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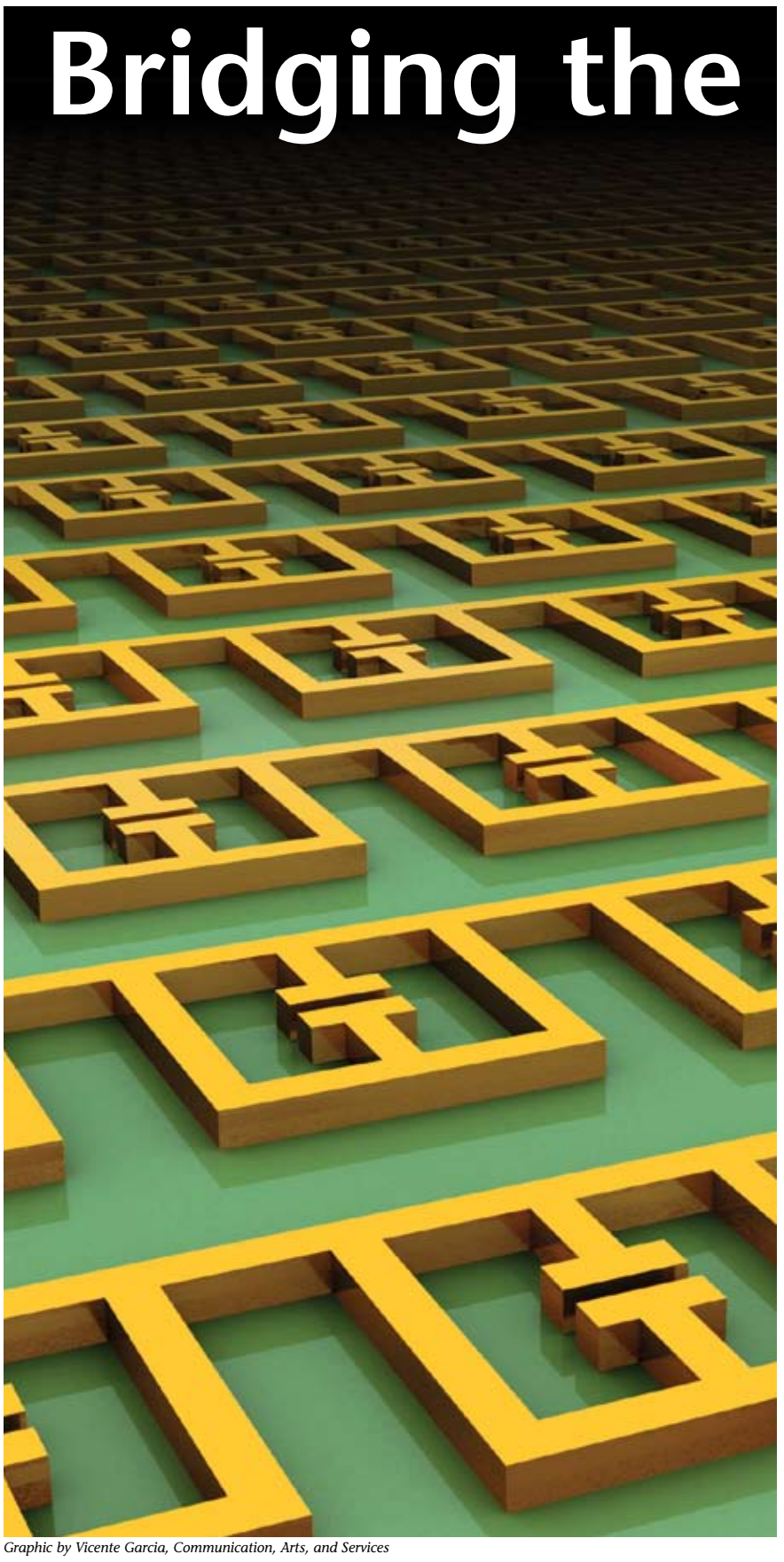
NewsLetter
Week of April 9, 2007 Vol. 8, No. 8

Bridging the terahertz gap



Graphic by Vicente Garcia, Communication, Arts, and Services

by Todd Hanson

Tucked in along the electromagnetic spectrum between the lower frequency microwaves and the higher frequency infrared light is the region of terahertz radiation.

Like microwaves, terahertz radiation has the ability to penetrate a wide variety of materials, including paper, cardboard, plastics, wood, and ceramics. Unlike X-rays and other higher frequency forms of radiation, terahertz radiation is non-ionizing, which allows it to offer far greater potential for wider use around human populations for such things as imaging and communications.

These clever and lucrative applications of terahertz radiation have long attracted the interest of scientists working in materials development, engineering, biomedical, and, more recently, homeland security fields. But being the wily wavelength that it is, terahertz radiation has proven difficult to control. Only recently have materials development successes offered hope for bridging what scientists have called the "terahertz gap."

