Los Alamos NATIONAL LABORATORY EST.1943

NewsLetter

Week of Jan. 17, 2005 Vol. 6, No. 2

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How important to you is communication about issues affecting the Laboratory and your work, and what are your top two preferred ways of receiving this information? Learn what your co-workers had to say on Page 4.

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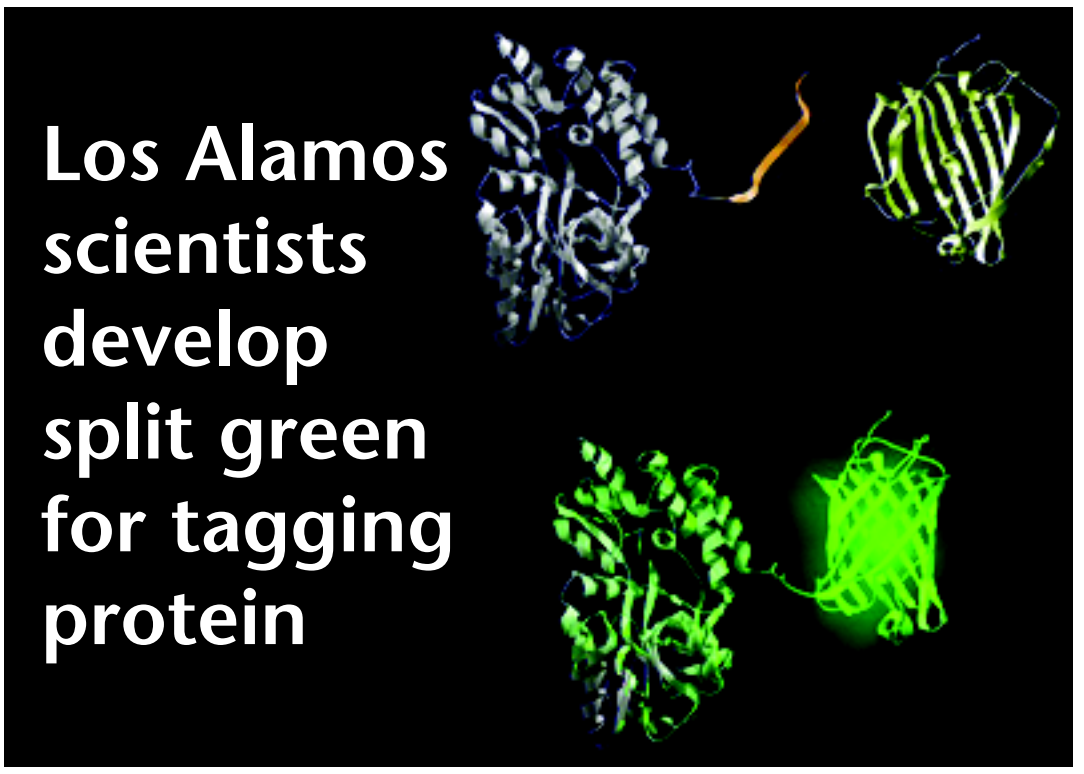

Los Alamos scientists develop split green for tagging protein

by Todd Hanson

Laboratory scientists have developed a new protein tagging and detection system based on a process for "splitting" a green fluorescent protein. Unlike current protein detection methods, the method works both in living cells and in the test tube and can be used to quantify proteins down to 0.1 picomole, or one billionth of a gram of a typical protein molecule. Because the method can be used to detect protein aggregation within the living organisms, it will be useful for high-throughput studies of protein structure and protein production, and for studying diseases, like Alzheimer's, that are associated with protein misfolding and aggregation.

In research published recently in the online version of the scientific journal Nature Biotechnology (*www.nature.com/nbt/*), Los Alamos scientists Stéphanie Cabantous, Tom Terwilliger and Geoff Waldo, all of Cell Biology, Structural Biology and Flow Cytometry (B-2), describe a method for engineering soluble, self-associating fragments of green fluorescent proteins that can be used to tag or detect soluble and insoluble proteins in living cells or cell lysates without changing protein solubility.

According to Waldo, "We think this discovery will have a major impact in the field of protein biotechnology and work related to deciphering the structure and function of proteins. I like to think of it as an enabling technology, a toolbox, if you will, for protein researchers, that could help them close the gap between sequencing the DNA of the human genome and determining the structures and functions of the encoded proteins."

The new system is based on the Rapid Protein Folding Assay method developed several years ago by Waldo, which used green fluorescence to signal protein folding. That method worked by fusing a protein's DNA to the DNA for green fluorescent proteins (GFP). The hybrid protein created by this linking then had the characteristics of both the GFP and the protein being assayed. If the protein being produced, or expressed, folds correctly, then the attached GFP also will fold correctly as it too is expressed. If the protein being expressed does not fold correctly, then the GFP also will not fold correctly and not fluoresce green. After scientists discovered that the GFP had some drawbacks, they developed the new system, which uses GFP fragments instead.

The split green fluorescent protein research resulted from Laboratory scientists efforts to develop a practical method for engineering protein folding and solubility as part of the National Institutes of Health Protein Structure Initiative, a large-scale effort to determine the structures of thousands of protein molecules. These protein structures can be used in the design of new therapeutics and to deepen our understanding of how cells work.

Los Alamos is the lead institution in one of nine NIH-funded Protein Structure Initiative Centers. The Los Alamos center seeks to eradicate tuberculosis by solving questions regarding the structure of key proteins from Mycobacterium tuberculosis, which can then be targeted for drug-design efforts.

For Your Safety

Heart healthy and back friendly snow shoveling tips

• Get your doctor's OK for snow shoveling before attempting it if you know you are out of shape or have a history of heart trouble.

• Dress in layers; shed some clothing if you get too warm.

• Don't rush into the job. Start slowly to give your body a chance to warm up.

• Don't be tempted to shovel quickly. Work at a slow pace.

• Stretch every few minutes and take breaks every 15 minutes or so. Drink water on breaks to replace fluids lost through sweating.

• If the snow is deep or heavy with moisture, scoop some off the top and then go back for a second load.

• All the shoveling may not need to be done in one day. If the snowfall is moderate, tackle half the driveway one day and the other half the next.

• Use safe lifting techniques for snow shoveling. Bend at the knees, not the back. Lift the shovel by straightening the legs.

• Keep feet apart to improve balance.

• Keep the load close to the body.

• Do not twist your body to toss the snow aside. Turn by moving your feet and toss straight ahead.

• Choose the right kind of shovel for the job. While steel shovels are sturdy, they also are heavy. Aluminum and plastic models are lighter but less durable. To remove powdery snow, push a large shovel shaped like a plow. Wet snow requires a shovel designed for lifting.

• For the safety of passersby, never leave a snow shovel where it can become a tripping hazard.

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NewsLetter

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Los Alamos National Laboratory is operated by the University of California for the National Nuclear Security Administration (NNSA) of the U.S. Department of Energy and works in partnership with NNSA's Sandia and Lawrence Livermore national laboratories to support NNSA in its mission.

Los Alamos enhances global security by ensuring safety and confidence in the U.S. nuclear stockpile, developing technologies to reduce threats from weapons of mass destruction and improving the environmental and nuclear materials legacy of the Cold War. Los Alamos' capabilities assist the nation in addressing energy, environment, infrastructure and biological security problems.

