



NewsLetter

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J. Robert Oppenheimer, a man for the ages

"Any single one of the following contributions would have marked Oppenheimer as a pre-eminent scientist: his own research work in physics; his influence as a teacher; his leadership at Los Alamos; the growth of the Institute of Advanced Studies as a leading center of theoretical physics under his directorship; and his efforts to promote a more common understanding of science. When all is combined, we honor Oppenheimer as a great leader of science. When all is interwoven with the dramatic events that centered around him we remember Oppenheimer as one of the most remarkable personalities of this century."

— Abraham Pais, Oppenheimer eulogy, 1967

April 22 marks the 100th birthday of the Laboratory's first director, J. Robert Oppenheimer.

Born in 1904 in New York City to successful textile importer Julius Oppenheimer and his wife Ella, J. Robert grew up in a world of wealth and privilege. From an early age, he demonstrated remarkable intellectual prowess and began collecting minerals at the age of five. By age 11, his collection and knowledge were so considerable that he was elected to membership in the New York Mineralogy Society. Oppenheimer attended high school at New York's Ethical Culture School, graduating at age 16. He then attended Harvard College, where he studied chemistry and graduated summa cum laude in only three years. He began his graduate studies at Cambridge but later transferred to the University of Gottingen in Germany to study under Max Born. He received his doctorate from Gottingen at the age of 23.

In 1929, he became a professor of physics at both the University of California at Berkeley and California Institute of Technology, commuting between the two universities over the next 13 years. In June 1942, General Leslie Groves selected Oppenheimer to serve as technical director of the Manhattan Project, the top-secret effort during World War II to design and build a nuclear weapon.

Oppenheimer proved to be not only a brilliant scientist but also an exceptional administrator. He brought some of the best scientists in the world together at the research facility at Los Alamos, and in just 28 months, Oppenheimer and his team produced two atomic bombs of very different design. Following the detonation of the bombs over the Japanese cities of Hiroshima and Nagasaki, Japan surrendered on Aug. 10, 1945.

Oppenheimer's leadership efforts earned him the Presidential Medal of Merit in 1946. Although he returned for a brief time to California after World War II ended with the goal of returning to academia, he quickly was drawn into the international debate on the role of atomic energy in world affairs.

In 1947, Oppenheimer was appointed chairman of the General Advisory Committee to the Atomic Energy Commission, serving from 1947 to 1952. It was in this role that he voiced strong opposition to developing a hydrogen bomb. Beginning in 1947, Oppenheimer also served as the director of Princeton's Institute for Advanced Study, a position he held until he retired in 1966.

In 1953, at the height of U.S. anticommunist feeling, Oppenheimer was accused of having communist sympathies, and his security clearance was taken away. By the early 1960s, the political climate that cost Oppenheimer so dearly had changed. As a result, President Lyndon Johnson awarded Oppenheimer the Atomic Energy Commission's Enrico Fermi Prize in 1963 for his many contributions to physics.

Oppenheimer died of throat cancer Feb. 18, 1967.

To commemorate Oppenheimer's 100th birthday, the J. Robert Oppenheimer Memorial Committee is sponsoring a photograph exhibit: "J. Robert Oppenheimer, 1904-1967: Photographs From His Life," at the Mesa Public Library gallery, located on the third floor of the library. A reception, open to the public, is scheduled from 2 to 4 p.m. Sunday, April 25, in the gallery, which is open during regular library hours. The Oppenheimer exhibit runs through May 30. More information about the exhibit is available on the Mesa Public Library Web site at <http://losalamos.govoffice.com/> online.



Patent, license award winners recognized

by Kathy DeLucas

Laboratory researchers were honored at the sixth annual Distinguished Patent and Licensing Awards reception for their scientific discoveries and technological innovations. Laboratory patent award winners and licensees were on hand to celebrate their accomplishments over the past year and to recognize exemplary achievements.

One hundred twenty innovators were honored for 72 patents issued during 2003, and 128 innovators shared \$460,000 in personal license income. Six-hundred forty thousand dollars in Laboratory license income remains at the Laboratory for use in research and development, education and technology transfer.

Greg Swift of Condensed Matter and Thermal Physics (MST-10) received the

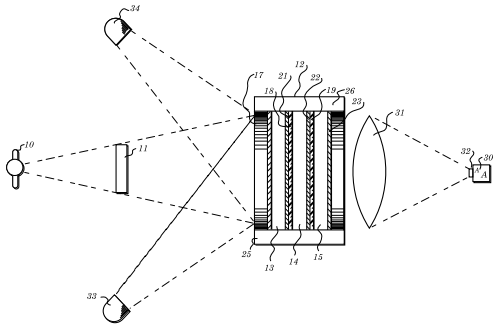
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Left photo: Greg Swift of Condensed Matter and Thermal Physics (MST-10) receives the Distinguished Patent Award from Laboratory Director G. Peter Nanos. Also honored at the ceremony as the Distinguished Entrepreneur was Ben Warner, right photo, of Actinide, Catalysis and Separations Chemistry (C-SIC). Photos by Edwin Vigil

Inside this issue, a look at technology transfer and the Lab ...

Did you know ?



First patent

Method and apparatus for producing radiographs

The first patent obtained at the then Los Alamos Scientific Laboratory was filed in 1945 in the names of Seth Neddermeyer and Donald Kerst, two original Los Alamos employees who were well-known for their creative and unrestrained experimentations into the explosive compression of materials. The patent covered an apparatus for conducting high-speed X-ray radiography of explosive detonations. No mention of Los Alamos appears in the published patent, as Los Alamos was a "secret city" when the patent was issued in 1947. This invention was an early accomplishment of a research program that has continued for some 60 years and for which Los Alamos National Laboratory is internationally renowned. Today this program has culminated in the operation of the Dual Axis Radiographic Hydrodynamic Test facility. Phase 1 of DARHT is now fully operational with a single-pulsed, first axis, X-ray machine. Phase 2 is scheduled for completion in the fall of 2004, with the commissioning of a complex, multi-pulsed, second axis, X-ray machine.