Recently, Los Alamos researchers Toni Taylor and Hou-Tong Chen, both of the Center for Integrated Nanotechnologies (MPA-CINT) along with their colleagues from Boston College, Boston University, and the University of California, Santa Barbara, developed a device that can be used to efficiently control terahertz waves. The device could be the basis for a range of novel electronics and photonics applications ranging from new imaging methods to advanced communication technologies.

Unlike X-rays and other higher frequency forms of radiation, terahertz radiation is non-ionizing, which allows it to offer far greater potential for wider use around human populations for such things as imaging and communications.

Devices that generate and detect terahertz radiation already are in development, according to Chen, but the development of the device and techniques to actually control the waves has lagged behind. "Our work is the next logical step in the development of terahertz technologies for wider electronics and photonics applications," he said

Chen's work is the result of his longtime intellectual interest in terahertz waves and he has been working in terahertz science and technology since doing doctoral studies at Rensselaer Polytechnic Institute. During that terahertz research, he realized that functional terahertz devices — switches, modulators, phase shifters, beam steering devices, and waveguides — largely do not exist because most of naturally occurring materials do not provide useful electronic and photonic responses at the terahertz frequency regime. Arriving at Los Alamos as a postdoc, Chen began working with Taylor, Richard Averitt, who is now with Boston University, and Willie Padilla, now at Boston College.

With the trio's help, Chen came to realize that the unusual electromagnetic properties of certain metamaterials might solve the material issues involved with building efficient terahertz functional devices. Metamaterials are artificial materials with properties derived from their sub-wavelength structures instead of their compositions. Moreover, Chen believes that a blending of semiconductor and metamaterial technologies might finally help fill the so-called "terahertz gap."

To create their device, the team used micro-fabrication processes to lay down an array of gold electric resonator elements (the metamaterial) over a semiconductor substrate. A voltage applied between the substrate and the metamaterial enables the device to modulate the

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For Your Safety

Laboratory Director Michael Anastasio recently distributed shirts to the Worker Safety and Security Team members, which were purchased by himself and Dick Watkins, associate director for environment, safety, health, and quality. Anastasio said the Lab's success is tied to the employees and that they are the heart of the institution. *Photo by Kathy DeLucas*

Laboratory creates new Voluntary Protection Program

by Kathy DeLucas

The Laboratory has established a Voluntary Protection Program office in the Environment, Safety, Health, and Quality Associate Directorate. The program is modeled after the Department of Energy's Voluntary Protection Program, which promotes excellence in occupational safety and worker health across the complex.

Twenty-five years ago, the Occupational Health and Safety Administration established VPP to demonstrate excellence in worker health and safety, and reward institutions that go beyond mere compliance. More than 1,800 sites currently are enrolled in the program.

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NewsLetter

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Los Alamos National Laboratory is a multidisciplinary research institution engaged in strategic science on behalf of national security. The Laboratory is operated by a team composed of Bechtel National, the University of California, BWX Technologies and Washington Group International for the Department of Energy's National Nuclear Security Administration.

Los Alamos enhances national security by ensuring the safety and reliability of the U.S. nuclear stockpile, developing technologies to reduce threats from weapons of mass destruction, and solving problems related to energy, environment, infrastructure, health and global security concerns.

NNSA National Nuclear Security Administration

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Our Goals

Editor's note: Laboratory Director Michael Anastasio recently announced the Laboratory's goals and commitments and how all employees can help the Lab reach them. Following are the goals that he described. The goals and commitments can be found at http://int.lanl.gov/memos/2007/03/goals.pdf and http://int.lanl.gov/memos/2007/03/Labgoals2007commit.pdf online.

- ⇨Make safety and security integral to every activity we do
- ⇨Implement a cyber security system that reduces risk while providing exemplary service and productivity
- ⇨Establish excellence in environmental stewardship
- ⇨Assess the safety, reliability, and performance of LANL weapons systems
- ⇨Transform the Laboratory and the nation's nuclear weapons stockpile to achieve the 2030 vision, in partnership with the Complex
- ⇨Leverage our science and technology advantage to anticipate, counter, and defeat global threats and meet national priorities, including energy security
- ⇨Realize our vision to be a capabilities-based national security science Laboratory
- ⇨Provide efficient, responsive, and secure infrastructure and disciplined operations that effectively supports the Laboratory mission and its work force
- ⇨Implement a performance-based management system that drives mission and operational excellence
- ⇨Deliver improved business processes, systems, and tools that meet the needs of our employees, reduce the cost of doing business, and improve the Laboratory's mission performance
- ⇨Communicate effectively with our employees, customers, community, stakeholders, and the public at large
- ⇨Develop employees and create a work environment to achieve employee and Laboratory success

Bingaman wants nation's focus on long-term challenges

The country needs to "get the focus back on major long-term challenges" and Los Alamos can help address those challenges, United States Senator Jeff Bingaman told Laboratory employees during a talk last week.

Bingaman discussed Perspectives on Science and National Security from Washington, D.C., at the National Security Sciences Building Auditorium.

"I strongly believe that [the Laboratory's] past and future relevance to this country lie in its ability to help the nation not only meet its security needs, but meet a whole range of needs the country has," said Bingaman. "My hope is that Los Alamos can be at the cutting edge of the resurgence of science to solve many of the nation's problems."