NNSA National Nuclear Security Administration

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Support for tsunami victims

Laboratory Director G. Peter Nanos

By now you are all aware of the earthquake and tsunami of Dec. 26, 2004, that has claimed thousands of lives, left many more thousands homeless and wreaked devastation to many countries in southeast Asia. Some of you may have been touched by the disaster in a personal way and already are providing support and assistance as you see fit.

Laboratory personnel, I have come to learn, know no limits to their personal generosity. I have seen this generosity manifested through employee participation in the annual United Way and Los Alamos Employees' Scholarship fund giving programs, or, as shown last month, through our annual Holiday Drive.

There are numerous charitable and disaster-relief organizations now accepting contributions to purchase much-needed supplies to assist the tsunami victims. To find a list of major, reputable organizations accepting contributions (Red Cross/Red Crescent, UNICEF, CARE, etc.) for tsunami relief, go to *http://www.google.com/tsunami_relief.html* online. There are no doubt other organizations not listed on this Web page who also have begun relief efforts. Regardless of which organization you choose to donate to, charitable giving is an individual decision. I know that the spirit of caring is alive and well at this Laboratory, and I ask that you consider reviewing this Web page and, as you see fit, choose how you might be able to assist those individuals impacted by this natural disaster.

Thank you for caring.

—Laboratory Director G. Peter Nanos

Proposed new polygraph rules are published

The Department of Energy's proposed polygraph rule has been published in the Federal Register at *a257.g.akamaitech.net/7/257/2422/01jan20051800/edocket.access.gpo.gov/2005/05-248.htm* online.

The proposed rule includes the following requirements regarding mandatory and random polygraph testing:

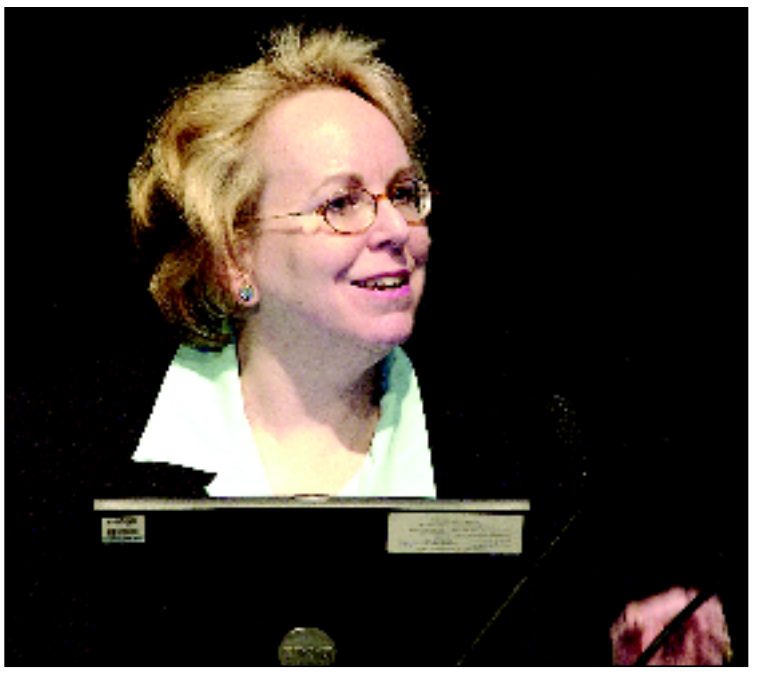
Categories of federal and contractor employees subject to mandatory evaluations, including polygraphs, no less than every five years would include: Office of Counterintelligence-related employees; most Office of Intelligence-related employees; non-intelligence special access programs designated by the secretary; individuals with regular and routine access to Top Secret Restricted Data; individuals with regular and routine access to Top Secret National Security Information; and individuals designated by program managers in certain DOE offices and programs with approval of the secretary.

Beyond core coverage, evaluations, to include polygraphs, of federal and contractor employees may be randomly scheduled for Office of Security-related employees; Office of Emergency Operations-related employees; Office of Independent Oversight and Performance Assurance-related employees; Sigma 14 and 15 employees and those who have regular and routine access to weapons concepts and designs that could produce improvised nuclear devices; and system administrators for systems containing classified information.

Last year, DOE Deputy Secretary Kyle McSlarrow testified before the Senate Committee on Natural Resources on DOE's efforts regarding a new polygraph examination and announced substantial changes to the policy. The policy reduces the number of polygraphs performed across the complex and requires mandatory testing for only those individuals with access to the most sensitive information.

McSlarrow's testimony is located at *http://www.energy.gov/engine/content.do?PUBLIC_ID=14087&BT_CODE=PR_CONGRESSTEST&TT_CODE=PRESSSPEECH* online.

Improvements in methodologies for tracking infectious disease needed



Seventy percent of known biothreats are zoonotic, according to pathologist and veterinarian Tracey McNamara, who spoke regarding the United States' current infectious disease surveillance methods for zoonotic pathogens. While the country is making significant in-roads in infectious disease surveillance, we have yet to achieve a truly integrated bio-surveillance system for the detection of zoonotic threats, McNamara said at a Director's Colloquium in the Physics Building Auditorium at Technical Area 3. One national animal-monitoring effort for infectious diseases is the National Animal Health Laboratory Network (NAHLN), headed by the Department of Agriculture. By March 15, the NAHLN will have messaging systems adopting the Health Level 7 standard for messaging, allowing veterinarians and zoos across the county to send information in a consistent format to the national database. However, as the NAHLN focuses primarily on infectious diseases in agricultural animals, it is limited in extensibility and usefulness in tracking infectious pathogens in wildlife. *Photo by LeRoy N. Sanchez*

Review and transition of Lab policies underway

by James E. Rickman

The Laboratory is taking the first steps to consolidate and streamline its policies, procedures and instructions that govern day-to-day work.

The Policy Office (POL) is leading an extensive review of all policies and procedures that apply Labwide. The goal is to have an integrated set of institutional policies and procedures that support the work force in meeting the Laboratory's goals, values and mission.

"We currently work under some 400-plus policies and procedures," said Diana Webb, POL leader. "Some of these date back 20 years or more and haven't been updated for quite a while. We continually hear that workers are put off by the volume and complexity of these documents and that policies provide conflicting or incomplete information."

Laboratory Implementation Requirements, instruction memoranda and the Administrative Manual are examples of documents under review. The Policy Office is working with subject matter experts across the Lab to make revisions. The Human Resources (HR) Division is leading the review of personnel policies covered in the AM.

Created under the Director's Office in 2003, POL has a broad charter to streamline and consolidate all Laboratory policies and procedures. During its first year, POL published its Web site, created a records management system that will be compatible with the Enterprise Project (EP) and developed a new policy process. Under the new process, the Executive Board will vet new policies to ensure that implementation would be in the best interests of the Laboratory.

This year, POL will review nearly 150 operational policies, procedures and instructions; nearly 160 business policies; and nearly 200 other documents and Web sites. Ultimately, Webb said, policies, procedures and instructions across the institution will provide consistent guidance to all employees performing work at the Laboratory.

