab managers and employees in managing intellectual property. The office also has created an IP Policy Board and Working Group to develop a more effective, robust IPM program; several members from the Lab's technical divisions are involved.

"The trick," explained Garcia, "is to have a new IPM program that adds to the Lab's intellectual excellence and institutional vibrancy, not detracts from it."

April employee service anniversaries

40 years
David Jardine, ESH-17

30 years
Gloria Brooks, HR-TI
Donald Bryson, BUS-DO
Arthur Herrera, NMT-11
Len Margolin, X-HM
Nick Romero, ESA-DE
Armando Vigil, ESA-EA

25 years
Marvin Barney, ESA-DE
Irving Bigio, CST-4
Bruce Crowe, EES-13
Nelson Demuth, TSA-7
Robert Fresquez, DX-1
Otoniel Garcia, P-22
Allen Herring II, CST-11
Marian Martinez, PA
Jerry Montoya, ESH-1
Ralph Montoya, S-6
Joel Moss, P-25
Felix Olivas, LANSCE-7
William Pelzer, BUS-3
Don Rodriguez, DX-4
John Romero, X-CI
Marcene Roybal, S-4
Linda Salazar, ESH-OIO
John Seal, LANSCE-12
Laron Smith, TSA-DO
Simon Suina, S-5

20 years
Mary Billen, CIC-6
John Blaylock, CIC-7
Paul Cunningham, DX-DO
Patricia Elliott, NMT-13
Roselia Gallegos, DX-2
Thomas Gamble, CST-1
Evangeline Hodge, CST-9
Sara Hoshizaki, CIC-6
Gordon Jarvinen, NMT-6
Richard Johnson, F-9
George Kyrala, P-24
Michael Lopez, NMT-9
B.T. Martinez, NMT-7
E. Corine Ortiz, DX-8
Sally Preston, EES-15

15 years
Katherine Anderson, CIC-1
William Baird, NIS-6
Tony Beugelsdijk, CIT-SP
Wendee Brunish, EES-DO
Nancy Cameron, CIT-IP
George Daly, BUS-5
Daniel Davis, ESA-DE
Gloria Davis, LC-BPL
Douglas Hatch, MST-7
Sarah Hebert, MST-6
P.H. Hemberger, NIS-7
R.L Hoebelheinrich, S-5
James Hollins, EES-7
Robert Huggard, ESA-WMM
Scott Kinkead, DX-2
George Martinez, F-9
Paul Montaño, NIS-4
Ghazar Papazian, DX-DO
Bruce Robinson, EES-5
Leonard Sanchez, ESA-DE
Cynthia Sandoval, ESA-WMM
Jay Spore, TSA-10
Anthony Tafoya, BUS-5
Michael Terry, TSA-11
Richard Thomsen, CIC-12
Mabel Willaman, NIS-DO
Ralph Nelson Jr., X-CI

10 years
George Allred, P-22
Miquela Archuleta, LANSCE-DO
Bruce Barrus, BUS-7
Stanley Cohen, LANSCE-6
James Crotinger, CIC-ACL
Charles Dorsey, ESH-OIO
Kathleen Gomez, BUS-8
Karl Hahn, DX-4
Norman Hamer, TSA-3
Todd Heineman, S-5
Paul Hoover, ESH-1
Kevin Hubbard, MST-7
Dennis Mack, BUS-8
Gerard Martinez, ESA-MT
Richard McKeever, ESH-4
Yvonne McKelvey, EES-5
Stephen Morgan, LANSCE-7
Patrick Ortiz, ESH-14
Geoffrey Reeves, NIS-2
Mary Ann Reimus, NMT-9
Edward Rodriguez, CIC-2
Franklin Salazar, BUS-1
Lorena Salazar, CIC-6
Alex Sandoval, NMT-5
K.A. Velarde-Lashley, NMT-1
Terry Weisgerber, ESH-5

5 years
McIlwaine Archer III, MST-7
Kristi Brislawn, CIC-12
Norman Delamater, X-TA
Robert Field, MST-6
Thomas McCleskey, CST-18
John Morrison, TSA-5
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Reuben Peck, S-2
Garth Reader, ESA-WE
Mark Smith, MST-7
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John Szymanski, NIS-2

In Memoriam

Dorothy Butler

Laboratory retiree Dorothy Butler died Jan. 1. She was 76. Butler received a degree in education with a minor in secretarial science from Eastern New Mexico University in 1942. She came to work for the Lab with the Atomic Energy Commission and the Manhattan Engineer District as a secretary in December 1946. Butler received a degree in accounting at St. Michael's College in Santa Fe in 1954. She left the Lab in 1963.