FROM THE TOP



Technology transfer at the Lab

As researchers employed by Los Alamos National Laboratory, we create technologies that have inherent scientific value. However, our technologies also may have social and financial value to individual inventors, the Laboratory and the nation. Our intellectual property is attractive to industry and can be licensed for commercial applications to solve important problems in the private sector. Effective technology transfer ensures that the technology, knowledge and information developed at the Laboratory is applied in applications that benefit society and contribute to our nation's economic competitiveness in which technology innovation is a critical component.

But technology transfer cannot happen unless we properly protect our intellectual property. A company will not invest the time or money to develop a technology into a product unless it can expect a protected position in a market. Laboratory managers must ensure that their employees properly protect the Laboratory's technology innovations. Properly protected, our intellectual property provides a technology base for further research and helps establish our reputation in a particular technology field. The patents and copyrights that fuel our technology-transfer activities also provide an inflow of royalties and research funds back to inventors and into our technical divisions. A technology portfolio that includes a repertoire of published patents can help a technical division attract new research dollars and new projects, while enhancing our credibility within the private sector that utilizes patents to identify new sources of innovative R&D.

The Laboratory's reputation for excellence — earned with more than 60 years of scientific contributions — helps ensure trust in our ability to continue generating exceptional work and meeting the challenges of a rapidly changing world. It also allows us to attract new employees, program sponsors and collaborators. Patents and copyrights ensure that we get credit for our work as well as assuring sponsors and collaborators that we are responsible for the careful handling of knowledge and proprietary information.

Technology transfer is an important part of our mission at Los Alamos National Laboratory. In fact, technology transfer between the Laboratory and the private sector is a federal mandate. I encourage Laboratory inventors to work with the Technology Transfer (TT) Division to identify alternate applications of technology developed as a part of their research activities, and to participate in technology transfer and commercialization efforts in partnership with our tech transfer professionals.



Laboratory Director
G. Peter Nanos

Los Alamos 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.



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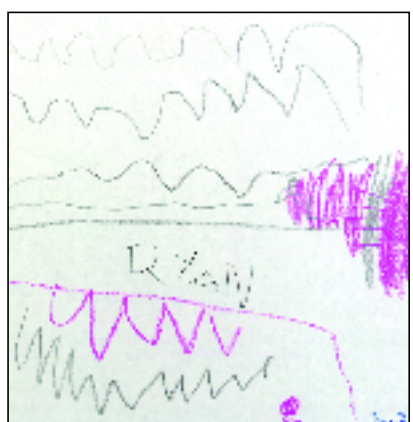
For Your Safety



Poster by
Rheanna
Morris



Poster by
Alexander
Mancino



Poster by
Ryan
Guenther

Children share their thoughts on safety

Safety is the number one priority at the Laboratory. Managers, supervisors and co-workers repeatedly have conveyed to employees the message of "Safety First" in all things done at the Lab, but safety is a message that can never be stressed enough.

With that in mind, three Lab organizations enlisted the services of a different messenger during last year's Safety Day activities at the Lab. The Technology Transfer (TT) Division, Office of Energy and Environment Initiatives (OEEI) and Office of Equal Opportunity (OEO) sponsored a poster contest based on the theme of safety and invited employees' children to enter.

The event's organizers felt the poster contest was a fun way to engage children in discussions about safety and to encourage them to think about what being safe means in and away from the workplace. They also felt displaying the posters would allow employees to see that children are aware of safety concerns and want their family members to be safe.

All entries were mounted and placed around Building 1325 in Technical Area O, which houses the three sponsoring organizations. Employees who viewed the display voted for their favorite in a specific age category.

Following the contest, TT Division, OEEI and OEO hosted a reception at the Lab for the participants and their parents. All the young artists received a ribbon and a certificate. Twenty-dollar gift certificates from Toys R Us, compliments of Charryl Berger of OEEI, were given to the children whose posters received the most votes in the various age categories.

All of the safety posters remain displayed around Building 1325, which is located on Trinity Drive, across from Ashley Pond.

Technology transfer and the Lab...

Industrial Business Development is now the 'Technology Transfer Division'

The Industrial Business Development Division has officially changed its name to the Technology Transfer (TT) Division in the hopes of shortening the explanation of who they are and what they do for their clients — those internal to the Lab as well as those in the regional business community and across the nation. TT Division — as it has for more than a decade (under several different names) — helps move technologies from the Lab to the marketplace to benefit society, the U.S. economy and to bolster regional economic development. The division accomplishes this by developing and managing an array of partnerships with the public and private sectors.

TT Division's staff comprises experts in technology transfer agreements (CRADAs, Work for Others, User Facilities, etc.), intellectual property (patents and copyrights) protection, licensing, marketing and entrepreneurial activities, who work to expedite interactions between Laboratory technical staff and technology partners. The goal of the TT Division specialists is to establish dual-benefit collaborations that meet the needs of both the Laboratory and its partners. TT offices are located at 2237 Trinity Drive (next to the Los Alamos Inn), the main phone number is 5-9091 and you can find them on the Web at www.lanl.gov/partnerships.

The articles in this special "Technology Transfer and the Lab" section include just a sampling of some of the many initiatives that are taking place on behalf of technology transfer at the Laboratory.



Donna Smith, Technology Transfer (TT) Division leader

Why technology transfer?

Technology transfer and working with industry has been an important component of the Laboratory for more than 20 years. Funding, emphasis and focus may have shifted over the years, but the high value of working with industry to develop technology and beneficial joint collaborations has continued to grow since technology transfer was mandated by Congress in the early 1980s.

Because potential business partners and even Laboratory staff had difficulty finding the right office to facilitate technology transfer, the division recently changed its name from the Industrial Business Development (IBD) Division to the Technology Transfer (TT) Division. The name change more accurately reflects what the division does — intellectual property management, licensing, technology commercialization, collaborating with industry and small business, and promoting regional economic development. The goals are to identify and facilitate the successful transfer of Laboratory-developed knowledge, capabilities, facilities, intellectual property and technologies to complement or supplement public and private industrial needs.

Transfer of Laboratory technologies occurs through agreements such as Cooperative Research and Development Agreements, Work for Others and User Facility Agreements. The division also works with the community to facilitate the establishment of new businesses based on Laboratory technology and expertise. Through a nationwide network of business contacts, TT Division works persistently to bring sources of investment capital to the region to enable new business development and to help existing businesses grow. Through partnerships with major firms, the division also helps to bring outside technologies into the Lab to ensure the implementation of proven industrial best practices at the Laboratory.