"2005 is a transition period — we're moving from an old policy system to a new one," said Webb. "In the coming year, Laboratory employees can expect to see a number of changes, such as a reduction in the number of documents and creation of new ones. In the next two years, what we'll see is a policy system that better supports our work force. These policies, procedures and instructions will employ an institutional approach to compliance based on the goals and values of the Laboratory."

The Policy Office already has received approval from Laboratory Director G. Peter Nanos to discontinue the Laboratory Performance Requirements series. In addition, this year POL instituted two new categories of documents, known as "Institutional Policies" and "Implementation Procedures," which will replace LIRs and AM sections.

"When we complete our 100 percent review of all policies, procedures and instructions, we'll know what we have policy-wise as an institution," said Webb. "The Laboratory Executive Board then will provide a roadmap of where we need to go as an institution based on our shared goals and values. Implementing policies based on that roadmap will allow all of us within the institution to perform our work in a safe, secure and meaningful manner to meet institutional goals and values."

More information about the Policy Office and policy-related issues is at *http://int.lanl.gov/policies* online.

Progress on science

by Tom Bowles, chief science officer

With the start of the New Year, I thought it would be good to look back on [the] progress we have made in trying to enhance science at the Laboratory since operations were suspended last summer. We have made significant progress in resuming activities and ultimately, as we address all of the issues identified in the management self-assessments, we will improve our ability to carry out the science mission of the Laboratory. While that will take considerable time, we have done a number of other things that have positively impacted science at the Lab.

The Chief Financial Officer (CFO) Division has made strides in reducing tax rates. As we reduce the dollar cost of doing business, we are trying to ensure that we do not drive up the time overhead on staff. It will not really be clear where we stand on that until all of the resumption activities are completed. To be proactive on the overhead in time, [Laboratory Director G. Peter Nanos] has stipulated that all new policies and procedures must be vetted for their cost and impact on science before being approved. A review of all existing policies also is underway to see if we can reduce their impact [see related story above]. The director also has provided $5 million in G&A funds to support science, along with $10 million for buildings to alleviate some of the space problems that Lab scientists face.

Ultimately, the most important development underway is the formation of working groups with representation from both the technical and support sides of the Lab. The goal of this [effort] is to re-establish priority for the science that underpins the Laboratory's mission. I am convinced that it is only by working together and understanding all the sides in an issue that we will be able to find acceptable solutions that support science while maintaining full accountability. I see very strong buy-in from all parts of the Lab in this effort. I believe that as the year progresses, these efforts will result in quite visible improvements in our ability to do science.

Nine proposals for research projects selected

UNM Joint Science and Technology Laboratory

by Hildi T. Kelsey

Nine research proposals will receive funding through the Joint Science and Technology Laboratory, a virtual, partnership-based laboratory created between Los Alamos and the University of New Mexico.

The research proposals are in the areas of bioscience, materials, quantum information science and computer science. Each selected project received University of California Directed Research and Development funding for the JSTL initiative. The combined total funding of the projects is $481,496.

The Joint Science and Technology Laboratory was created through a memorandum of understanding signed in October 2003 between Los Alamos and UNM.

Regarding his involvement as a member of the JSTL management committee, Bill Feiereisen of the Computer and Computational Sciences (CCS) Division commented, "I have always been excited about the idea of supporting New Mexico schools in technology. With the intellectual capabilities of our national laboratories — in Los Alamos and at Sandia — and excellent higher education institutions such as UNM, we have the resources here in the state to play a vital role in supporting the country's national security mission. These proposals are an implementation of that capability embodied in strategic partnership and scientific knowledge sharing."

Laboratory technical staff members and their UNM faculty and researcher counterparts submitted proposals to JSTL for consideration last summer. Project proposals required researchers to describe work to be performed for a period not to exceed one year and provide significant opportunities for student and postdoctoral involvement. Each proposal included a project summary, details of the proposed project (including the nature of the collaboration), budget and biographical sketches of the principal investigators.

Thirty-six submissions were reviewed by the management committee and nine were recommended for funding. The JSTL executive committee, consisting of Tom Bowles, the Lab's chief science officer, and Terry Yates, UNM vice president for research, approved the recommendations.

For a brief description of each winning proposal, go to *www.lanl.gov/orgs/pa/newsbulletin/2005/01/04/text02.shtml* online.

Best recruiting practices: Deployed recruiters

Editor's note: This article is the third in a series spotlighting the Lab's best practices in recruiting.

by Brooke Kent

Specialization plays a central role in modern science, but does it also merit a place in scientific recruiting? Beth McCormick of Staffing (HR-S) thinks so.

"Author Tom Robbins joked that 'to specialize is to brush one tooth.' All kidding aside, the Lab's immensity and complexity makes specialization in recruiting not just necessary, but vital," explained McCormick, who serves as the Lab's recruiting manager.

That's why McCormick launched a pilot program in 2004 that deployed specialized recruiters to the Computing, Communications and Networking (CCN), Chief Financial Officer (CFO), International, Space and Response Technology (ISR), Nuclear Nonproliferation (N) and Supply Chain Management (SUP) divisions.

"The deployed recruiting model emerged from our drive to simplify the Lab's recruiting process," McCormick said. "Especially for divisions that rely on intricate, hard-to-evaluate technical or business skills, a deployed recruiter can function as a strategic business partner. Working exclusively with one division lets the deployed recruiter become intimately familiar with that customer's short-term needs and long-term priorities. As a result, the deployed recruiter can develop targeted recruiting strategies while expediting the candidate screening and selection process."

Valerie Lopez, a deployed recruiter for CFO, seconds the model's benefits. "Since I use my knowledge of the division to identify the most valuable candidates, I reduce the amount of time that a manager spends on the hiring process, as well as the total time to hire a candidate. What that translates into is simple: instead of having to review 50 to 60 résumés for a job posting, a manager evaluates only five to ten candidates whom I've already phone-screened. Just imagine the time, effort and hassle that saves," Lopez said. Bob Gilbert, a deployed recruiter for SUP, said, "Any division that utilizes the deployed recruiting model will be impressed, not just with the time it saves, but also with the expertise it lends to the entire process, and the increased success it generates in closing on top candidates."

Customers who utilize deployed recruiters agree. Annette Houston, a group leader for Technical Support, Staffing, and Research and Development (SUP-10), worked with Bob Gilbert on several searches and noted that "Bob has saved me an inordinate amount of time and energy. I have been extremely pleased with the process. Because of it, I don't have to identify potential candidates — they are brought to me." Another customer, Camilo Perez, a group leader for Business Systems Support (CFO-SYSTEM), concurs. "This process has been completely refreshing to me as a manager. Working with a deployed recruiter has freed me from a substantial part of the candidate screening process, and thus saved me a lot of time," he said.

