2009–2010 Progress Report

Technology Transfer

Science Impacting the Marketplace

Los Alamos
NATIONAL LABORATORY
EST.1943

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"Technology Transfer Division comprises a group of very talented people who are passionate about developing partnerships for the good of the Laboratory, the region, and the nation. We will continue to use our business development and intellectual property acumen to support Laboratory missions and advance science that matters."

—Steven Girrens

Technology Transfer Division Leader, 2008-2010

Los Alamos National Laboratory

The Laboratory

Los Alamos National Laboratory, a Department of Energy laboratory managed by Los Alamos National Security, LLC, is a premier national security research institution. As a guardian of America's freedom and security from the birth of the atomic age to the present, the Laboratory has continued to enhance 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.

As one of the largest employers in Northern New Mexico, the Laboratory employs over 11,000 people with an annual budget of about $2 billion. With its salary and benefits, statewide procurements, and community development programs, the Laboratory represents significant economic impact for the region and the state. Professional scientists and students come to Los Alamos from all over the world to participate in scientific projects. No other laboratory in the world pursues a broader array of world-class scientific endeavors or collaborates on national security science in as many technical disciplines.

Technology Transfer Division

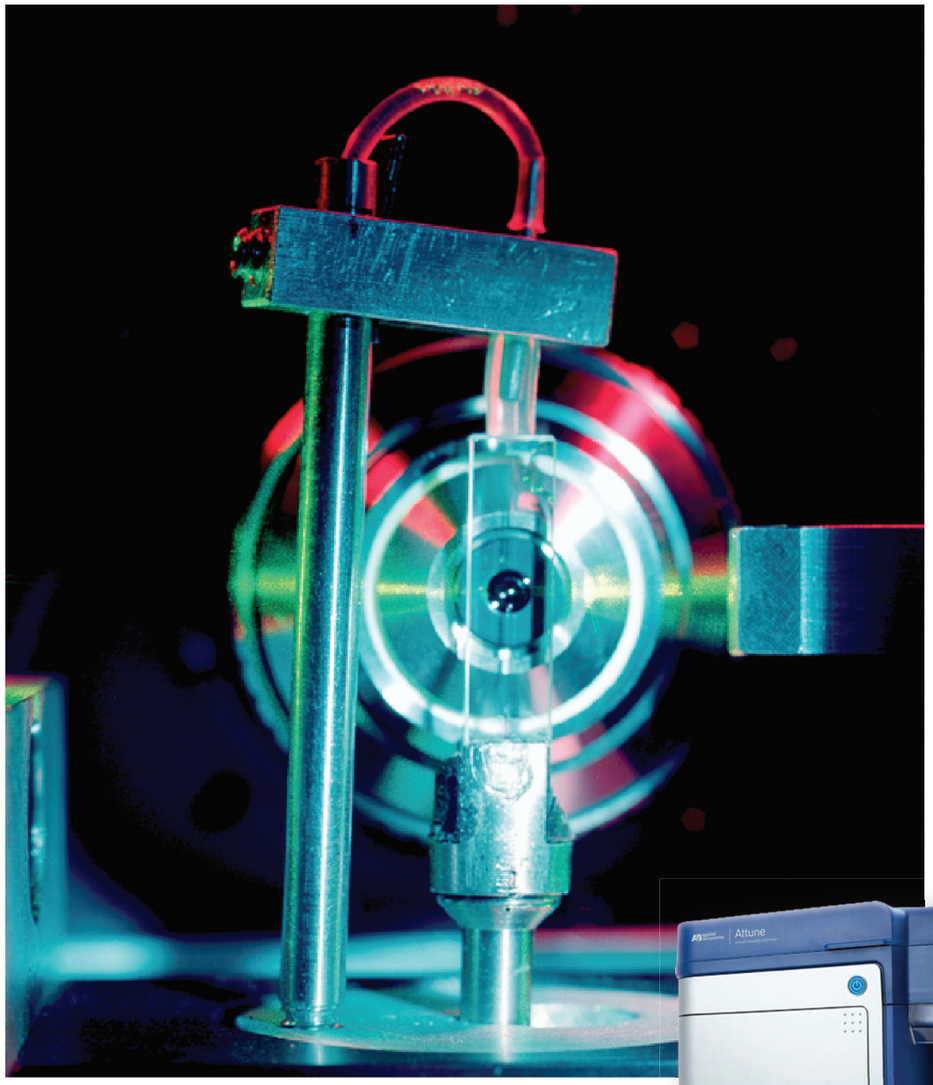
As the Laboratory's liaison with industry, the Technology Transfer Division helps move technologies from the Lab to the marketplace. Technology Transfer also manages Lab-industry research partnerships and serves as the Laboratory's resource on industry relations. Such corporations as Procter & Gamble and Chevron Energy Technology Company have been collaborating with Los Alamos on technical problems of mutual interest since 1995 and 2004, respectively. Both companies enthusiastically sponsor Industrial Fellows who act as technical liaisons between the company and the Laboratory.