Technology transfer activities at the Laboratory have brought in several million dollars of research funds over the years. These funds have provided incremental funding to advance technologies in some of the Laboratory's most prolific programs including fuel cells, superconductivity, computational fluid dynamics, reliability engineering and many others. In each of these areas, interactions with and investments from industry have contributed to our success.

The Hydrogen Technology Partnership

The importance of the national hydrogen-technology effort and the role both the Laboratory and the state of New Mexico play in this effort have been a key factor in a new, statewide partnership, the Hydrogen Technology Partnership (HyTeP). During the past year, TT Program Manager Ken Freese has been on assignment to the New Mexico Economic Development Department working on an economic development strategy for the state to establish a business cluster for hydrogen and fuel-cell businesses. Commercialization of hydrogen and fuel-cell technologies is a major strategic focus for TT, as well as working within the Northern New Mexico region to stimulate the local economy. During 2003, TT Division helped develop the New Mexico Hydrogen Technology partnership, an alliance of public and private sector organizations seeking to position New Mexico to take economic advantage of the emerging global hydrogen economy. Together with HyTeP and New Mexico state agencies, the Lab conducted an economic opportunity assessment for the hydrogen economy in New Mexico, and developed a strategy to grow new and existing businesses in this cluster. The recommendations from this strategy became the elements of legislation developed by the New Mexico EDD and the Energy, Minerals and Natural Resources Department, introduced in the 2004 legislative session. The Laboratory will continue to participate as a member of HyTeP in the implementation of this strategy to build new businesses on hydrogen and fuel-cell technologies coming out of the Laboratory.

How the Lab does technology transfer

The Laboratory develops partnerships and collaborations with industry, academia and other research institutions that help accomplish programmatic goals while benefiting the nation's industrial and academic sectors.

"Today, more than ever before in our nation's history, the keys to solving problems that impact global security reside in our ability to collaborate with other institutions whose capabilities and expertise intersect with and expand the unique capabilities at the Laboratory," said Technology Transfer (TT) Division Leader Donna Smith.

Through the TT Division, the Laboratory negotiates and maintains a variety of mechanisms that enable industry, academia and other research institutions to establish partnerships and collaborations with the Laboratory. These mechanisms include agreements for nondisclosure of proprietary information, cooperative research and development, nonfederal work for others, personnel exchange and user facilities. TT orchestrates matches among the Laboratory's scientific and technical talent, expertise and facilities with research and development needs in industry and academia for the advancement of national security, technological innovation and economic competitiveness.

The benefits of these collaborations are the technical achievements that they enable. Most recently, industrial partnerships in the form of CRADAs and commercial license agreements have focused on technology application areas that include homeland security, high-temperature superconductivity and polymer electrolyte membrane fuel-cell technologies. The division has the primary responsibility for negotiating all technology transfer agreements and also is responsible for working closely with technical staff to develop the best intellectual property strategies that support the objectives of Laboratory research and development programs.

"The Laboratory needs strategic partners to complement its science and technology capabilities and to commercialize the results of its research and development," according to Laboratory Director G. Peter Nanos. "Our goal is to grow these partnerships into multi-disciplinary, multi-divisional efforts," he said. Industrial partners currently working with the Laboratory include Procter & Gamble, DuPont, General Electric, American Superconductor and Motorola.

TT maintains a Laboratory Web site (www.lanl.gov/partnerships/) to keep both Laboratory staff and external customers informed about technology licensing opportunities, mechanisms for partnering with the Laboratory, training offerings and related technology commercialization opportunities and resources. The Web site provides detailed information and forms to assist Laboratory staff with their efforts to understand and comply with Lab and DOE policies and procedures, to patent and copyright technologies and to develop agreements with industry. The site also contains information on licensing and entrepreneurial activities.

Industrial Fellows



In a fast-paced, cutthroat economy, business experts say winning in the consumer marketplace requires a combination of technical and economic superiority to bring a product quickly to market. At the Laboratory, researchers are finding a similar and increasingly competitive workplace. The Laboratory facilitates external partnerships as an effective means of accelerating technology growth and jump-starting innovation. To facilitate this type of technical matchmaking, the Laboratory in cooperation with the Industrial Research Council created the Industrial Fellows program in 1995. (This program does not exist at any of the other national labs.)

The program places Laboratory scientists, engineers and managers in selected host companies for one to two years with the goal of nurturing the development of complementary capabilities among institutions and forging long-term strategic relationships. Industrial Fellow candidates are chosen for their combination of technical, social and managerial skills, as well as their ability to build problem-solving teams. Industrial Fellows remain Laboratory employees throughout their assignment, but report to the corporations' senior level management and have full access to proprietary technical and business information. Costs are shared between the Laboratory and the host company.

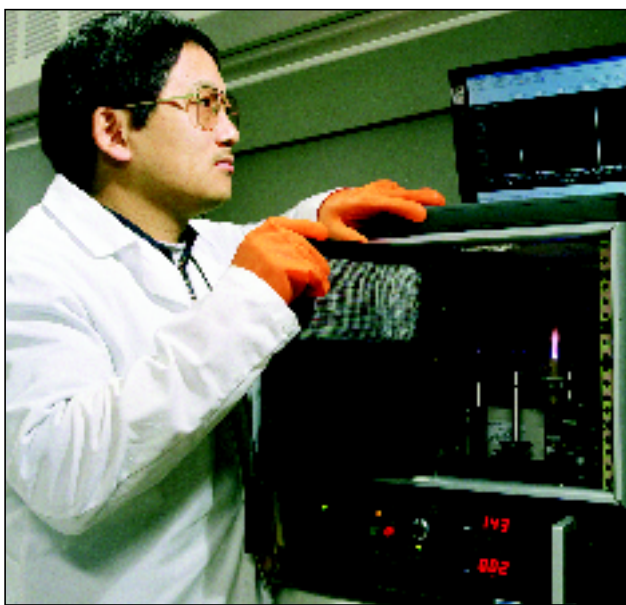
The trick is to find the right partnership that can leverage corporate and Laboratory resources to solve technical problems of mutual interest that is faster, cheaper and better than it would be if either partner worked alone on the issue. Procter and Gamble is one such partner. The original Laboratory/P&G partnership provided the Laboratory with a wealth of data crucial to the validation of weapons engineering codes while also providing P&G with process enhancements in reliability engineering that ultimately resulted in \$1 billion in cost savings for the company. Procter and Gamble is a leading manufacturer of consumer goods and health-care products. Annual sales are more than \$43 billion. The company employs more than 98,000 people in 80 countries on six continents. Last year P&G invested \$1.7 billion in research and development at 19 technical centers and with nearly 100 university and laboratory partners.