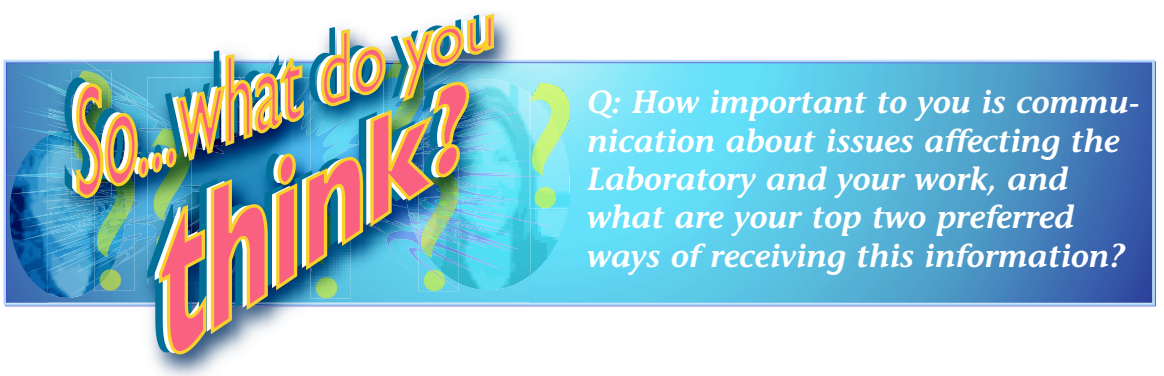
Replicating that success is the model's goal. "The Lab's future rests on a streamlined, focused recruiting process that attracts the very best employees," said McCormick. "Over the past six months, four deployed recruiters have screened more than 9,000 résumés, phone-screened 258 candidates and participated in 103 interviews that, thus far, have resulted in 15 hires and several pending offers. It's clear that the deployed recruiting model expedites the hiring process for divisions with involved technical or business requirements, and that's what makes it a Labwide best practice in recruiting."

For more information on the deployed recruiting model, contact the Lab's recruiting office at 7-8849, or write to to *recruiting@lanl.gov* by e-mail.

Comment period extended to Jan. 21 on Lab contract RFP

Friday (Jan. 21) is the new deadline to submit comments to the Department of Energy on the draft request for proposal for management and operation of the Laboratory.

The draft request for proposals can be found at *www.doeal.gov/lanlcontract recompete/DraftRFP.htm* online.



Q: How important to you is communication about issues affecting the Laboratory and your work, and what are your top two preferred ways of receiving this information?

Donna Gadbois of Training Services (PS-13)

Since my job is in training, communication is very important to me because I need up-to-date information to pass on to students. On a personal level, official communication about Lab issues is important, because it helps quiet the rumor mill and decreases the uncertainty in people's lives. I like e-mail communication in the form of official notices/distributions, because I can refer to them at later dates to refresh my memory. However, I may be one of the minority who read e-mail. There is nothing like personal delivery in the form of director/AD/manager talks, and the recent brown bag trend is very good.

Nathan Knoche of Environmental Characterization and Remediation (ENV-ECR)

Communication about issues affecting the Lab and my work is extremely important to me. Often issues are learned of second hand, which in turn can lead to false conclusions. I prefer e-mail and the Lab's Web home page postings to receive information about the Lab and my work. Colloquiums are another useful tool that help us to understand what other people in the group are doing and also to update us on the status of the project and program.

Pat Gallagher of Solid Waste Regulatory Compliance (ENV-SWRC)

Communication is one of the most important yet difficult tasks in any organization. Communication about the most important issues avoids rumors and makes employees feel like they are a more valuable part of the organization. I think the Lab needs to work harder on two-way communication. I believe it truly misses opportunities to do things better, because it does not listen to employees as well as it could. There are some mechanisms for this, such as "Tell Pete," which are great, but the Lab should make an effort to involve employees more in the development of Labwide systems and listen and act on employee suggestions at all levels of management (except mine which listens very well, of course!). My two preferred ways of receiving information are e-mail and [the Daily] Newsbulletin.

Kirt Anderson of Site Planning and Project Initiation (SPPI)

Communication is very important because it is the main way to have an overall picture of the Laboratory. Communication also is important as it relates to my future and the future of my family and as it relates to my work with the rest of the Laboratory. I prefer newsletters sent through e-mail, as well as briefings through group leaders that allow us to ask questions about issues. I also like the director's talks to the Laboratory, because they help to provide an understanding of his convictions on an issue.

Jessica Sebring of Operations Support (SUP-OPS)

Communication is what I consider the most important aspect of my work. Without proper communication, important tasks may be overlooked or done incorrectly, which causes many problems and waste[s] time trying to solve the problem. It is important for all of us to be well informed about what is occurring both within our own area and Labwide. I prefer to receive this information electronically via e-mail and the Lab Web site.

Joan Thompson of the Los Alamos Neutron Science Center Division Office (LANSCE-DO)

Communication equates to inclusion and can dispel anxiety and rumor. By nature, it must be the proverbial "two-way" in order to build trust. I make time to read the Daily Newsbulletin to keep informed. I also find our division all-hands meetings to be of value.

Patent awards

Editor's note: Some of the individuals listed below are no longer employed at the Laboratory but were at the time they applied for the patent.

Recently issued patent awards

Nondegenerate four-wave mixing using photoinduced charge-transfer materials
Patent No. 6,761,999, issued July 13, 2004
Eric Maniloff and **Duncan McBranch** of Physical Chemistry and Applied Spectroscopy (C-PCS); **Alan Heeger** of the Director of Science and Technology Base Programs (STB-DSTBP) Office; and **Dan Vacar** of the University of California, Santa Barbara

Synthesis of [2H1, 13C], [2H2, 13C] and [2H3, 13C] methylaryl sulfones and sulfixides
Patent No. 6,764,673, issued July 20, 2004
Rodolfo Martinez, **Marc Alvarez**, **Louis Silks III**, **Clifford Unkefer** and **Jurgen Schmidt** of Biotechnology, Spectroscopy and Isotope Chemistry (B-3)

Remote down-hole well telemetry
Patent No. 6,766,141, issued July 20, 2004
Scott Briles and **Daniel Neagley** of Space Data Systems (ISR-3), **Don Coates** of the Physics (P) Division and **Samuel Freund** of Intellectual Property (LC-IP)

Detection of phenols using engineered bacteria
Patent No. 6,773,918, issued Aug. 10, 2004
Cheryl Kuske of Molecular Microbiology and Immunology (B-1) and **Thomas Terwilliger** of Cell Biology, Structural Biology and Flow Cytometry (B-2) and **Arlene Wise** of B-7

Volatile chemical reagent detector
Patent No. 6,780,379, issued Aug. 24, 2004
Liaohai Chen, **Rong Wang** and **David Whitten** of Spectroscopy, Imaging and Molecular Chemistry (B-4); and **Duncan McBranch** of C-PCS