Before speaking to employees, Bingaman, D-New Mexico, and some of his staff received classified and unclassified briefings on Laboratory programs.

At the talk, the senator described three long-term challenges he said the Lab can help the nation address:

1. The future needs and plans for the nuclear stockpile.
2. The ability to reduce the risk that nuclear weapons will be used.
3. The need to address the challenge of changing the way the United States produces and transmits energy.

"The Lab will continue its tradition of service to the nation and I look forward to working with you to continue that tradition," concluded Bingaman.

Afterward, Bingaman spoke to regional media representatives at the J. Robert Oppenheimer Study Center.

Photo by LeRoy N. Sanchez, Records Management/Media Services and Operations

Managing with metrics and data

New online tool helps Laboratory meet performance objectives

Meeting objectives, operating safely and securely and providing goods and services are critical goals at the Laboratory.

Measuring how well the Lab meets its objectives has changed over the years, and until recently, there were no institutional standards or tools in place to assist managers in these effort.

The Contractor Assurance Office (CAO) was asked to design, launch, and integrate a single Contractor Assurance System. The Contractor Assurance System includes processes and tools for managing issues, assessing and measuring key performance and Labwide commitments.

The CAO Web site has several online tools to assist managers and employees with workplace performance and continuous improvement efforts. The LANL Dashboard is one of those tools, and it is being used at the Director's Portfolio Review to identify emerging issues and take action to improve Laboratory performance and meet customer commitments.

Summarized dashboard metrics are accessible in the LANL Briefing Book. Metrics are sets or standards of measurement stated in quantifiable terms.

There are six focus areas measured though the dashboard: mission; science, technology and engineering; operations; business; environmental; and institutional support. Each focus area has drill-down metrics that will be updated monthly.

Additional tools and services provided by Contractor Assurance are

- Issues Management Tracking System (LIMTS) available to all employees for entering issues and resolving them.
- Assessment schedules and user-friendly assessment aides.
- Process management and performance improvement tools and training.
- Commitment management tracking system for identifying commitments and appropriating resources and priorities.
- Resource expertise to assist in developing metrics, entering issues, conducting assessments.

Acting Deputy Laboratory Director Jan Van Prooyen receives a tutorial on the LANL Dashboard from Roland Knapp, standing, associate director of the Contractor Assurance Office. The dashboard is one of several online tools managers are using to measure performance. *Photo by Sandra Valdez, Records Management, Media Services and Operations*

- Black belt, green belt, and yellow belt Lean Six Sigma training and support to better manage processes and improve performance.

Over time, having one institutional system helps the Lab to become more agile, integrated and aligned. For managers, the advantage of the integrated Contractor Assurance System is the opportunity to gain insight into performance, track the progress of issues for resolution, and help managers make informed decisions, said Roland Knapp, Contractor Assurance Office associate director.

For employees, having a better understanding of how goals and strategies are aligned will help them prioritize and streamline their work. The LANL Briefing Book gives employees information on how their organization is doing and where they need to help the Lab meet its performance objectives, said Knapp.

These tools will help the Laboratory to improve continuously and to provide a consistent basis for making decisions and setting priorities, Knapp added. Additional tool enhancements are being developed by CAO and distributed throughout 2007.

Information in the briefing book and dashboard is to be treated and marked for Official Use Only. All employees with yellow network access and authorized Department of Energy/National Nuclear Security Administration personnel can view the LANL Briefing Book at *http://lanl.gov/organization/performance/lanlbriefing* online.

Employees can access the tools through the Laboratory's home page from the "Performance" link at *http://lanl.gov/organization/performance/* online.

Bridging the terahertz …

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intensity of terahertz waves by up to 50 percent. This experimental demonstration of the device exceeds the performance of existing electrical terahertz modulators and, according to Chen, the team hopes to further improve the device's performance even more in coming months.

Filling the terahertz gap should yield marvelous technological benefits. Because it can "see" through plastics and cardboard, it might also be used in manufacturing to inspect packaged objects for quality control or process monitoring. Because many organic molecules and materials have their rotation and vibration spectra at terahertz frequency range, terahertz spectroscopy may someday be used to provide "fingerprints" of materials like hazardous gases, toxins, and explosives. Terahertz radiation also is sensitive to water content, so terahertz radiation might be used to detect differences in body tissue density. Using terahertz spectroscopy, diseased human tissues like tumors would image differently than do normal tissues. Because terahertz radiation does not damage DNA like X-rays, it also is a safer medical and dental imaging alternative.

Terahertz waves also have the potential to provide increased bandwidth and higher speeds for telecommunications. In a vacuum like outer space, terahertz radiation can travel long distances, making it a good candidate for short-range, secure communication mechanisms between satellites. However, communications applications also will require far more engineering work to become a practical reality. It will require the creation of higher performance, higher speed, and more frequency agile terahertz metamaterial devices.

Having laid some of the basic science groundwork, Chen and his colleagues are now trying to develop high-efficiency, high-speed, functional terahertz devices for real-world applications. They are working to improve the performance, in particular, the operational speed of the current device. They also are exploring the use of other types of metamaterials for the complete control and manipulation of the terahertz radiation.