Deborah Summa of the Engineering Sciences and Applications (ESA) Division recently completed an Industrial Fellows assignment at Procter and Gamble. In addition to consulting with individual scientists and project teams on specific technical issues, Summa participated in various technical community-of-practice symposia. The community-of-practice groups are global user groups organized around a specific core capability such as sensors, polymers, plastics, etc. Summa also provided input into technology scouting and assessment groups, marketing and consumer behavior studies, development teams, manufacturing reviews and intellectual property strategy sessions.

The program has been so successful that P&G requested a replacement to continue the relationship when Summa returned to the Laboratory. TT Division staff member Kevin Jakubenas was selected to represent the Laboratory for the next two years. Jakubenas started work with P&G in Cincinnati on March 16.

For more information on how to become an Industrial Fellow, contact Susan Sprake at 5-3613 or sprake@lanl.gov by e-mail.

Technology transfer and the Lab...



Yixiang Duan adjusts a filter in his portable air-particulate monitor; the front panel has been removed to show the monitor's microwave-plasma torch, a key to its capabilities. The Technology Transfer (TT) Division awarded funds to Duan of the Chemistry (C) Division and to a team from the Materials Science and Technology (MST) Division to help develop the licensing potential of their technologies. The awards came from the Technology Maturation Fund, an internal source of "venture capital" created to promote Lab technologies that have strong commercial potential. Photo by John Flower of Imaging Services (IM-4)

saving large amounts of heating and cooling energy. The inventors also wanted to apply the technology to automobile rear-view mirrors that could be electrically tinted to reduce nighttime headlight glare. A proposal was submitted requesting \$35,000 to build the prototype mirrors in conjunction with an Arizona based start-up company. In less than five months, the project was successful, and the technology was licensed. The technology has since attracted the interest of several car manufacturers.

The fund is available to any Laboratory employee who has submitted an invention or copyright disclosure. Applicants must identify specific short-term milestones to overcome the hurdle to commercialization. Selection criteria are based on market opportunity, technical risk, competing solutions and applicant credentials. Applicants receive detailed written feedback and are encouraged to use TT Division's resources to assist with commercialization, such as training courses, mentoring and intellectual-property-protection assistance. Proposals are reviewed by a panel of TT staff with both business and technical backgrounds. The total time from proposal to receipt of award is about six weeks. Inventors who are interested in submitting a proposal are encouraged to contact their division's intellectual property coordinator or visit the fund's Web page at www.lanl.gov/partnerships/tech_mat.html online.

Intellectual property and successful portfolio management

Researchers employed by the Laboratory create technologies that have inherent scientific value, but these technologies also can have financial value. Much of the Lab's intellectual property is attractive to industry and can be licensed for commercial development. In fact, technology transfer between the Laboratory and the private sector is a federal mandate. But technology transfer cannot occur unless intellectual property is properly protected. This intellectual property includes inventions, discoveries, software, drawings and technical know-how of the staff. (As a condition of employment, individuals agree to report any potential intellectual property developed during their employment at the Laboratory.)

To date, one of the Laboratory's most successful and well-managed portfolios of licensable technologies derives from the fuel-cell program. Since the mid 1970s, the Laboratory has been instrumental in advancing state-of-the-art fuel-cell technology and has earned an international reputation as a leader in this revolutionary industry. The Laboratory's pioneering advancements in reducing the amount of platinum needed in a fuel cell have resulted in a reduction of fuel-cell production costs by a factor of at least 20, which has greatly enhanced the potential for commercialization of fuel-cell technology. Laboratory researchers also have pioneered notable advancements in the following areas: membrane electrode assemblies, polymer electrolyte membrane fuel-cell stack design and direct methanol fuel-cell systems.

Currently, hundreds of companies, universities and federal laboratories are engaged in some form of fuel-cell

Technology Maturation Project

In 2002, the Technology Transfer (TT) Division established the Technology Maturation Fund to move inventions from the Laboratory to commercial development. While many technologies support mission needs, a number of them also can be applied to industry. But small amounts of funding are needed to demonstrate the commercial application, a task that is often beyond the program scope or funding availability. The TMF is the equivalent of seed funding for these projects.

Since its inception, the TMF has received 35 proposals from 11 different divisions. Fifteen of the qualified projects have received a total of more than \$500,000. Awarded projects, averaging about \$35,000 each, consist of one or two specific milestones aimed at overcoming a hurdle to commercialization.

In a recent example, the fund provided money to build prototype mirrors, which were outside of the original scope of the program. Two researchers had originally developed a set of ionic fluids for use in large architectural windows common in skyscrapers. The fluids allow the window tint to be controlled electrically, potentially



Ken Stroh of the Materials Science and Technology (MST) Division is shown with a Laboratory-built fuel-cell powered scooter. File photo

continued on Page 5

research and development. Industry experts have estimated that research and development activities within this burgeoning industry will exceed \$2 billion during 2004.

In the commercialization context, the Laboratory's fuel-cell portfolio, which includes patent applications, issued patents, copyrights and know-how, is one of the most significant and actively managed portfolios of intellectual property at the Laboratory, according to Program Manager Ken Stroh. The Laboratory's Technology Transfer (TT) Division began concerted efforts directed at licensing the fuel-cell portfolio in 1999. Since then, more than 18 percent, or \$1,178,000 of the more than \$6.3 million total license income generated by the Laboratory is directly attributable to licensing of the fuel-cell portfolio.