Technology Transfer works with the Laboratory Counsel to protect the Laboratory's intellectual property through patents and copyrights. Intellectual property protection enables us to negotiate, execute, and administer commercial, noncommercial, and government licenses on behalf of Los Alamos National Security, LLC, manager of the Laboratory for the Department of Energy. Through these agreements, we create vital links between the Laboratory and the private sector, leading to innovative and effective solutions to the nation's scientific and security challenges.

TT continues to engage in business development activities that benefit the region, the national economy, and all of society. In this progress report, we provide a glimpse into our successes, achievements, and developments during the 2009-2010 fiscal years.

Acoustic Cytometry Systems, LLC

Spun Out, Acquired, and in Production



DNA fragments flow through the flow channel from the bottom of the flow cell to the exit tubing at the top. The green (532 nm) laser beam passes through the focusing lens from right to left and then through the flow cell.

Invitrogen (now Life Technologies) acquired ACS in 2008 and developed the Attune® Acoustic Focusing Cytometer, which is currently distributed worldwide.

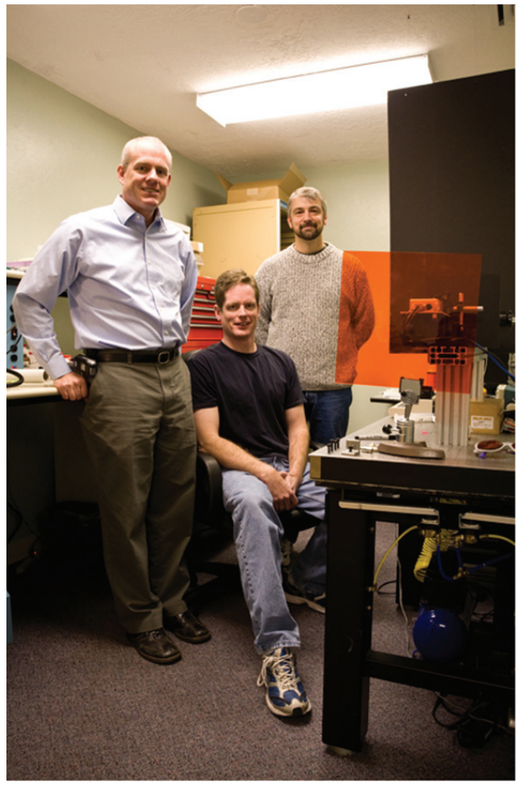
The field of flow cytometry was originally invented at Los Alamos National Laboratory (LANL) as a way to allow scientists to quantitate and examine cells by passing them through a laser-based detection device. Thousands of cells per second may be analyzed individually, allowing rapid characterization of entire populations of cells as well as the detection of rare cells. Cell biologists use flow cytometry for a wide range of applications, including the study of cellular protein expression, immunophenotyping, quantifying cellular DNA, and measurement of a variety of cellular phenotypes for the purposes of basic cell biology research and drug discovery. The flow cytometry instrumentation has continued to advance with support from the National Center for Research Resources at the National Institutes of Health (NIH).