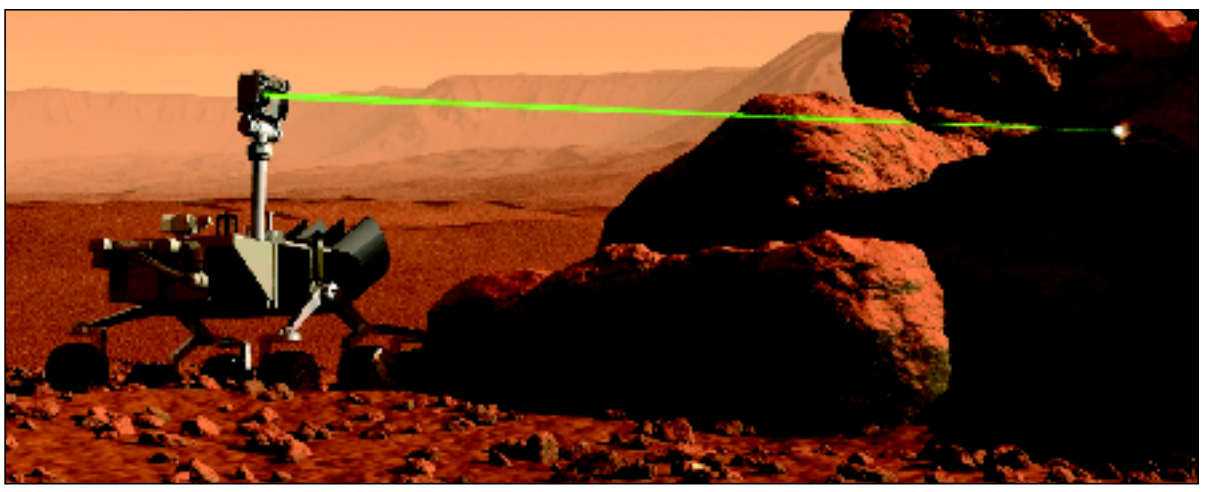
Handheld CZT radiation detector
Patent No. 6,781,134, issued Aug. 24, 2004
William Murray, **Kenneth Butterfield** and **William Baird** of Advanced Nuclear Technology (N-2)

Optimizing the availability of a buffered industrial process
Patent No. 6,782,295, issued Aug. 24, 2004
Harry Martz Jr. and **Michael Hamada** of Statistical Sciences (D-1), and **Arthur Koehler** and **Eric Berg** of Proctor & Gamble

Magnetic vector field tag and seal
Patent No. 6,784,796, issued Aug. 31, 2004
Roger Johnston and **Anthony Garcia** of Advanced Chemical Diagnostics and Instrumentation (C-ADI)

Hydrogen production from carbonaceous material
Patent No. 6,790,430, issued Sept. 14, 2004
Klaus Lackner of the Theoretical (T) Division and **Hans Ziock** of Hydrology, Geochemistry and Geology (EES-6)

Method for producing chemical energy
Patent No. 6,792,867, issued Sept. 21, 2004
Betty Jorgensen of Materials Dynamics (DX-2) and **Wayne Danen** of the Dynamic Experimentation (DX) Division



Mars Science Laboratory rover using ChemCam to analyze a rock. *Artist's conception, courtesy French Space Agency and the Laboratory*

Los Alamos wizardry to aid new Mars Science Laboratory

by Nancy Ambrosiano

Having analyzed Mars from afar via orbiting satellite, instruments developed at the Laboratory will next be on their way to play in the Martian dirt. Two of the eight instruments aboard NASA's planned Mars Science Laboratory rover, scheduled for launch in 2009, include Los Alamos technology.

The Laboratory's contribution to the new Mars effort is two-fold: providing a laser unit to measure elemental composition of rocks and soils, plus an X-ray diffraction device to analyze minerals in complex soil and rock samples from a different perspective. The rolling Mars Science Laboratory rover will be designed to operate for a full Martian year, or two Earth years, exploring potential habitats for evidence of past or present life.

The Los Alamos laser unit, called ChemCam, uses laser-induced breakdown spectroscopy, to measure the chemical content of the target samples.

ChemCam works by firing an intense pulse of laser light at a surface from as far as 13 meters away. The laser beam zaps a pinhead-sized area on the target, ablating or vaporizing it. A spectral analyzer then peers closely at the light from the vaporized sample. Atoms ablated in ionized states emit light and each sample yields a unique spectral emission of bright lines characteristic of the elements present in the material. Like fingerprints, the emission line wavelengths can be matched to a library of known chemical compounds. Even dust-covered rocks will reveal their inner secrets to the ChemCam interrogation. The laser also can be used to clean dust or weathering coatings from the sample prior to the analysis without the need to drive up to the target rock.

"ChemCam is the only instrument that can determine the elemental compositions of dust-covered rocks remotely," said Roger Wiens of Space and Atmospheric Sciences (ISR-1), Los Alamos' principal investigator on the project. The unit can recognize all known elements, noted Wiens, so detailed information on possible future Mars base sites can then begin flowing back to Earth for analysis.

The other piece of the ChemCam combo, the Remote Micro-Imager, will give very close-up images of the samples being analyzed, with an effective resolution that exceeds MER's Pancam by five to 10 times. The laser and camera are provided by the French space agency. Los Alamos is in charge of the spectrographs, data processing unit, power supply, software and project management.

Another of the rover's planned instruments is CheMin, an X-ray diffraction/X-ray fluorescence instrument for mineralogical analysis. Its principal investigator is David Blake of NASA's Ames Research Center in Moffett Field, Calif. Partnering with Blake are Los Alamos geologists Steve Chipera and David Vaniman, both of Hydrology, Geochemistry and Geology (EES-6). CheMin will identify and quantify all minerals in complex samples such as basalts, evaporites and soils, one of the principle objectives of the Mars Science Laboratory.

"CheMin is named for its ability to obtain chemical and mineralogical data simultaneously from samples of soil or rock," said Vaniman. "The mineralogical capability is particularly powerful because it is based on X-ray diffraction, the standard method for mineral identification used in laboratories on Earth and required by the International Mineralogical Association for recognition of any new mineral."

Both ChemCam and CheMin are previous winners in the "R&D 100" competition sponsored by Research and Development Magazine.

For images and additional information on the ChemCam project, go to *libs.lanl.gov/* online. For images and additional information on CheMin, go to *chemin.lanl.gov/* online.

For Laboratory closures, delays or early dismissal information, call UPDATE at 667-6622 or 1-877-723-4101 (toll free).

Quantum cryptography team co-winner of prestigious European research prize

by Jim Danneskiold

Los Alamos researchers and other members of a multi-nation collaboration that is developing a revolutionary technology for information security have captured half of the European Union's Descartes Prize for Research.

Los Alamos' quantum cryptography team and six other institutions in the Information Society Technologies QuComm collaboration received the prize for their project to build a secure global communication system using particles of light.

Quantum cryptography makes a more secure global infrastructure possible by enabling two parties to encode a secret key with single photons so they can communicate much more securely than with other cryptographic techniques. Once the quantum key is encoded through polarization, any attempt by a third party to eavesdrop on the communications is easily detected. Among potential applications for quantum cryptography include nearly all forms of electronic communications and electronic banking and voting.

The QuComm partnership will split the one-million-Euro prize (about $1.3 million) with a team of life scientists studying mitochondrial DNA, whose research might someday lead to therapies to slow the aging process. The prizes, now in their fifth year, were awarded in Prague, Czechoslovakia, by Janez Potocnik, EU commissioner for science and research.

"The idea behind our collaboration was to take quantum encryption out of the laboratory and show that that you can do something useful with it," said **Richard Hughes** of the Physics (P) Division, who leads the Laboratory's quantum cryptography projects.

"These days the ability to ensure privacy is immensely important, and obviously the jury thought that our work was significant for business, government and eventually for the average computer user," Hughes said. "The prize is awarded specifically for things that will have a major impact on improving society, so we were very pleased to win competing against projects in the biosciences, nanotechnology, chemistry and other equally important fields."

The IST-QuComm collaboration is made up of research groups in Sweden, Germany, France, Switzerland, Austria and the United Kingdom, in addition to the Los Alamos team.