Regina Grace Herrera

Laboratory undergraduate employee Regina Grace Herrera died Feb. 15. She was 18. Herrera graduated with honors from Santa Fe Indian School in 1998. She was a full-time student at the University of New Mexico-Los Alamos. Herrera started working as a high school coop technician with Organic Analysis (CST-12) on Feb. 9, 1998.

Quentin Jones

Quentin Jones, 79, died Feb. 3 after a long illness. He lived and worked in Los Alamos from 1949 until 1986. During that time, he was employed by the Department of Energy as a security inspector and by the Laboratory in the Physics (P) Division as a mechanical technician, working on many of the Nevada test shots. In 1940, he joined the United States Army and was honorably discharged in 1945 after serving in the Pacific Theater during World War II.

William E. Wood

Laboratory retiree William E. Wood, 69, died Sept. 24, 1998. Wood joined the Laboratory in 1947 as a warehouseman in the former Supply (S) Division. He later was a receiving, warehouse and property clerk, laundry room attendant and property representative. He retired from the Lab in July 1988 as a property administration specialist in the former Nuclear Technology and Engineering (N) Division. Wood returned to the Laboratory as an associate that same year, retiring again in 1993.

Roger Hartley White

Former Laboratory employee Roger Hartley White died March 4. He was 80. White grew up in Ohio and Illinois and graduated from Western Reserve Academy in 1938. He received a bachelor's degree in mechanical engineering from Stanford University in Palo Alto, Calif., in 1942. White came to work for the Lab in 1943 as a staff engineer. He retired in 1977 while working in the former Critical Experiments and Diagnostics (Q-14) group but continued to work as a consultant.

"Science at Home" is a publication developed by Science Education (STB-SE) to interest children, particularly those in grades four through eight, in science through hands-on activities. We are reprinting experiments from the book, along with other scientific activities, for employees to share with their families, or just to enjoy themselves.

Dense or not

Have you ever wondered why the chocolate in a glass of chocolate milk always settles to the bottom? Or why you must shake a container of orange juice well before pouring it into a glass? The answer lies in the property of matter that scientists call density. Density is a measure of how heavy something is compared to the space it takes up. It is one of those things that all matter must have in order to be matter. Some materials, like styrofoam, have such low densities that they float on just about anything. Other stuff like iron is so dense that we use it to anchor things down.

In this activity you will experiment with several different liquids and solids, combining and comparing them to determine how their densities "stack up" against each other.

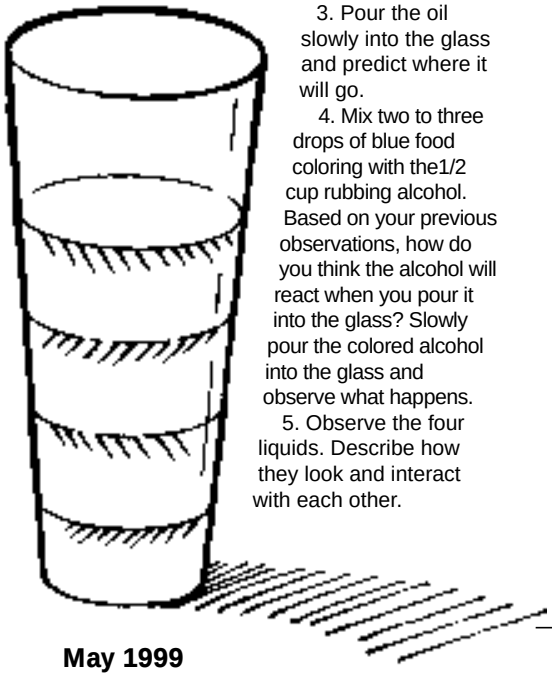
The stuff you'll need

A tall glass or jar, 1/2 cup syrup, 1/2 cup water, 1/2 cup cooking oil or baby oil, red and blue food coloring, 1/2 cup isopropyl rubbing alcohol, a small birthday candle, a small cork, a steel bolt, a small deflated balloon, measuring cups and mixing spoon.

Here's the plan

1. Pour the water into the glass. Add two to three drops of red food coloring to the water and stir.

2. Slowly pour the syrup down the inside of the glass and observe what happens. Why do you think the syrup doesn't mix with the water?