In addition to Chen, Taylor, Averitt, and Padilla, other members of the terahertz device development team include Joshua Zide and Arthur Gossard from the University of California, Santa Barbara. The terahertz device research was supported by Laboratory Directed Research and Development funds and the Center for Integrated Nanotechnologies, a Department of Energy/Office of Science Nanoscale Research Center.

A Talk with Terry

After an extensive national search for a principal associate director for science, technology, and engineering, Terry Wallace emerged from a stellar set of applicants as the Laboratory director's choice to retain the post he had been holding in an acting capacity. Recently, Associate Director Wallace sat down with the *Los Alamos NewsLetter* staff to tell us a little about his job, his work and personal life, and the plans he has for science at Los Alamos.

Photo by LeRoy N. Sanchez, Records Management/Media Services and Operations

NewsLetter: Let's start with the basics. How long have you been at the Laboratory?

Wallace: I first worked at the Laboratory in the summer of 1976 as an undergrad student. I worked with the group that recorded the seismic signature of underground tests, and had the experience of being near the Nevada Test Site for some very large explosions. After graduate school I worked with several colleagues at the Lab, and then became a visiting faculty member in the Earth and Environmental Science (EES) Division. I was hired as a permanent Los Alamos employee in May 2003.

I started as the acting division leader of EES Division and then became division leader in November 2003. In February 2005, I was selected to become the associate director for strategic research. In the summer of 2005 I helped write the Los Alamos National Security, LLC, proposal to the National Nuclear Security Administration for the Laboratory's management and operations contract. In the spring of 2006 we worked on a laboratory structure that reflected the desire to become a capabilities-based lab, and out of that evolved into my former job as the acting principal associate director for science, technology, and engineering on June 1, 2006.

NewsLetter: But you've been around Los Alamos longer than that, right?

Wallace: Yes, I have. I was raised and educated in Los Alamos. My father, Terry Wallace Sr., was recruited to the Laboratory in the 1950s and worked on Project Rover, and later founded the Superconductivity Program in 1986. I always have been involved in Los Alamos, and remain dedicated to the community.

NewsLetter: And after attending New Mexico Tech for your undergraduate degrees and graduate school at CalTech, you then taught for twenty years at the University of Arizona. What was that like?

Wallace: I am quite fortunate to have had a full academic career — I was able to build a robust graduate program, and was able to do seismological field work all over the world. I worked for a decade deploying seismic stations in South America, and have a deep fondness for the people and geography of the Andes. I always enjoyed teaching, and towards the end of my Arizona career I decided to teach a large undergraduate course introducing science literacy through a curriculum focused on geologic disasters. Teaching several hundred freshman and sophomores was a true experience in "communication."

NewsLetter: As acting PADSTE, you had some permanent impacts on the Lab's organization. What can you tell us about that?

Wallace: The Laboratory is poised at a very important crossroads. The Lab has gone through many transitions in its 64-year history, but the one we are going through now is second to none. The Lab always will have a primary responsibility to assure the nation's nuclear deterrent, but the era of weapon's systems extensions is winding down.

The challenge for the Lab is to serve the nation broadly, and maintain and grow our wonderful scientific and engineering capability to solve complex problems of national priority. This requires a philosophical shift in how the Lab is managed. We have emphasized that the Laboratory is a "capabilities" lab that supports program and mission. This means a lab in which a large number of customers can buy science and technological innovation from the capability inventory. Structurally, this means that program offices will shift from "owning" teams of scientists and engineers, and instead assembling

integrated project teams from capability homes — divisions and associate directorates.

We have started that process with STE. There are four directorates based on themes for the future. These themes are things that the Lab must excel in: science based predicition (ADTSC), materials for the future (ADEPS), the science of forensics (ADCLES), and excellence in engineering (ADE). I expect some further changes, but all driven by the same desire to have a strong science laboratory that is agile and responsive to emerging mission and national priorities.

NewsLetter: When you imagine the Los Alamos National Laboratory of the future, what do you see?

Wallace: In the next decade, the Lab will undergo many changes. To meet the challenge of being the "national security science laboratory of choice," we will have to revitalize our campus. Building the Science Complex that will house nearly 1,400 scientist is an absolutely essential component of remaking the campus. As far as the science is concerned, I envision an experimental-based, materials-centric, science laboratory that relies on effective integration of experiments with exceptional theory, modeling, and high-performance computing. I see a laboratory capable of providing innovative and responsive solutions to national security problems through the agile, rapid application of key science and technology strengths. I see a lab of extraordinary scientific and engineering ability supported by best practices in every area from accounting to safety and security.

NewsLetter: Now that you're no longer in an acting capacity, what kind of changes can we expect to see in science at the Laboratory?

Wallace: The transition that we laid out in June of 2006 will require years to complete. Although there can be tremendous frustration on the pace of change, the focus on Work for Others, revitalizing the campus, and creating new models of collaboration are something that will require strong buy in from staff. Perhaps the biggest change from "acting" to "permanent" is the realization from parts of the Lab that the vision for the lab of the future is not ethereal.