Progress in quantum cryptography and related areas has been rapid in recent years. A key breakthrough came two years ago, when Los Alamos researchers sent an encrypted quantum key nearly six miles from the Los Alamos Neutron Science Center to the Pajarito Ski Area, still the only demonstration of quantum key distribution through the atmosphere in daylight.

Last year, IST-QuComm physicists at the University of Vienna succeeded in sending encrypted photons more than one-third of a mile across the river Danube, while a group at the University of Geneva recently demonstrated quantum teleportation at wavelengths used in telecommunications through a 2-1/2 mile fiber-optic cable. The IST-QuComm consortium also performed the first-ever bank transfer guaranteed by quantum technologies over a 3.7-mile fiber-optic cable in Vienna this summer. Four years ago, the Los Alamos team made headlines when it sent encrypted photons through 30 miles of fiber-optic cable across Laboratory grounds.

A high-profile jury from the fields of science industry and government selected the two winning collaborations for the Descartes Prize from among eight finalists, representing the entire spectrum of science and technology disciplines. Jury chair was Ene Ergma, vice president of the Academy of Sciences of Estonia and president of the Estonian parliament.

PEOPLE

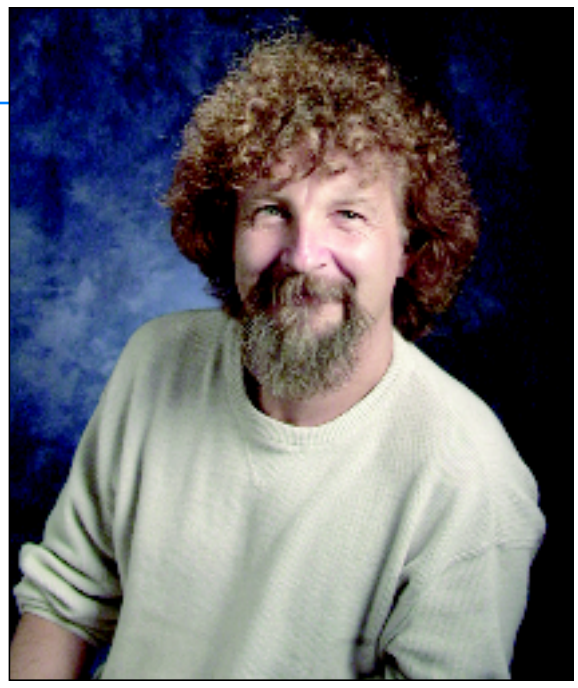
Zurek named Phi Beta Kappa visiting scholar

Physicist **Wojciech Zurek** of the Theoretical (T) Division was named a Phi Beta Kappa Visiting Scholar for 2004-05. Established in 1776, Phi Beta Kappa is the nation's oldest and largest academic honor society. Its Visiting Scholar Program serves to enrich the intellectual atmosphere at participating institutions.

"I am delighted with the award, excited about the prospect of interacting with the students and faculty and honored to join the distinguished company of the other Phi Beta Kappa scholars," said Zurek.

Phi Beta Kappa scholars are a select group: Steven Chu, recently appointed director of Lawrence Berkeley Laboratory and a 1997 Nobel Prize winner, is the only other physicist this year. Visiting scholars spend two days per campus meeting with students, participating in classroom lectures and addressing the academic community at up to eight universities and colleges with Phi Beta Kappa chapters. Specific topics selected for discussion by Zurek include Probabilities in Physics: From Quantum Entanglement to Classical Ignorance and Randomness and Maxwell's Demon.

Zurek joined the Laboratory in 1984 as a J. Robert Oppenheimer Fellow and led Theoretical Astrophysics (T-6) from 1991 to 1996. In 1996, he was named a Laboratory Fellow. Along with his groundbreaking work in quantum mechanics (he is well known for developing theory of decoherence and for the "no-cloning theorem"), his research interests extend to physics of information, astrophysics, cosmology and quantum computation.



Wojciech Zurek

In 1979, Zurek earned a doctorate in physics from the University of Texas in Austin (where he will return in February as visiting scholar). He also has a master's degree in physics from Stanislaw Staszic Technical University in Krakow, Poland in 1974.

In addition to writing nearly 200 scientific papers, Zurek edited influential volumes Complexity, Entropy, and Physics of Information and (with John Archibald Wheeler) Quantum Theory and Measurement.

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In Memoriam

Blake Morstad

Blake Morstad, who recently joined the Laboratory as a mechanical engineer in Applied Electromagnetics (ISR-5), was killed in an avalanche on New Year's Day during a cross country ski trip in Montana. Morstad, 24, joined the Laboratory in November.

A memorial fund has been established by Morstad's colleagues in ISR-5. Laboratory personnel and others who want to contribute to the fund can provide cash or write personal checks to the Blake Morstad Memorial Fund at the bank. The account number for the fund is 00282618-01.

Donations will be used to pay for moving expenses and medical insurance for his wife, Adele, who is due to give birth to their first child next month.

Norman Lyon Jr.

Laboratory retiree Norman Lyon Jr. died Sept. 30, 2004. He was 84.

Lyon was born in Springfield, Mass. From 1944 to 1946, he served in the U.S. Navy in the Pacific during World War II.

In April 1963, Lyon came to Los Alamos as a machinist in the former Fabrications (SD-1). During his career in Los Alamos, he also worked in the former Branch Shops (SD-5 and MEC-5). He retired in 1983 and moved to Santa Fe in 1985.

Lyon is survived by his wife, Emma; daughter Sarah; and sons, John and Brad.

Manuel Urizar

Laboratory retiree Manuel Urizar died Oct. 24, 2004, in Albuquerque. He was 83.

A World War II veteran, Urizar came to Los Alamos in 1947 as a junior scientist, a year after discharge as a sergeant from the U.S. Army.

He was born in Winnemucca, Nev., and had degrees in chemistry and physical chemistry from the University of Portland and Catholic University respectively.

Over Urizar's 40-year career at Los Alamos, he worked as a technical staff member and section, associate group and group leader in the former Explosives (X), Design Engineering (WX) and GMX divisions. He retired in 1988 in the former Dynamic Testing (M) Division, later returning to the Lab as an associate in the same division. He retired as an associate in September 1992.

Urizar is survived by daughters Anne of Tucson, Ariz., and Arlene Highfill of Albuquerque; sister Frances MacRoberts of Los Alamos; and four grandchildren.

R. Arthur "Rudy" Rivera

Laboratory retiree Arthur "Rudy" Rivera died Oct. 10, 2004. He was 77.

Born in Pojoaque, Rivera was a U.S. Army veteran and served in the Philippines in World War II. After his discharge, he returned to New Mexico and joined Project Y at the Laboratory in January 1947.

He worked at the Laboratory for 35 years in the warehouse and classification groups, retiring in 1981. He returned to the Lab later that year as a records analyst in the former Communication and Records (CRM) before leaving the Lab in 1982.

Rivera is survived by daughters Lorraine Jones of Santa Fe and Miquela Rivera-Lozano of Albuquerque; two grandchildren; two brothers and sisters; and other relatives.