In 2006, LANL spun out a new company, Acoustic Cytometry Systems, LLC (ACS) to commercialize a novel technology. The company furthered the development of a method to use sound waves to guide cells through cytometers, or cell meters, to allow researchers to closely examine tissue samples for medical diagnostics. Unlike typical flow-through cytometers—which use fluids to rapidly push thousands, if not millions, of compounds through cytometers for drug discovery—the ACS technology allows researchers to use sound waves to completely stop the flow of tissue samples and focus on individual cells up close.

ACS was subsequently acquired in 2008 by Invitrogen Corporation, which later merged with Applied Biosystems to form Life Technologies. The company advanced the LANL technology and developed the Attune® Acoustic Focusing Cytometer, a first-of-its-kind cytometer system that uses acoustic waves to precisely control the movement of cells during analysis. The system is based on a portfolio of intellectual property developed at LANL for which Life Technologies holds exclusive commercial license rights.

"Acoustic focusing enables both longer transit times and higher throughput, which simultaneously permits better interrogation of every cell in a sample as well as the analysis of much larger numbers of cells," said Mike Olszowy, head of flow cytometry at Life Technologies. By further developing LANL's acoustic cytometer technology and launching it as a commercial product, Life Technologies is poised to bring researchers and scientists "one step closer to…precise quantitation of molecular phenotypes at the single cell level," a huge advancement in today's biological and medical research capabilities.

The Attune® Acoustic Focusing Cytometer offers researchers a flexible, high-performance cytometer at less than half the price of comparable instruments. It improves the sensitivity, throughput, and accuracy of flow cytometry-based assays, while also enabling a greater variety of sample types than can be evaluated on traditional hydrodynamically focused cytometer systems. "This is not a toy," says Dr. Olszowy. "The Attune Cytometer provides extremely high-quality data and the flexibility to analyze complex samples with reduced interference —we have not yet fully discovered the limits of its performance and applications."



For Research Use Only. Not for human or animal therapeutic or diagnostic use.

MagViz and CoilViz

Better, Faster, Cheaper Airport Security

Andrei Matlashov of Applied Modern Physics places bottles of shampoo, water, and other liquids on a conveyor belt for analysis by the MagViz machine at Albuquerque International Sunport.

Increased airport security in recent years has led to the limitation of liquids approved and permitted as carry on items on planes in the United States. The Transportation Safety Administration has determined that only three bottles of liquid or gel, restricted to three-ounces or smaller, are considered safe to carry onto an airplane. Unfortunately, in some cases, passengers may find that they need to carry on larger items, such as baby formula or medication. These items would require further screening, potentially exposing airport security to hazards.

New technology under development at Los Alamos National Laboratory (LANL) could not only amend the three-ounce bottle restriction, but could also have applications for medical imaging, homeland security, and food processing. This would not only be more convenient for airline passengers, but less dangerous for staff members involved.

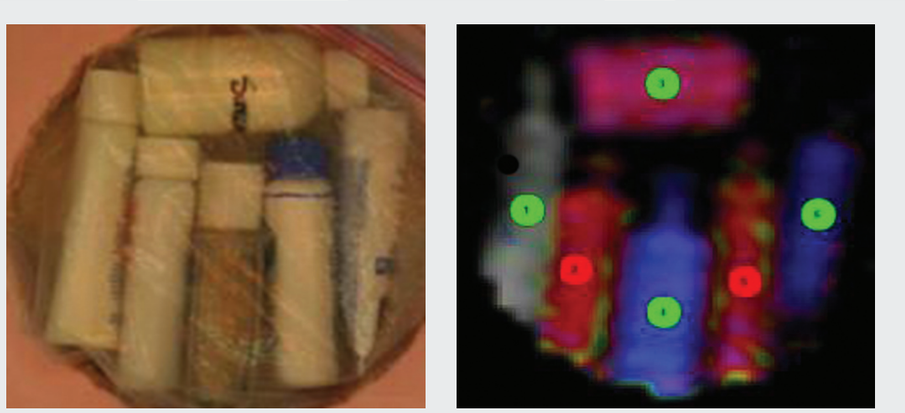
The first generation MagViz uses ultra-low magnetic fields to help distinguish between benign liquids, such as shampoo, and explosives, such as high-volume hydrogen peroxide. At its heart is a magnetic field up to a million times smaller than those used in Magnetic Resonance Imaging (MRI) machines at hospitals. Despite the low fields involved, this machine is able to obtain the chemical signature necessary to identify dangerous substances. The original six-foot by six-foot machine was tested at the Albuquerque International Sunport in December of 2008 and was capable of analyzing the contents of 5-6 bottles at a time.