NewsLetter: Okay, let's start with people issues.

Wallace: The most important resource at this Laboratory is its extraordinary staff. Recruiting people who will become leaders in their respective fields is something the Laboratory has done well in the past and it will be a challenge in the immediate future to preserve that pipeline, even in this time of budget uncertainty. It must remain the top priority of the Laboratory to attract scientists and engineers who will excel. By the way, the budgets for the Lab are far from certain, but the financial picture looks secure for the next couple of years.

NewsLetter: What about the mission?

Wallace: The Lab's mission is "We are a national security laboratory developing and applying science and technology to ensure the safety, security, and reliability of the U.S. nuclear deterrent; reduce global threats; and solve other emerging national security challenges." I doubt that the Lab's mission of national security will change very radically, but I do think it is likely to evolve to emphasize national priorities other than the nuclear deterrent, including energy security and technological superiority. Right now, 56 percent of our support is from Defense Programs funding, which is a lot of reliance on a single customer. It is inevitable that DP funding will shrink in the future, but we will need to maintain an outstanding science base. This science base can be applied broadly to many problems of national importance.

"I envision an experimental-based, materials-centric, science laboratory that relies on effective integration of experiments with exceptional theory, modeling, and high-performance computing."

NewsLetter: And science?

Wallace: I want to emphasize that the Laboratory has been on a roller coaster since 1999 with the public spectacle of the Wen Ho Lee case and the questioning of the Lab's ability to do work safely and securely. Despite the seven years in the crucible of change, the Lab has continued to produce extraordinary science. The Lab is publishing more than 1,800 peer reviewed papers annually, and the staff are recognized by professional society awards at a very high rate. The science portfolio is quite broad, and this is the challenge for the Lab: how do we focus our investment in science to assure that we maintain the quality of our science and engineering?

There are all sorts of very interesting questions in science today, but many of them are areas that we cannot, or should not, pursue here at Los Alamos given our mission. Frankly, there has been some work the Lab has pursued in the past that really should have been sent elsewhere. In the future, I think we need to pay really close attention to the choices that we make in selecting research areas and in research program development.

Although there are many examples we could explore, I think that the biosciences is one that is particularly illuminating. The Lab has a strong bioscience program, but in the future the whole concept of "bio-security" will be a national priority. The Laboratory, through its strengths in computation, complex systems, and interdisciplinary teams, can tackle the difficult problems of environmental surveillance, disease monitoring, and medical countermeasure based upon quantitative modeling of pathogen lifecycle in the environment and inside the host. This clearly means that we will require focus in our bioscience capabilities.

NewsLetter: What about the infrastructure?

Wallace: This is perhaps our most crucial hurdle. Although the almost nine million square feet of space that the Lab currently occupies is way too much, a considerable amount of that space is not premium workspace. Most of the Laboratory was built in the 1950s, and the facilities are not only antiquated, but have not been maintained in a way that allows us to use our infrastructure budget in an effective way. We simply must get out of space, build new labs, and develop a long term investment strategy for infrastructure. This is a budget challenge — we must build a wedge in our budget to provide long term investment in our campus. This will require tremendous scrutiny on our hiring for several years, and we must have a disciplined approach to infrastructure.

As the Laboratory heads into the future, we need to both reduce our footprint in a way that we can still do our mission effectively and make maximum use of the space we do occupy. This will take careful planning of space reductions that are coupled with current and future construction efforts around the Lab.

NewsLetter: What are your immediate priorities for infrastructure.

Wallace: I think we have three principal foci. First, we need to refurbish the Los Alamos Neutron Science Center (LANSCE) and then maintain it as a multi-use facility for material and nuclear science. Second, we need to focus on the continuing development of high performance computing in order to return Los Alamos to a leading position in scientific computing. Third, we need to maintain the Laboratory's leadership role in actinide science, which requires revitalizing the Laboratory's radiological facilities.

NewsLetter: Okay, how about sharing something personal. For example, what do you do in your spare time?

Wallace: I don't really have that much spare time actually. I do have several hobbies, including golf, swimming, and mineral collecting. I have a passion for historical mineralogy — the pursuit of mineral wealth drove major changes in history, including science, massive migration, economic systems, and even language. I have a mineral collection built over 40 years that is focused on silver minerals and mines. As for golf, I am quite average, although I love to be outside pursuing the single good shot that makes you think that you might have the game mastered. I swim almost every day, but it is really a matter of survival in the water rather than being a competitive swimmer. In younger days I would play basketball everyday — a game I truly enjoy.

Terry, thanks for talking with us.

Interview by Todd Hanson

Diego Martinez selected to attend Nobel Laureate conference

Photo by Richard Robinson, Records Management/Media Services and Operations

Diego Martinez

Diego Martinez, a graduate research assistant student intern in Genomic Sequencing and Computational Biology (B-5) was selected to attend the 57th meeting of Nobel Laureates this summer in Lindau, Germany.