January service anniversaries

35 years
Justo Cordova, LANSCE-2
Rhonald Keinigs, X-4
Judy Marriott, DIR
Daniel Sandoval, HSR-5

30 years
Margaret Baca, SUP-2
Donald Close, N-2
Norman Elliott, MST-7
John Farr, NMT-16
Joseph Ginocchio, T-16
Allen Hartford Jr., LANSCE-DO
John Hendricks, D-5
Phillip Klingner, ISR-3
Richard Larson, ESA-WSE
Fred Roensch, C-INC
Joe Romero, ESA-TSE
R.F. Strickler, SUP-OPS
Joe Thompson, MST-10
Carl Wilson, C-PCS

25 years
Harold Armstrong, CCN-7
Thomas Carey, ISR-1
Allen Cogbill, EES-11
Joyce Elliott, MST-7
Juan Fernandez, P-24
Marcia Gallegos, IM-9
Charlotte Garcia, PS-13
Edward Idar, X-4
Jack Johnson, LANSCE-10
Steven Maaranen, DIR
Yvonne Martinez, CFO-1
Timothy Martinez, MSM-2
Elizabeth Martinez, SUP-2
Cindy Mills, NMT-4
Sarah Pacheco, N-DO
John Power, LANSCE-8
Catherine Salazar, CFO-3

20 years
Patricia Aguilar, SUP-3
Patricia Berger, CER-20
Joseph Butner, ESA-ESA
Julie Carpenter, HSR-12
Sean Clancy, X-3
Robert Devine, HSR-4
James Estes IV, NMT-1
Pamela French, ADWP
Judy Fresquez, ADTR-TRO
John George, P-21
Yvonne Gonzales, SUP-2
Debbie Gonzalez, TT
George Gray III, MST-8
Timothy Hayes, NMT-4
Lori Ann Hicks, CFO-1
Hector Hinojosa, IM-1
Ruth Holt, IM-EP
Thomas Houlton, HSR-4
Alan Kernodle, LANSCE-7
Ping Lee, DIR
Henry Marquez, LANSCE-5
Eva Martinez, N-1
Sarah-Jane Maynard, SUP-2
Andrew McCown, D-4
Fred Mueller, MST-STC
George Newman Jr., HSR-1
Hain Oona, ESA-TSE
Peter Pazuchanics, P-23
Darrell Peterson, X-2
Deborah Pirkl, EES-DO
Keith Rendell, PM-IP
Charles Rense, MSM-2
Cary Skidmore, ESA-ESA
James Smith, MST-8
Debbie Spore, P-25
Jacqueline Stack, STB-RL
Cheryl Straub, EES-2
Harunori Takeda, X-4
Garth Tietjen, IM-1

15 years
John Berg, NMT-11
Bradly Cooke, ISR-4
Rochelle Follmer, CFO-3
Bernard Foy, C-PCS
Joseph Giles, ADTR
Diane Gonzales, IM-EP
Walter Hansen, N-1
Cheryl Kuske, B-1
Craig Leasure, PADNWP
Loretta Lopez, HR-D-SR
Nestor Ovalle, IM-8
Cynthia Phillips, S-2
Denny Rice, CCN-5
Jeanne Robinson, C-PCS
Erik Vold, X-3
Jeffrey Whicker, HSR-4

10 years
Mark Abhold, CHS
Rick Alexander, NWO-RLW
Ruth Ann Vargas, HSR-4
Timothy Babicke, HR-SR
Gian Bacigalupa, ENV-SWRC
William Barber, CCN-12
G. Morrison Bennett, IM-1
Alan Berscheid, D-4
Janel Bigcrow, IM-8
Larry Collins, ISEC
Jose Gomez, FM-WFM
Debora Hall, NWO-NA
Jason Kitten, C-INC
Tony Mondragon, S-2
Nancy Nicholas, N-NST
Tinitia Oliver, FM-TA-55
Veronica Pacheco, SUP-2
Charles Peper, ENG-IIM
Pete Pittman, ESA-AET
David Robbins, DX-2
Mark Robinson, NMT-14
Pamela Roybal, CCN-4
Charity Roybal, HSR-4
Davy Sparks, NMT-2
Valerie Trujillo, STB-RL
Ralph Trujillo, SUP-2
Deborah Wilke, STB-UC
Todd Williams, T-3

5 years
Angela Arias, ESA-TSE
Mark Becker, N-3
C.S. Blessinger, N-2
J. Christopher Echohawk, EES-9
Charles Ferenbaugh, CCN-12
Henrietta Gallegos, N-GTR
Ellen Louderbough, LC-ESH
Quinn McCulloch, MST-10
Kathleen McDonald, DIR
Elizabeth Medina, CFO-1
Thomas Meyer, ADWEM
David Miller, NMT-16
Beverly Ramsey, EMRGCY OPS
Paulo Rigg, DX-2
Steve Rogers Jr., S-5
James Schaefer, N-4
Dennis Trujillo, NMT-12

Zurek named …

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Along with his new role as Visiting Scholar, Zurek is a foreign associate of the Cosmology Program of the Canadian Institute of Advanced Research. He was a member of the external faculty of Santa Fe Institute, where he has founded the Complexity, Entropy and Physics of Information network. Recently, Zurek co-organized and directed the Quantum Coherence and Decoherence Program as well as the Quantum Computing and Chaos Program at the University of California's (Santa Barbara) Institute for Theoretical Physics, and Complexity, Computation and Physics of Information Program at the Isaac Newton Institute in Cambridge.

Three employees win Energy Management Award

Emilio Racinez of Utilities (NWO-UI), **Joe Grider** of Diversified Facilities (FM-DF) and **Melvin Burnett** of Design Engineering and Construction Services (FESS-DECS) recently were honored at the 25th annual Department of Energy Management Awards ceremony in Washington, D.C.

The three, along with John Lopez of Lopez Engineering and Randy Orr of Automated Control Systems Inc., received the Energy Savings Retrofit Installation Honor for achieving a "20.4 percent savings in electricity use through retrofit projects" in the Otowi Building at Technical Area 3. The electricity savings achieved through these projects saved the Laboratory more than $71,000 in 2003.

"The $71,000 a year savings is just for this $500,000 small building project," said Racinez. "The important aspect of this energy savings retrofit project at the Otowi is that it demonstrates that new building technology retrofit can be done Labwide in older and new buildings. Multiply this by 10 or 20, and you can see the greater impact."

The Energy Management Awards were established in 1979 by DOE's In-House Energy Management Program, part of the Federal Energy Management Program, to recognized outstanding contributions toward energy and dollar savings at DOE facilities and field organizations.

The winners received an engraved plaque and a letter from Energy Secretary Spencer Abraham.

This month in history …

January

1610 — Galileo discovers the four major moons of Jupiter.

1790 — President Washington delivers the first "State of the Union" speech.

1847 — The Taos Rebellion against the U.S. occupation of New Mexico results in the slaying of Gov. Charles Bent.

1862 — The U.S. income tax goes into effect.

1900 — Baseball's American League is founded.

1930 — The element Fr (francium) is discovered.

1939 — The uranium atom is split for the first time using the cyclotron at Columbia University in New York City. Thus began the Manhattan Project, leading to the construction of the atom bomb.

1943 — The Pentagon in Washington, D.C., opens.

1944 — Edward Teller begins teaching a course in advanced physics at Los Alamos High School.