In an effort to increase the success of the fuel-cell licensing program, the Technology Transfer staff established an active portfolio management team in February 2001. The Hydrogen and Fuel Cell Portfolio Management Team comprises program managers, line managers, technical staff, Legal Counsel and Technology Transfer staff associated with the Lab's hydrogen and fuel-cell programs. The overarching goal of the team is to strategically manage the intellectual property portfolio to meet the Laboratory's programmatic objectives and to increase the probability of successful commercial deployment. The team meets monthly to review new invention disclosures; discuss ongoing intellectual property issues, such as international patent filings and the timing of relevant publications; characterize all the components within the portfolio as either core or noncore IP; develop optimal commercialization strategies; and manage all the industrial interactions and projects such as nondisclosure agreements, material transfer agreements, CRADAs and licenses.

Currently, the Laboratory is engaged in approximately 30 different industrial interactions associated with the fuel-cell portfolio.

"The team's coordination has been instrumental in managing these interactions/partnerships, many of which are in similar areas and have far-reaching IP consequences," said Stroh. "The successful transfer of this vital technology and its use by the commercial sector may have profound consequences for the nation's future energy security needs. It is imperative for us to manage this portfolio strategically with a full understanding of the long-term implications of commercialization decisions."

Licensing Growth

For the past eight years, the Laboratory's Licensing Program has facilitated the transfer of Laboratory-developed technologies to the private sector through commercialization of a number of intellectual property portfolios.

"The intellectual property generated by Los Alamos National Laboratory researchers in the form of patents and copyrights is vital to the performance of our institution," said Laboratory Director G. Peter Nanos.

In addition, the Laboratory has successfully leveraged these intellectual assets to attract funding from federal and private sponsors and from strategic alliances with private industry.

The Licensing Program also fosters lucrative technology transfer activities and enhances regional economic development efforts, he said.

In recent years, federally funded research, which often leads to a license, has become an increasingly important source of innovation needed by U.S. industry to stay competitive, according to Nanos.

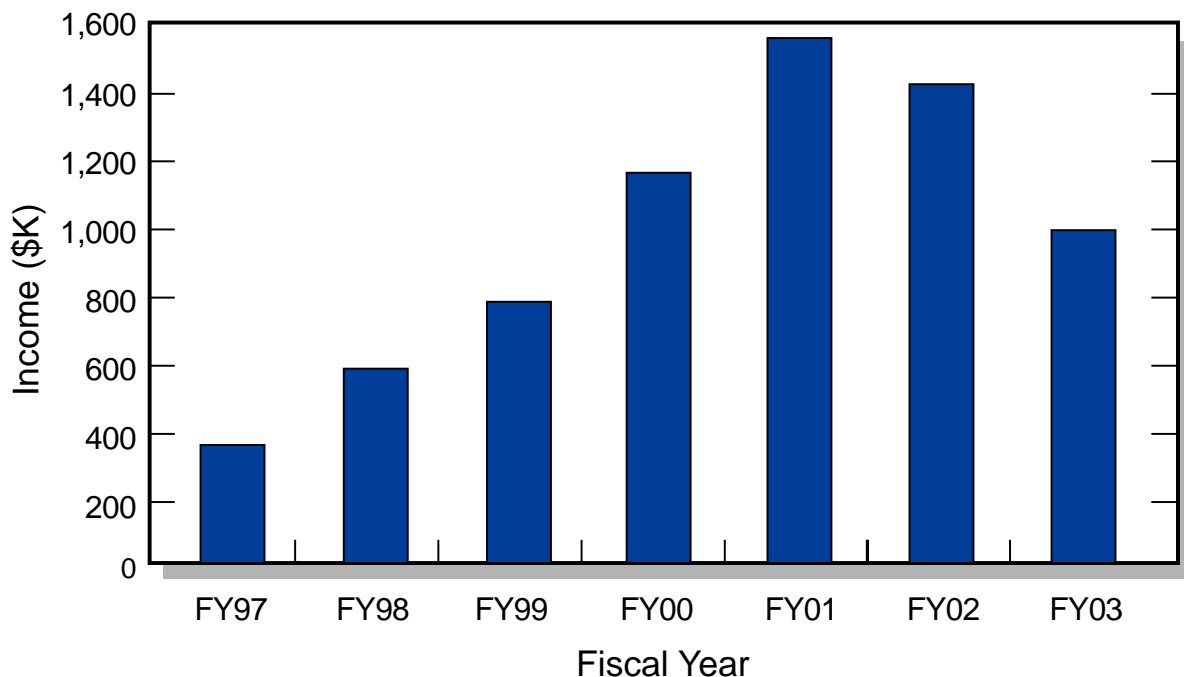
"Private industry recognizes that Los Alamos National Laboratory is a reservoir of extraordinary scientific talent and cutting-edge technology," said Technology Transfer (TT) Division Leader Donna Smith. "The new products and services being created by our licensees capitalize on the key technical advances developed by our world-class researchers. In addition to the benefit to U.S. economic competitiveness, these product and service offerings enhance the reputation of the Laboratory as a premier provider of outstanding technology innovations."

The Licensing Program currently manages more than 200 active commercial licenses. In addition, the Laboratory's active license portfolio contains more than 650 noncommercial licenses with academia, government entities and other nonprofit organizations. In the last few years, the program has witnessed accelerated growth, due in large part to the active participation of the Laboratory's technical staff in concert with TT Division in commercialization activities.

Overall, TT Division's Licensing Program has generated more than \$8.6 million in licensing income for the Laboratory. Eighty-five percent of this income is redistributed to the inventors and to the technical divisions for scientific research and development, technology transfer activities and education programs at the Laboratory.

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Annual Licensing Program



TT Division Training

The Technology Transfer (TT) Division has established a series of courses to help inventors learn about important policies related to commercialization activities; methods of evaluating the commercial potential of inventions; and the process for commercialization at the Laboratory, including special consideration for those interested in entrepreneurial activities. The principal objective of TT's training courses is to encourage and promote active participation by Laboratory inventors in the commercialization process.

"The Laboratory is overflowing with creative inventors, but many believe that bringing an invention to light, let alone to market, is a daunting task," according to Donna Smith, TT Division leader. "Some think that inventions developed here will never go beyond the defense establishment. However, many of the Laboratory's inventions can and do become commercialized through a variety of technology transfer channels, including licenses, cooperative research and development agreements and spin-off ventures."