Martinez is part of the Annotation and Analysis team in B-5 and has been a student intern since 2004. His research is funded by the Department of Energy Office of Science Biological and Environmental Research. He also is pursuing a doctoral degree in bioinformatics at the University of New Mexico.

Martinez was nominated to attend the meeting by his mentor, Jean Challacombe of B-5, said Carole Rutten of the Education and Postdoc Office (STBPO-EPDO).

"I nominated Diego because I believe that this experience will have a positive impact on Diego's future research and benefit his scientific career for years to come," said Challacombe.

The Lindau Conference is July 1-6 and offers students from throughout the world a chance to interact with Nobel Prize winners.

"This is a once-in-a-lifetime opportunity to learn about science from the greatest minds of our day," said Martinez.

The STBPO-EPDO coordinates the nomination process each year for the Laboratory.

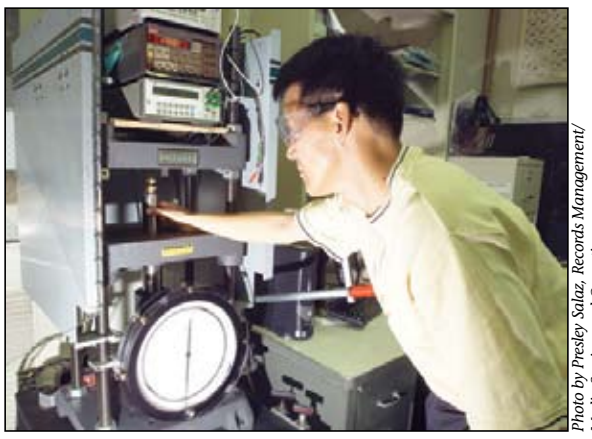

Photo by Presley Salaz, Records Management/Media Services and Operations

Tuson Park

Park receives Outstanding Young Researcher Award

Tuson Park, an Oppenheimer Postdoctoral Fellow in Condensed Matter and Thermal Physics (MPA-10), has been named the 2007 Outstanding Young Researcher by the Association of Korean Physicists in America for his contributions to the field of correlated electron physics.

Park, who joined the Laboratory in 2003, received a doctorate in physics from the University of Illinois at Urbana-Champaign.

The AKPA was launched in 1979 to promote scientific research in physics and to strengthen ties among Korean physicists in America. The Outstanding Young Researcher Award has been given annually by the AKPA since 1994 to recognize and promote excellence in research by outstanding young ethnic Korean physicists in North America working at research universities/institutions or at industrial and government laboratories.

The award was presented to Park at a joint reception with the American Physical Society Forum of International Physics and other expatriate physicists associations at a meeting of the APS in Denver, Colorado.

In Memoriam

Henry Filip

Laboratory retiree Henry Filip died January 23. He was 86.

Filip joined the Laboratory in 1945 as a junior scientist during the Manhattan Project. After the project, he was involved in the development of nuclear propulsion, isotope separation, and laser applications at the Laboratory. He retired in 1984 as a staff member in the Physics (P) Division.

Filip received a bachelor's degree in math and physics from the Wesleyan University in Illinois.

He is survived by his wife, Marie; children Frederick Filip of Los Alamos, Jan Janecka of Santa Fe, and Marie Bledsoe of South Lake Tahoe, California; brother George Krajcovic of Plainfield, Illinois; a grandson, nieces, and nephews.

Roger Lazarus

Laboratory retiree Roger Lazarus died January 27. He was 81.

Lazarus joined the Laboratory in 1951 as a staff member in the Theoretical (T) Division. He helped pioneer the development of computers for large-scale calculations and founded the Computing Division where he served for several years as its first director.

Lazarus received a bachelor's and master's degree in math from Harvard University. He served in the Pacific theater in World War II, and returned to Harvard to complete his studies, receiving his doctorate in theoretical physics in 1951.

Lazarus is survived by his wife, Peggy; five children, John of Boston, David of New York City, Katherine of Irvine, California, Virginia of Evanston, Illinois, and Elizabeth of Boulder, Colorado; and eight grandchildren.

Larry Libersky

Laboratory employee Larry Libersky died March 10 at the age of 60.

Libersky joined the Laboratory in 1998 in the Applied Physics Division (X-DO) and was working in Contiuum Dynamics (CCS-2) when he passed away.

He earned his bachelor's degree in chemistry from Winona State University and his doctoral degree in physics from New Mexico Institute of Mining and Technology.

Libersky is survived by his wife, Dee; his mother Evelyn; children Jason Libersky, Seth Brown, and Rachel Ortiz.

Q: Are you familiar with the Laboratory's new goals that Director Michael Anastasio recently introduced? How important do you think it is for the Laboratory to have clear goals for which all employees are committed to help attain?

Sandip Niyogi of Chemical Sciences and Engineering (C-CSE)

Yeah, I especially like the sixth goal [leverage our science and technology advantage to anticipate, counter, and defeat global threats and meet national priorities]. If you have excellent science at the Lab it helps offset some of the public attention on other administrative issues. Science is the primary goal of the Lab.