While the research team, led by Michelle Espy of LANL's Applied Modern Physics Division, was able to develop a much smaller version of the MagViz unit that could test larger bottles—one at time—the award-winning team recently made an additional breakthrough.

Named CoilViz, this new technology eliminates the need for SQUIDs, or Superconducting Quantum Interference Devices. This machine still uses low magnetic fields, but given that SQUIDS require low temperature to operate effectively, eliminating these devices also reduces the machine's complexity and operating expense. While the detectors are not as sensitive as those on MagViz, they have the correct specificity for their task, simplifying the screening of airport liquids.

This newer machine is even smaller than the second-generation MagViz, not only increasing portability of the device, but also decreasing the costs of manufacturing or operating it. In addition to making screening faster and easier, this screening technology also has medical and military applications. It can be used in underdeveloped countries and war zones to detect explosives or simply to identify spoiled food containers without the risk of exposure and contamination, among other applications. The research team's ground breaking work has been recognized by both a R&D 100 Award as well as a Laboratory Distinguished Performance Large Team Award.

Originally developed with funding from the Department of Homeland Security, both MagViz and CoilViz are looking for commercial partners to license this technology. A company would need to build two of these systems to undergo testing and obtain certification by the Transportation Security Laboratory. Once approved, the technology could then be purchased by the Transportation Security Administration for airport use.



Hazardous materials may still be able to pass through airport security as long as they are contained in 3 oz. containers or smaller. MagViz and CoilViz are able to detect hazardous materials such as the 40% H_2O_2 detected in bottles #2 and #5. Red light = bad liquid. Green light = OK liquid.

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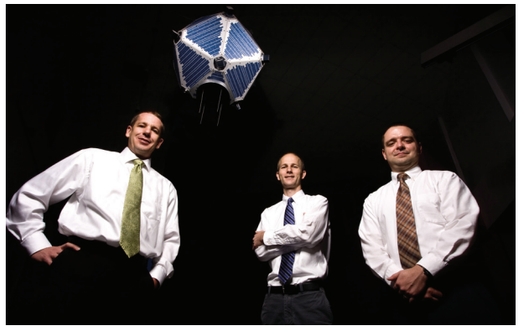
Innovation at its Best

Adaptive Radio Technologies, LLC (ART)

On the Frontier of Aerospace Research



The ART staff were not only granted a license from LANL, but they are LANL staff working "after hours" to work with this start-up.

In 2009, ART was granted a license from LANL and established as a spinoff company. ART was able to receive help from the LANS Venture Acceleration Fund (VAF), as well as coaching from Technology Transfer's Springboard program, and assistance through their MBA program.

ART's three founders, Michael Caffrey, Keith Morgan, and Dr. Joseph Palmer established the company with a goal of increasing the value and success of missions through innovative communications systems. The ART technology provides an order of magnitude greater data downlink capacity from Low Earth Orbit (LEO) satellites over conventional satellite radios using the same power, volume, and mass.

The company has continued to grow since its establishment, gathering feedback from potential customers and incorporating the feedback into their designs. These designs provide buyers with the most advanced nano- and microsatellite software-defined satellite on the market, specific to each customer's needs. The most advanced version of these satellites is of great interest to prime defense contractors and government agencies seeking to meet specific mission requirements and/or to conduct concept-testing for future space systems.

Recently, ART won an Air Force Research Laboratory, Small Business Innovation Research Award to advance their products. Now working on completing field tests, the group has plans to soon release this technology to contract manufacturers and begin full production.

Metallicum, Inc.

Stronger, Lighter, More Flexible

In early 2009 a license agreement was established between LANL and Manhattan Scientifics, Inc. concerning the Laboratory's nano-structured metals, made by the small spinoff company Metallicum, Inc. Dr. Terry Lowe, the company's president, founded Metallicum in 2001 when working with the U.S. Department of Energy to develop these nano-structured metals. Metallicum was acquired by Manhattan Scientifics in 2008.