Successful commercialization activities can bring significant royalty income to both the inventor and to the Laboratory. "The Laboratory's intellectual property is one of its outstanding assets and it is important for Laboratory staff to understand the importance of intellectual property management, the process of commercialization and the availability and location of resources that can help inventors navigate through the system," said Smith.

Many of the graduates of TT's training courses move to the next step in commercialization and begin actively working with the division on CRADAs, licenses or start-up opportunities.

"After many years of seeking to commercialize some of my ideas, the course gave me a fresh outlook and new approaches to try," according to John Telford of the Nuclear Materials Technology (NMT) Division. "I would certainly recommend the course to anyone who was entertaining thoughts of marketing an invention."

Below is a list of upcoming training courses. TT also provides on-site courses to groups or divisions. To request training for your division, to register or to suggest training courses you would like to see offered, contact Shandra Clow at clow@lanl.gov by e-mail.

Upcoming Course Dates

- Commercialization Training
May 3-6
- Managing Intellectual Property:
A Guide for Managers
May 11
- SBIR Training — Phase II Workshop
May 26
- SBIR Training —
Cost Proposal Workshop
May 27
- Commercialization Training
June 15-16
- Managing Intellectual Property:
A Guide for Managers
Aug. 11
- Commercialization Training
Aug. 23-25
- Managing Intellectual Property:
A Guide for Managers
Dec. 8



R&D 100 Awards

Beginning in 1978, Los Alamos has entered R&D Magazine's annual R&D 100 competition. The R&D 100 awards program is designed to honor significant commercial promise in products, materials or processes developed by the international research and development community. Each year, R&D Magazine recognizes the world's top 100 scientific and technological advances with awards for innovations that demonstrate the most commercial potential.

Since 1978, the Lab has won 89 awards, winning eight last year, more than any other institution or company. During the last 15 years, Los Alamos has averaged 4.88 winners per year — more than any other laboratory.

One fairly recent winner, David Cremers of Advanced Chemical Diagnostics and Instrumentation (C-ADI), has won five R&D 100 awards. Four of these awards were based on Laser-Induced Breakdown Spectroscopy. Cremers and his team used the technology at the 2002 Winter Olympics to test sled runners for illegal coatings. His work also has been used to analyze toxic metals in soils, beryllium particles in air and the makeup of soils on Mars.

The Technology Transfer (TT) Division provides coordination of the Laboratory's award submissions to R&D Magazine along with significant assistance in intellectual property protection, marketing information and general consultation. R&D 100 winners receive Laboratory Directed Research and Development funding to continue work on the technology.

Researchers who don't win remain advocates of the competition. Richard Lujan of Weapon Design Services (ESA-WDS), inventor of the gravity brake, a simple reliable mechanical brake for protecting hoisted loads said he was disappointed about not winning, but not disappointed from last year's competition.

"The experience was extremely rewarding and one of the most pleasant in my 28 years at the Lab," Lujan said. "The enthusiasm and encouragement boosted my spirits and helped to reinforce my resolve to take the invention to the next level."

Another submitter who didn't win in 2003, Pat Unkefer, invented Take-Off, a metabolic plant stimulant that increases plant photosynthesis rates. Unkefer, of Biotechnology, Spectroscopy and Isotope Chemistry (B-3), said her experience was also positive. "The challenges and the fun don't have to end with the invention discovery," she said. "Converting a scientific discovery into a successful product is a challenging discovery process in itself. It's a whole new dimension to science," Unkefer said.

For more information on the submittal process, contact Cindy Boone at 7-1229 or boone@lanl.gov by e-mail.

Technology transfer and the Lab...

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The fundamental licensing strategy for the portfolio is based upon nonexclusive licensing. The portfolio management team has determined that a nonexclusive licensing strategy is the best way to increase the likelihood of successful commercialization.

"We don't want to try to pick winners at this early stage by engaging in exclusive licensing that could ultimately prove detrimental, such as selecting companies that may not be viable over the long-term," Stroh said.

The portfolio management framework implemented by this team more than three years ago has been so successful that the new Technology Management teams within TT Division are modeled on this framework.

Regional Economic Development

The Laboratory's presence benefits local economic development by employing a large percentage of Northern New Mexico residents and attracting highly educated scientists and engineers to the area, which creates an environment for entrepreneurial development and growth.

The Laboratory's involvement in regional economic development activities, particularly as it relates to the development of new businesses, benefits the Laboratory and the region in a variety of ways, according to Donna Smith, Technology Transfer (TT) Division leader.

"The Laboratory can directly benefit from helping enhance or create enterprises that provide employment outside the Lab, improve the community tax base and contribute to a vibrant diversified region that is an outstanding place to live," Smith said. "By working in more effective and flexible ways with industry, we try to ensure that our technology and knowledge will be successfully transferred to benefit the nation and the region through startup and spinoff businesses."

Over the last seven years, TT Division has assisted 254 new clients — 77 of which are new startup companies. These new startups have created 270 jobs and attracted \$67 million in capital investment into the region. Despite tougher economic conditions, more than 70 percent of these startups remain in business. Since 1997, 25 Laboratory employees have taken entrepreneurial leave of absence from their technical positions to start or participate in new regional companies based on Laboratory technology or expertise.

"The Laboratory is finding it increasingly difficult to attract the young, innovative talent needed to fill our scientific and technical positions — the human capital that is the cornerstone of our reputation for scientific excellence," said Laboratory Director G. Peter Nanos.

"An economically diverse and robust regional community will attract more qualified employees to the Laboratory, giving them a broader community of intellectual creativity in which to engage and providing additional employment opportunities for spouses and families," he said. TT offers a broad range of services to Laboratory staff and regional businesses, including market assessments, expert business counseling and access to funding sources, networking events and professional organizations. For more information on how to start a business based on a Laboratory technology, contact Belinda Padilla at bapadilla@lanl.gov by e-mail.