3. Pour the oil slowly into the glass and predict where it will go.

4. Mix two to three drops of blue food coloring with the1/2 cup rubbing alcohol. Based on your previous observations, how do you think the alcohol will react when you pour it into the glass? Slowly pour the colored alcohol into the glass and observe what happens.

5. Observe the four liquids. Describe how they look and interact with each other.

6. Gently place the steel bolt into the top liquid. What happens? What do you think will happen when you put the birthday candle in? Try it. Based on these observations, predict where each of the different solid objects will go when they are placed in the liquids. Test your hypothesis by placing the other small objects into the liquid one at a time. What happens to each one?

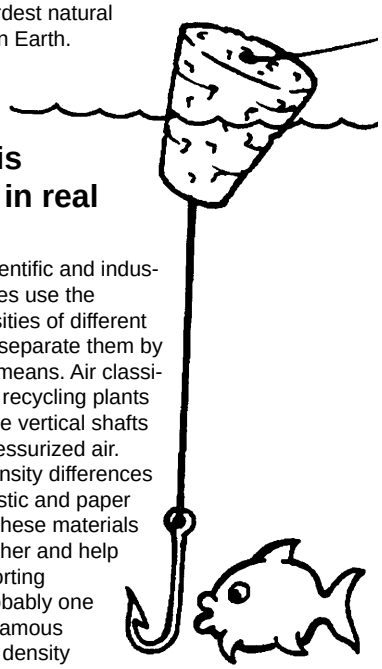
Wrap-up

When you poured the four liquids into the glass, they didn't mix, but instead formed layers inside the jar. The thing that kept them separate was their different densities. When you placed the solid objects into the jar, they all floated at different levels because they, too, had different densities. The steel bolt dropped all the way to the bottom of the jar because it has the greatest density of all the materials tested. The other solids floated on the liquid that was slightly more dense than they were.

What's going on here?

Density is one of the fundamental properties of matter. It relates how much stuff (mass) is packed into how much space (volume). An object's density depends on the type of atoms that make it up and how they are packed together. Density is a property of all matter, not just solids. Liquids and gases can have different densities too. The reason that a helium balloon floats in air is because helium atoms are very light compared to nitrogen, oxygen and other gases that make up air. Many people automatically think that solids must be more dense than liquids because the molecules in solids appear to be packed tighter together, but as you discovered in this experiment, this is not always the case. The fundamental unit of each element, the atom, acts like a tiny building block. Even though they are too small to see, atoms can be broken down into smaller particles called, protons, neutrons and electrons. The thing that distinguishes one type of atom from another is the number of these particles they contain. Hydrogen, the lightest and simplest atom, is made up of one electron and one proton. Lead, a much heavier, complex atom contains 82 protons, 82 neutrons, and 82 electrons. Because it has so much more material, an atom of lead weighs much more than an atom of hydrogen.

Atomic mass alone isn't the only cause for density differences between substances. Sometimes they are controlled by the way the atoms are arranged. Some materials like cork have a very open structure which leaves the atoms with a lot of space between them. One of the most abundant elements found in cork is carbon, the same element that diamonds are made of. As you just demonstrated, if you put a piece of cork in a bucket of water, it will float because its density is less than water. If you were to place a diamond in the same bucket it would immediately sink to the bottom. Even though diamonds are made from the same principle element as cork, the carbon atoms are arranged in a super tight structure. This structure not only gives diamonds their density, but it makes them the hardest natural substance on Earth.



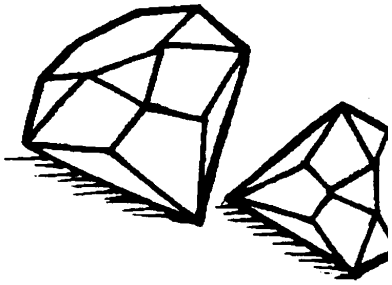
Where does this happen in real life?

Many scientific and industrial processes use the relative densities of different materials to separate them by mechanical means. Air classifiers used in recycling plants look like large vertical shafts filled with pressurized air. They use density differences between plastic and paper to separate these materials from each other and help speed the sorting process. Probably one of the most famous examples of density being used to separate out different materials is panning for gold. Gold is one of the most dense materials known, having a density 19 times greater than water and almost a third more than lead. When people pan for gold, they use the pan to scoop up some of the sediment from the bottom of a stream and swish it around in the water. Because it has a relatively low density, most of the sediment gets washed back into the stream, but gold is so dense that it just drops to the bottom of the pan.