Alma Sondreal of Science, Technology, and Engineering (PADSTE)

I think it is very, very important. We work in a government Department of Energy environment and we should abide by the goals. I think it is important because we need to improve our image.

David Dooling of Applied Science and Methods Development (X-1-SMMP)

I think one primary goal is the need to respect employees. It is assumed that this is being done, but it has been forgotten, and that needs to be explicit and amongst the goals.

Sylvia Quintana of the Science Program Office (SPO-SC)

It is really important. What I think is necessary is to establish a good communication plan and get the good word out. I'd like to see the director go out and have meetings with staff at the division level and re-affirm for us that the path is moving forward.

Margaret Chan of Departmental Computing (CTN-1)

I think it is important, because we will know the goals and that will help improve morale, knowing where we stand.

Eleven students receive science undergraduate internships

Eleven students will participate in internships this summer as part of the Laboratory's Science Undergraduate Laboratory Internship (SULI) program.

The program is sponsored by the Department of Energy's Office of Science. Students in this program work with scientists and engineers on projects related to Laboratory research programs and participate in lectures, classroom activities, career guidance and planning, and field trips.

The students are

• **Sofiane Boukhalfa**, a student at the University of Illinois who will work with Stephen Doorn of Chemical Sciences and Engineering (C-CSE).

• **Colby Boyer** of the University of California, Berkeley, who will work with Carolyn Davenport of System Integration (HPC-5).

• **Christina Brady**, University of California, San Diego, who will work with Stephen Doorn (C-CSE).

• **Benjamin Clay** of Virginia Tech will work in Modeling, Algorithms, and Informatics (CCS-3) under the mentorship of Sami Ayyorgun.

• **Ian Faust** of the University of Michigan, Ann Arbor, who will work with Thomas Intrator of Plasma Physics (P-24).

• **David Geb**, University of California, Los Angeles, who will work with Torsten Staab of Applied Engineering Technology — 5 (AET-5).

• **Robert Igel** of Bradley University who will work in International and Nuclear System Engineering (D-5) with Dave DeCroix.

• **Tyler Karrels** of the University of Wisconsin, Madison, who will work with Sami Ayyorgun of CCS-3.

• **John Ogren**, University of New Mexico, who will work with Justin Torgerson in Neutron Science and Technology (P-23).

• **Ian Percel**, University of Illinois, Urbana Champaign, who will work with Rick Nebel in Production Codes and ASC Acceptance (X-3-PC).

• **Jesus Rendon**, University of California, Berkeley, who will work with Chang Kim in Cell Biology, Structural Biology, and Flow Cytology (B-2).

Voluntary Protection Program …

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VPP participants develop and implement systems to effectively identify, evaluate, prevent, and control occupational hazards to prevent employee injuries and illnesses. As a result, the average VPP worksite has a lost-workday-incidence rate at least 50 percent below the average.

Laboratory officials have committed to implement the program in three years, ensuring that existing programs and operations meet the VPP goals. Using data such as safety trends and analysis, self-assessments, and continual improvement processes, the Laboratory will apply for VPP recognition in 2009. Laboratory Director Michael Anastasio is the Voluntary Protection Program champion.

Key to the program's success is fostering a safe work environment through worker involvement.

In order to facilitate the employee involvement goal, Anastasio established an institutional employee team called the Worker Safety and Security Team. This team replaced the Director's Central Safety and Security Committee. Unlike the DCSSC, the WSST is led by front-line workers versus senior managers.

Subteams at the associate director and division levels are being established, and the structure will eventually roll down to the group level so that every worker gets personally involved in the operations and decisions that affect employee health, safety, and security.

Anastasio is the WSST champion. Dick Watkins, ADESH&Q, and Paul Sowa, associate director for safeguards and security are co-sponsors. Felicia Taw of Inorganic Isotope and Actinide Chemistry (C-IIAC) is the chairperson, and Janine Fales of Weapons Engineering Technology (WT) is the vice-chair.

There are four other core goals of the Voluntary Protection Program:

• Management Leadership
• Worksite Analysis
• Hazard Prevention and Control
• Health and Safety Training.

To address the Management Leadership goal, associate directorates, KSL Services, and Protection Technology Los Alamos have made a commitment to this program by authorizing two of their workers to serve on the WSST.

Some of the work being conducted in support of the goals of Worksite Analysis and Hazard Prevention and Control includes efforts in the Integrated Work Management process and 10 CFR 851 preparations.

The final area of VPP is Health and Safety Training. The Laboratory needs to ensure that managers and employees fully understand the policies, rules and procedures established to prevent exposure to hazards. Performance Based Leadership training and Human Performance Improvement training for all workers covers much of the required knowledge for this goal. Additional behavior based systems also will address many of the requirements.

Additional benefits of the program may include improved employee morale, fewer noncompliance findings, improved communication between management and employees, increased productivity, and decreased worker compensation costs.

A VPP Steering Committee has been chartered and is chaired by Jay Johnson, principal associate director for operations. Other committee members include Jerry Ethridge, associate director for infrastructure and site services; Carolyn Mangeng, acting associate director for environmental programs; Bethany Rich, VPP office lead; Susan Seestrom, associate director for experimental physical sciences; Taw; and Watkins.