Los Alamos a leader in technology transfer

Los Alamos is one of nine institutions recently recognized as a leader in technology transfer practices and regional economic development, according to a report by the Department of Commerce titled "Role of Federal Laboratories in Building Tech-Led Economic Development: A Look at Best Practices." The Laboratory was selected based on a variety of innovative programs, including the following:

- Sponsoring 48 master's of business administration students since 1998 from 18 leading business schools to assist the Laboratory in transferring and commercializing technologies.
- Conducting more than 20 entrepreneurial training workshops involving more than 2,500 participants in the past five years and co-sponsoring Small Business Innovative Research training workshops for regional and startup companies.
- Providing around \$450,000 annually in awards through the Laboratory Technology Maturation Fund to Los Alamos inventors to adapt their technologies for commercialization.
- Supporting an entrepreneurial-leave-of-absence program that allows Laboratory staff to participate in a new start-up based on Laboratory technology and expertise.
- Nurturing the establishment and growth of state professional associations in information technology and software development, biotechnology and biomedical sciences, and the Internet.
- Recruiting venture capital firms to locate offices in New Mexico (for example vSpring, one of the newest tenants in the Los Alamos Research Park).

Did you know ?

- Abraham Lincoln of Springfield, Ill., applies for a patent for a device to lift vessels over shoals by means of inflated cylinders. Lincoln receives the patent in May 1849.
- On March 11, 1791, Samuel Mulliken of Philadelphia, Pa., became the first person to receive more than one patent from the U.S. Patent Office. Four patents were issued for his machines: (1) to thresh corn and grain, (2) to break and swingle hemp, (3) to cut polished marble, and (4) to raise the nap on cloths.

Intellectual property coordinators

Intellectual property coordinators are relatively new to the Lab, but similar functions have long existed in private industry.

"The IPC is both an adviser and a technology scout available for first-line contact with individual inventors and authors on matters of intellectual property and commercialization," said Donna Smith, Technology Transfer (TT) Division leader. "All Laboratory IPCs have considerable hands-on research experience and are familiar with aspects of the intellectual property process, including invention/copyright disclosures, publication timing, patent strategy, licensing, royalties, consulting and high-tech business startups," she said.

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

Noninvasive characterization of a flowing multiphase fluid using ultrasonic interferometry

Patent No. 6,644,119 issued Nov. 11, 2003
Dipen Sinha of Electronic and Electrochemical Materials and Devices (MST-11)

Ion monitoring

Patent No. 6,649,916 issued Nov. 18, 2003
Duncan MacArthur of Safeguards, Science and Technology (N-1) and **Christopher Orr, Craig Luff** and **Thomas Dockray** of BNFL

Spherical boron nitride particles and method for preparing them

Patent No. 6,652,822 issued Nov. 25, 2003
Jonathan Phillips, Seth Gleiman and **Chun Ku Chen** of Weapon Materials and Manufacturing (ESA-WMM)

Method for forming a potential hydrocarbon sensor with low sensitivity to methane and CO

Patent No. 6,656,336 issued Dec. 2, 2003
Rangachary Mukundan, Eric Brosha and **Fernando Garzon** of Electronic and Electrochemical Materials and Devices (MST-11)

Preparation of energy storage materials

Patent No. 6,656,390 issued Dec. 2, 2003
Lin Song Li and **Quanxi Jia** of Superconductivity Technology Center (MST-STC)

3,6-Bis(1H,2,3,4-tetrazol-5-ylamino)-1,2,4,5-tetrazine or salt thereof

Patent No. 6,657,059 issued Dec. 2, 2003
Michael Hiskey, David Chavez and **Darren Naud** of Materials Dynamics (DX-2)

Cascaded thermoacoustic devices

Patent No. 6,658,862 issued Dec. 9, 2003
Gregory Swift, Scott Backhaus and **David Gardner** of Condensed Matter and Thermal Physics (MST-10)

Particle size analysis in a turbid media with a single-fiber, optical probe while using a visible spectrometer

Patent No. 6,660,995 issued Dec. 9, 2003
Murat Canpolat and **Judith Mourant** of Szilard Resource (B-3)

Method and apparatus for fine tuning an orifice pulse tube refrigerator

Patent No. 6,666,033 issued Dec. 23, 2003
Gregory Swift of Condensed Matter and Thermal Physics (MST-10) and **John Wollan** of Cryenco Inc.

Energetic powder

Patent No. 6,666,936 issued Dec. 23, 2003
Betty Jorgensen of Polymers and Coatings (MST-7) and **Wayne Danen** of Dynamic Experimentation (DX-DO)

Web-based multi-channel analyzer

Patent No. 6,668,277 issued Dec. 23, 2003
Russell Earl Gritz of Isotope and Nuclear Chemistry (C-INC)

IPCs also can advise and refer on research proposals, nondisclosure agreements and various funding agreements requiring the disposition of intellectual property. Recently, IPCs have advised Lab researchers with commercial technologies such as improved computer-virus recognition, image processing, sensors/detectors, cancer detection, improved combustion, clean electric-power generation, bioinformatics, potential AIDS vaccines, genomics and advanced materials.

The following IPCs are assigned to specific divisions:

Don Coates is the IPC for the Physics (P) Division and shares IPC duties within the Chemistry (C) Division. After 25 years with DuPont, Coates joined Los Alamos five years ago as the first Laboratory IPC. Don holds a doctorate in physical organic chemistry from Florida State University. He holds 20 patents and authored several publications. His research interests have included high-temperature technology, plasma chemistry and physics, high-strength materials, supercritical fluids and radio-frequency identification technology.

Bruce Lamartine is the IPC for the Nuclear Nonproliferation (N) and International, Space and Response (ISR) divisions. He has been at the Laboratory for 17 years. Before that, he was a technical staff member with both the U.S. Air Force and Motorola.

Lamartine holds a master's degree in chemistry and a doctorate in physical chemistry from Case Western Reserve University. He



Bruce Lamartine

has authored 75 publications and received nine patents, five biographical citations and 12 research career awards. He has consulted for Motorola and Norsam Technologies Inc., and is the co-founder for two startup companies. His research interests include surface chemistry and physics, failure analysis, nanoengineered surfaces, focused ion-beam technology and vacuum instrumentation.