Now try this

Anyone who has ever sipped a soft drink with ice has probably observed that ice is less dense than water. That's why ice always floats on the top. What would happen if you placed ice in oil? Get busy and find out! Fill a tall glass 3/4 full of cooking oil and gently place an ice cube on top. Pay particular attention to what happens when the ice begins to melt.

If you want to really layer some liquids, you can repeat the first activity but add ketchup, molasses and dish washing liquid to your mix. Predict where each will "stack up" in the jar, then test your hypothesis to see how close you came to getting it right.



This month in history

May

1541 — Spanish explorer Hernando de Soto discovers the Mississippi River

1792 — Twenty-four merchants form the New York Stock Exchange at Number 70 Wall Street

1848 — The Treaty of Guadalupe Hidalgo is ratified, officially making New Mexico and other southwestern states part of the United States

1927 — Charles Lindbergh completes the first solo flight across the Atlantic Ocean

1943 — Lt. Col. Whitney Ashbridge becomes commanding officer of Los Alamos

1960 — A U-2 photo reconnaissance plan piloted by Francis Gary Powers is shot down over the Soviet Union

1972 — Presidential candidate George Wallace is shot and left paralyzed

1980 — Mount St. Helens in Washington erupts

1988 — Dedication ceremonies are held for the Advanced Radiochemical Weapons Diagnostic Facility at TA-48

1991 — Lab scientists report on research showing the key outbursts from the sun that trigger magnetic storms on Earth

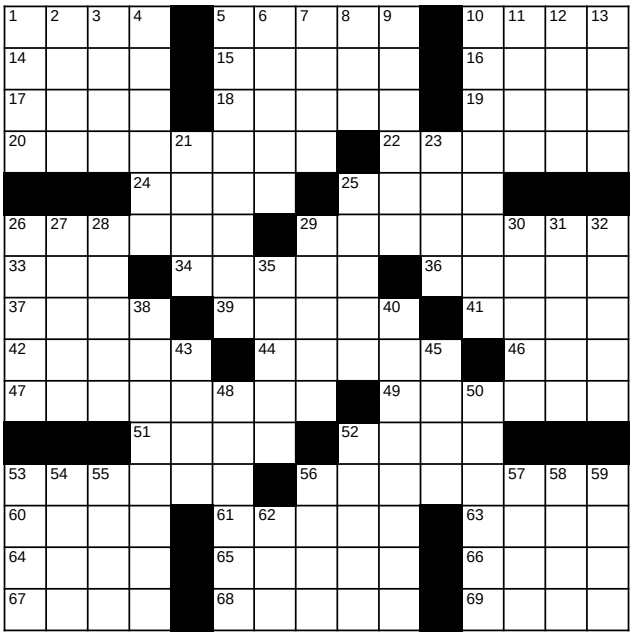
1992 — The Los Alamos Canyon bridge closes for repairs, forcing traffic between the town and Lab to go through the canyon

1997 — Johnson Controls Northern New Mexico is selected to begin negotiations on a contract to provide support services to the Lab

Syndicated material

Removed at the request of the syndicate

"Where in the world …"



ACROSS

1 Think over, consider
5 Worth
10 Per —
14 Shakespearean protagonist
15 Genus of widely distributed grasses
16 Jet-assisted takeoff (abbrev.)
17 — Major or Minor
18 Hawaiian island
19 Radio talk show host
20 Country in southern Africa
22 Bugs, to Elmer
24 States, avers, utters, announces, declares
25 "O Mio Babbino —"
26 Presents
29 Country in Central America
33 Free from taboo, in some Polynesian islands
34 Stringed musical instrument of India
36 Tale
37 Tunes
39 Jargon, dialect
41 Worker who helps preserve perishables
42 Former emperors of Russia
44 Solemn affirmations (Scottish dialect)
46 Computer assisted instruction (abbrev.)
47 Country in eastern Africa
49 Country in southwest Africa
51 Lazily lounge
52 Untruth teller
53 Benevolent, kindhearted
56 Country in southeastern Europe
60 Soon
61 Vital principle of animating force within living beings
63 One of Columbus' ships
64 Valuable fur
65 With well, accepted as worthy
66 Food made from soybeans
67 Grecian portico with pillars
68 Pay out
69 Pack away