1946 — The first computer, ENIAC, is finished by John Mauchly and J. Presper Eckert.

1947 — The Atomic Energy Commission officially takes over from the Army the responsibility for the nation's atomic program.

1948 — The first bank opens in Los Alamos.

1950 — President Truman announces the decision to proceed with production of the hydrogen bomb.

1956 — Meetings of the Technical Exchange Committee begin, providing an opportunity for Los Alamos and Sandia national laboratories to discuss technical information.

1969 — Pulsars are first identified by University of Arizona astronomers.

1970 — The National Environmental Policy Act, requiring evaluations of federal actions that might significantly affect the environment, is signed into law.

1973 — NASA announces the start of the space shuttle program.

1975 — The Atomic Energy Commission is replaced by the Energy Research and Development Administration and the Nuclear Regulatory Commission.

1982 — The Otowi Building at Technical Area 3 opens and nearly 600 people from five divisions move in.

1986 — Sig Hecker becomes the Laboratory's fifth director.

1987 — The Department of Energy announces President Ronald Reagan's approval of the construction of the Superconducting Super Collider.

1994 — President Bill Clinton creates a national advisory committee to study human radiation experiments and releases of radiation.

1994 — Pajarito Site (TA-18) is designated a national nuclear landmark.

1995 — The Laboratory's Center for International Security Affairs is established.

2001 — Citing a lack of passengers, Rio Grande Air, discontinues service into Los Alamos. Rio Grande Air had been providing air service to Los Alamos since March 30, 1999.

And this from the Jan. 12, 1999, Daily Newsbulletin — The Laboratory recently shattered the world record for peak proton beam output by delivering pulses of 31 trillion 800-megavolt protons to a target for neutron production. Twenty pulses per second were delivered, for an average current of 100 microamperes.

The information in this column comes from several sources including the online History Channel, the Newsbulletin and its predecessors, the atomic archive.com, Echo Vitural Center, Science & Technology, Real History Archives, and Carey Sublette, "Chronology for the Origin of Atomic Weapons" from www.childrenofthemanhattanproject.org/MP_Misc/atomic_timeline_1.htm.

Submissions are welcome. Please be sure to include your source.

Employee pedals her way to victory

by Steve Sandoval

Have bicycle will travel. It's an appropriate adage for Jessica Kisiel of Information Technology and Data Analysis (HR-ITDA). Kisiel recently spent 24 hours — continuously — pumping the pedals of her bicycle and testing the limits of physical exhaustion at the 24 Hours of Adrenalin [sic] race in Phoenix.

Her reward? Another 24-hour race this September — Kisiel calls it another challenge — at Whistler Resort north of Vancouver, British Columbia.

Kisiel won the race last October in Phoenix, completing 17, 11-mile laps in 24 hours.

"I was determined to overcome the mistakes I made during my first competitive solo 24-hour race. My goal was to ride consistently for the duration and maintain adequate food and fluid intake," said Kisiel.

"Winning and qualifying for the 2005 World Solo 24 Hours of Adrenalin Championship was awesome, a great way to end the season."

And last summer, Kisiel was one of four women who got to wear the stars and stripes representing the United States at a world mountain bike event in Austria. She finished 43rd of the 70 women competitors in that event.

Kisiel, a Web page developer at the Lab, competed in the second Mountain Bike Marathon World Championships in Bad Goisern, Austria.

"I never had any reasonable expectation that I would qualify [for the event]," she said. "My main goal for the season was to do the NORBA marathon series," she added, referring to the National Offroad Bicycle Association series of qualifying races. "That was my focus. Making it to the worlds was just a huge bonus."

Being a competitive mountain biker wasn't something Kisiel planned. Though she's been competitive for nearly a decade, she wasn't a mountain-biking toddler or one who set youth cycling records. Bicycles were mostly a means of transportation for Kisiel at the University of California, Santa Barbara, and later at the University of Arizona.

Fast forward a decade, and Kisiel and her husband spend many weekends mountain biking and racing. They recently participated in the Cerro Vista Challenge, a 50-mile mostly uphill ride to an elevation of 12,000 feet from Angel Fire to Sipapu. Last winter she did another 24-hour race in Tucson and placed third. She also now teaches an occasional class or two in mountain bicycle fundamentals through the Los Alamos Family YMCA, and leads monthly women's only rides as a member of the Tuff Riders Mountain Bike Club.

Jessica Kisiel

In order to compete in Austria, Kisiel had to ride in three qualifying races, after which she was seeded second, thereby qualifying for Austria, she explained. None of these races were easy; all were about 60 miles in distance and ranged from four to more than eight hours in time, she said.

At the world marathon in Austria, a 106-kilometer event (about 65 miles), her Cannondale Scalpel lightweight aluminum bike held up pretty well under some adverse conditions, she said. Save for a flat tire, Kisiel and the bike survived the grueling race through hills, mud, dirt, some pavement and windy, twisty turns.

Kisiel kept a diary of the race. In one section of the race she wrote, "I climbed strong and crested the top into the loose, wet, foggy downhill. The water, mud spraying into my eyes and constantly foggy glasses [made] it difficult to let my speed go."

About one-third of the way into the race, Kisiel recounted another adventure: "As I powered up the most technical climb of the race I had to stay focused on the trail, which offered many obstacles. Aside from the steep incline, mud, roots and rocks, photographers snapped pictures and fans cheered in foreign languages as they puffed their cigarettes and blew smoke in my direction. It was exhilarating and I rode well, able to maneuver though sections that other riders were forced to walk."

Kisiel said she enjoyed representing the United States at the race. "Wearing the stars and stripes of the USA was a neat experience. Nearly all of the male American riders [who] passed, none of [whom] I had met, would yell some encouraging words, our only bond being our nationality," she wrote in her diary.

"A muddy mess after the race, I was approached by some kids for an autograph. How cool, my first autograph as a professional mountain biker," Kisiel wrote. "Competing at Worlds was a great experience that I am happy and privileged to have had … I finished and I rode very strong and was actually getting physically sick from the effort at the end so I know I gave it my all and more. I accomplished my goal and did my best."

And, Kisiel added, after the race, she and her husband traveled south to be cycling spectators at the prestigious Tour de France. They journeyed from Gueret to La Mongie following four stages of the tour. "The Tour de France is quite a spectacle, something every cyclist should experience at least once," she said.

Father/son take trip of a lifetime

While Kisiel was riding through rolling hills, pavement and muddy stretches, George Glass of Training Services (PS-13) a bicycling enthusiast, and son, David, had the trip of a lifetime bicycling in parts of the Tour de France.

Glass joined 24 others in France starting in Toulouse and moving on to the Carpentras area in Provence, finishing in the Grenoble area where they rode their bicycles on day trips up the passes that were either on last year's Tour De France or had been on previous years (e.g. Mount Ventoux).

They also were able to watch the tour racers for three of the days, either at the finish line or at an intermediate point somewhere on that day's stage or at the start. Glass said he saw six-time Tour de France winner, American Lance Armstrong. "I saw his back once as he passed by," said Glass.

Glass said he and his son experienced very long waits, because roads would be closed several hours for security reasons and to ensure the racers could pass through. But Glass said the waits were worth it; the Tour de France is the "crem de la crem" for those who follow avidly the bicycle racing world.