Robert Hermes is the IPC for the Bioscience (B) and Theoretical (T) divisions. He has been with the Lab for 22 years. He has an undergraduate degree in biology and a doctorate in polymer science. He holds seven patents, numerous publications and two R&D100 Awards. Hermes founded two companies and recently has returned from entrepreneurial leave. His interests range from biology and chemistry, to physics.



Robert Hermes

David Schiferl is an IPC for the Chemistry (C) Division. He has been with the Lab for 27 years. He holds a doctorate in physics from the University of Chicago. Schiferl has authored more than 60 publications, holds one patent and has won five career awards including a Distinguished Performance Award. He has served as a Laboratory Industrial Fellow at PPG Industries and now heads the Industrial Fellows Program. His research has been primarily in the area of static high pressure with recent emphasis on high-pressure X-ray diffraction techniques supporting stockpile stewardship.

Patent, license award ...

continued from Page 1

Distinguished Patent Award from Laboratory Director G. Peter Nanos. Swift received the award for his patent, "Oscillating Side-Branch Enhancements of Thermoacoustic Heat Exchangers." The Distinguished Patent Award is selected by Laboratory Fellows and recognizes a premier patent exemplifying a significant technical advance, adaptability to public use and noteworthy value to the Lab's mission. Swift also was the recipient of the Distinguished Licensing Award given annually by the Laboratory's Technology Transfer (TT) Division. Nominees for this award are evaluated based on ongoing active engagement in the licensing process, promotion of their technologies, number of licenses per technology and support for multiple uses of the technology.

For more than 20 years, Swift's research has focused on engines and cooling technologies based on using sound waves. He has submitted 27 invention disclosures and has been awarded 32 patents. Currently, he and his team have five additional patents pending. Swift's technology for acoustic heat engine technology uses no moving parts and converts heat into acoustic power that may be used in refrigeration. The heat engine also may be used to produce electricity. In 1999, Swift won an R&D 100 Award based on the acoustic Stirling heat engine's potential for significant commercial promise. Swift's most recent collaborations focus on the use of the thermoacoustic technology for gas separation. This includes processes for separation of crude oil and for natural gas liquefaction, as well as other refrigeration technologies.

Ben Warner of Actinide, Catalysis and Separations Chemistry (C-SIC) also was honored at the ceremony as the Laboratory's 2003 Distinguished Entrepreneur. Warner, winner of last year's Distinguished License Award, has inventions that include electrochromic window tinting and micro X-ray fluorescence for drug discovery. Warner helped to commercialize a radiation dosimeter and helped in the successful licensing of the electrochromic window technology to a small business. Warner developed a business plan for the X-ray fluorescence technology and formed a company to compete for the license.

The Distinguished Entrepreneur Award honors an individual whose hard work, ingenuity, innovation and perseverance have contributed significantly to the Lab's ongoing efforts in commercialization and entrepreneurship. Some qualities the panel looks for are based on someone who has demonstrated substantial financial and personal risk taking, innovative and creative thinking and professional business planning.

"Our innovative prowess is a metric of our success and the quality of our science," Nanos said in his remarks. "We apply this prowess to develop spinoff technologies that benefit American economic competitiveness as well as the Northern New Mexico regional economy and business community."

Last year, 72 U.S. patents were issued for Los Alamos inventions, 19 commercial licenses were approved and \$1.1 million in licensing income was generated. The Lab's portfolio now contains more than 600 licenses with academia, government agencies and other nonprofit organizations, as well as more than 150 commercial licenses. Since 1988, the Lab's licensing program has generated more than \$8.6 million in royalties. Approximately two-thirds of that income has gone to fund research, education and technology transfer activities at the Laboratory. The remainder has gone to the innovators.



Employee finds balance between Tae Kwon Do and her artwork



Kathi Parker of the Technology Transfer (TT) Division teaches Tae Kwon Do in her spare time. She is the first woman in the World Tae Kwon Do Association to become a 5th degree black belt. Parker also is an accomplished watercolor artist. At right is one of her recent works, a painting of her son's Converse shoes back when he was a little boy — he's 17 years old now. Photos courtesy of Parker

by Kathy DeLucas

It's the Yin and Yang, the cosmic opposites, that interplay in Kathi Parker's hobbies and personal life. Two nights a week and on Saturdays, she teaches Tae Kwon Do. In her other spare time, she paints with watercolors.

Tae Kwon Do is the highly effective art of unarmed combat for life-threatening situations. It is a self-defense system involving the skilled application of punches, blocks and kicks with the hands and feet. In addition to the fighting skills involved, there is a strong emphasis on mental discipline and self-restraint to avoid combat that is not absolutely necessary. Parker is the first woman in the World Tae Kwon Do Association to become a 5th degree black belt. Parker practices at the WTKDA, New Mexico Schools, which was established in 1969.

Parker also is an accomplished watercolor artist, having been accepted to display at this year's Contemporary Hispanic Market in July in Santa Fe. She also has been published in books about colored pencil and has been in numerous regional and local arts and craft fairs, including the New Mexico State Arts and Crafts Fair.

Parker, of the Technology Transfer (TT) Division sees the activities as opposites, but said there also are similarities.

"Tae Kwon Do is very structured. There are rules and expectations," she said. "In watercolor, the only expectations are my own."

While the differences are obvious, both diversions require skill, concentration, focus and output, Parker says.

As a teacher of the Korean martial art, Parker also has become a student in human behavior.

"Through teaching, I've learned a lot about the various ways people learn," she said. "And I've learned a lot about myself."

Parker relays the story of a young girl who started taking the class at the age of 6. In the beginning, the girl was intensely shy — afraid to ask for anything and afraid to take risks. But after seven years in class, the young woman is now a model brown belt soon to test for black belt, and she recently won the New Mexico runner up in the state interpretational speech contest.

"It's really all about being the best you can be," Parker adds. "It's very good for a person's self-confidence."

Parker, a technology transfer specialist and a 28-year Laboratory employee, says anyone of any age can participate in Tae Kwon Do. Her students range from 7 to 78 and some have no athletic training at all. "It's often best if a person has not been involved in another sport before," she said. "That way they don't have to 'unlearn' bad habits."

Parker's artwork and her martial arts give her balance. "A person needs other things in their lives besides the Lab."

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