DOWN

1 Layered sandwich
2 Leander's heartthrob
3 Direction
4 Fish family, found mostly in the tropics
5 Southeastern Asian country
6 Rogers' mate
7 Soap opera actress — Sofer
8 Woman's name
9 Island country off the China coast
10 Small country in eastern Africa
11 A metrical foot
12 Ornamental case for small objects
13 Greatest amount
21 Armed conflicts
23 Suffix indicating those who carry an action to excess
25 Fr. Impressionist painter
26 Sometimes controversial New Mexico historical figure
27 Palm off
28 Actress Fawcett
29 — Sophia, Istanbul landmark
30 Johnny — of "Key Largo"
31 Relating to an area
32 Middle Eastern country
35 Follow
38 Indian Ocean country
40 Country in southeast Asia
43 In a short while
45 Tricky or unsuspected condition
48 Folds in trousers
50 Western New Mexico town
52 Unit of measure for the flow of light
53 Overactors
54 Sports nickname, The Big —
55 Lake in California
56 Two-wheeled transportation
57 Sometimes violent free-for-all
58 Slang for news, intelligence, knowledge
59 Woman's organization (abbrev.)
62 Siesta

Syndicated material

Removed at the request of the syndicate

spotlight

Juggling kids, horses and work

by Nancy Ambrosiano

Gracie and Nancy Ambrosiano of Public Affairs in the show-jumping phase of competition in Carbondale, Colo.

An expression I've learned in moves from Virginia to Alaska, back to Virginia, on to Livermore, Calif., then North Carolina and finally to Los Alamos is "trailing spouse." It's that awkward term for the person who tags along with the person who's been hired, and who now seeks to put down roots and gain employment in the new place. By now, I could probably give little classes on survival skills for trailing spouses (or would that be trailing spice?). You know the drill: "Have a mobile career of your own, have interests and activities that can be done on the run," and similar things. The magic phrase for those classes would basically be: "Get a life." Or in my own case, "Get a horse."

I've been a rider since I was a small child, and my folks are still foxhunters back in Virginia, so I can't say I've ever not been a horse person. And while it's not simple trailing equine dependents around like a giant ball and chain, it's one of the things that has kept me sane and happy through 20 years of trailing life in the physics and supercomputing communities.

I have a 12-year-old gray thoroughbred mare, Gray Skies, a.k.a. Gracie, who has tolerated moves across country twice now and seems none the worse for wear. And together she and I have been competing in the sport of "eventing," a type of equestrian triathlon where scores from three phases of competition are totaled for an all-around winner. I've been an eventer since I was a child, but it's a new thing for Gracie. Three years ago, the mare had never jumped anything more than a mud puddle, but she has found a niche in the world of dressage, show jumping and cross-country jumping — the phases of eventing that one sees during fragments of Olympic Equestrian Games coverage.

Ambrosiano, center left, and winning teammates in the 1998 Chronicle of the Horse Adult Team Championships for the western United States, held in Flagstaff, Ariz.

In her previous career, Gracie was a dressage horse, trotting neatly around a manicured ring with a tiny white fence. No jumping, no galloping, no funny stuff. Gracie has since progressed from quivering with nerves before a log on the ground to leaping into water obstacles from a full gallop, blasting out of the water onto the far bank and negotiating a gymnastic series of big, solid obstacles just a step away. One tends to yell "Yee Haaaaaa!" through such obstacles, after spitting out the duckweed. It's not something you can make a horse do; they have to love it and embrace the challenge of figuring it out on the fly — and Gracie is one who can do it.

As I've discovered, there are a surprising number of eventers in New Mexico. Three or four of us live in Los Alamos, and we have built a tolerance for long road trips. Flagstaff, Ariz.; Las Cruces, N.M.; Carbondale, Colo.; and Jackson Hole, Wyo., are among the key destinations for eventers, and we are resigned to driving our high-mileage vehicles deep into the night to balance work and travel time. Come to think of it, as a working mom with competitive aspirations, I've also resigned myself to such oddities as riding by the light of a camping lantern, round and round in the shadows, practicing the essential dressage movements and rhythms, much as figure skaters practice their circles.

Asked by a riding magazine how to make time for riding in the midst of other duties, I've suggested the "take no prisoners" approach, where every sunny lunch time, decent evening and spare second has to be grabbed and assessed for its potential. To that end, I keep riding gear in the back of my truck, and I know it's exactly 10 minutes from my office in Public Affairs (where I'm a public information specialist) to the stable in White Rock. Got a good day with kids occupied in scouting? Run to the barn. Chilly evening with husband home? Run to the barn. Miserable Saturday with husband on travel? Forget the barn, take the kids to the Santa Fe Children's Museum and consider indoor exercise when we get home.

Reflections
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