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

Letter-box-line blackener for the HDTV/ conventional analog hybrid system
Patent No. 7,079,192, issued July 18, 2005
Frederick Wysocki of the Physics (P) Division and **George Nickel** of Hydrodynamics and X-ray Physics (P-22)

Vision-based obstacle avoidance
Patent No. 7,079,924, issued July 18, 2006
John Galbraith of Applied Modern Physics (P-21)

Apparatus and method for temperature correction and expanded count rate of inorganic scintillation
Patent No. 7,081,626, issued July 25, 2006
Kiril Ianakiev, **Michael Browne**, and **Jeffrey Audia** of Safeguards Science and Technology (N-1) and **Sin-Tao Hsue**

Oxygen-consuming Chlor-alkali Cell Configured to Minimize Peroxide Formation
Patent No. 7,083,708, issued August 1, 2006
Jerzy Chlistunoff of Sensors and Electrochemical Devices (MPA-11) and **Shimshon Gottesfeld**

Catalysts for Lean Burn Engine Exhaust Abatement
Patent No. 7,083,765, issued August 1, 2006
Kevin Ott of Materials Chemistry (MPA-MC), **Mark Paffett** of Materials Technology: Metallurgy (MST-6), and **Noline Clark**

Method for Lean Burn Engine Exhaust Abatement
Patent No. 7,085,653, issued August 1, 2006
Thomas Terwilliger of Cell Biology, Structural Biology, and Flow Cytometry (B-2)

Identification Coding Schemes for Modulated Reflectance Systems
Patent No. 7,095,311, issued August 22, 2006
Don Coates of the Technology Transfer (TT) Division, **Scott Briles** of Space Instrumentation Systems (ISR-4), **David Platts** and **David Clark** of Hydrodynamics and X-ray Physics (P-22), and **Daniel Neagley**

Methanol-Tolerant Cathode Catalyst Composite for Direct Methanol Fuel Cells
Patent No. 7,101,635, issued September 5, 2006
Piotr Zelenay of Sensors and Electrochemical Devices (MPA-11) and **Yimin Zhu**

Nathan Morley, a sixth grade student at Piñon Elementary School, plays a game of Sidewinder with "lunch buddy" Robert Cunningham. In 2005, Cunningham received a Big Brothers Big Sisters Volunteer of the Year Award for his work in the school-based program. *Photo by Richard Robinson, Records Management/Media Services and Operations*

Hey buddy, let's do lunch!

Laboratory employee volunteers with Big Brothers Big Sisters

by Krista D. Wilde

Every Monday, Robert Cunningham of High Performance Computer Systems (HPC-3) has an important lunch date — with a student at Piñon Elementary School in White Rock.

Cunningham has volunteered as a "lunch buddy" at Piñon Elementary School for the last six years. As a lunch buddy, Cunningham goes to the school once a week during lunch and spends an hour with a child and builds a relationship with him or her.

"I was looking for a volunteer opportunity and two of my friends mentioned this program. I don't have any children, but I enjoy spending time with my nieces and nephews, so it seemed like a good fit," Cunningham said.

The children request a lunch buddy; Big Brothers Big Sisters matches them to a volunteer. There are more requests for a lunch buddy than there are adult volunteers to be lunch buddies, explained Cunningham.

"Being a lunch buddy is something I really enjoy — it's rewarding. Over the course of the school year, I am able to develop a friendship with the child, and it's gratifying to know the child appreciates it. I get to play, and it's fun!" Cunningham said.

Lunch buddies receive training about ground rules, such as how to handle a crisis, and what to do if they suspect that the child is abused. The training also presents information about the psychological impact of a program like this on a child. Research indicates that children who develop a relationship with an adult who is not an authority figure are less likely to get in trouble when they are older, explained Cunningham.

"When I learned about the research, it really put a whole new sense of meaning behind this program," he added.

Cunningham's passion for volunteering originated with his parents, especially his mother, who raised six children but also found time to volunteer with children and at their church.

"I've been volunteering in different areas since I was in junior high. It is rewarding to give to charity. I get a charge from it," said Cunningham. "In this case it's play. When I go hang out for an hour, I forget about stress at work and personal problems. It's an escape for me and the child appreciates it, so it's a win-win situation."

In 2005, Cunningham received a Big Brothers Big Sisters Volunteer of the Year Award for his work in the school-based program. "I was just floored — it was such an honor," he said.

"I started this on a lark and it is more than I thought. I thought I would go to lunch and go home, but it is a relationship and it has such a long-term affect on the children."

April is National Volunteer Month

Employees who are interested in volunteering can search for opportunities through VolunteerMatch, a network of nonprofit organizations that helps match people who want to volunteer with organizations. VolunteerMatch offers a variety of online services, including a searchable database that allows nonprofits to list volunteer opportunities and potential volunteers to find activities that interest them. It also allows employees to track when, where, and how often they volunteer.

To participate in the VolunteerMatch program, which is coordinated through the Community Programs Office (CPO), go to *volunteermatch.lanl.gov* online to register.