Nano-structured metals are lightweight industrial metals manufactured by Metallicum, Inc. In the manufacturing process, the company shears the metal into tiny crystals, which makes the metal stronger and more flexible. These new nano-structured metals are highly beneficial to society and can be used for a range of applications, from dental and medical implants to car and airplane structures. In the medical field, these metals are valuable for their acceptance into the human body biologically. These metals not only last longer, but can integrate with bone up to 20 times faster than metals currently used. When used to build cars or airplanes, these nano-structured metals are admired because of their light weight. Dr. Lowe estimated that nano-metals could reduce the weight of an airplane by about 5%, as much as 5,000 pounds on some aircrafts. Ultimately, the lighter vehicles would help reduce the amount of fuel used by the vehicle, lowering operating costs.

These nano-structured metals could help create more jobs for Americans, particularly in New Mexico. The agreement between Metallicum, Inc. and Manhattan Scientifics was praised by Senator Jeff Bingaman, "This merger is another great example of how our national laboratories can partner with the private sector and create vital jobs while meeting some of our nation's most promising needs."

Manhattan Isotopes Technology (MIT)

Elements for Heart Imaging

Jason Kitten is a former Lab employee, and Suzanne Kitten is on leave through the Entrepreneurial Leave of Absence program.

MIT was started in November 2009 by Jason Kitten, Suzanne Kitten, and Larry Pitt. The company is working to supply strontium-82 to radiopharmaceutical companies. Strontium-82 is used in the medical field for heart imaging and cardiac diagnoses. Approximately 23,000 people are affected by strontium-82 every year, and the product is certainly in demand.

Before this project, strontium-82 in the U.S. was manufactured only by LANL and Brookhaven National Laboratory. In the last few years the production rate of strontium-82 has increased drastically, putting added pressure on these government institutions. By branching into a separate company, MIT can use LANL patented technology to commercialize the product and help alleviate this pressure.

James Maxwell

Three Innovations, Three Consecutive R&D 100 Awards

James Maxwell of LANL's IAT-3 (Nuclear Counterterrorism Response Division) has been involved in laser and microchemical processing for more than 14 years. His work has pushed the frontiers of nanotechnology with ground breaking technologies that have garnered R&D Magazine's prestigious R&D 100 Awards, known in the industry as the "Oscars of Invention," in 2008, 2009, and 2010.

In 2008, Maxwell won an award for Laser-Weave, a process involving hyperbaric laser chemical vapor deposition that allows scientists, engineers, and manufacturers to grow high-strength inorganic fibers into useful shapes and complex patterns, or braid or weave strong cables, cloth, or composites. This can produce high-value, cost-effective refractory ropes and textiles, as well as prototype high-aspect ratio micro-electrical mechanical systems used in industry.

"To put it simply, we grow things from gases using lasers," said Maxwell, who holds a doctorate in mechanical engineering with a specialty in laser microchemical processing from Rensselaer Polytechnic Institute.

Maxwell's Laser-Weave technology received assistance from LANL's Technology Maturation Fund to help reach its full potential.

Maxwell's technique lets him grow structures and fibers at astonishing speeds. For example, "Laser-Weave is able to produce carbon fibers up to 13 centimeters long in a single second, and many other materials at millimeter per second growth rates," he said. When laser-woven fibers are braided together, the resulting cloth is exceptionally strong, able to withstand high temperatures," Maxwell explained. "It can be used in anything from the inside of your toaster to exhaust nozzles in rocket engines."

The next year, Maxwell built upon Laser-Weave to develop 2009 award-winning Lasonix, the technology that enables hybrid circuits of micro vacuum electronic devices, optoelectronics, and traditional silicon-based devices to be integrated in an automated fashion through a single tool without mechanical assembly or circuit boards.

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Using Lasonix, Maxwell and his team have created the first ever three-dimensional diodes in the form of fibers. "Lasonix illustrates the ability of the Laboratory – specifically that of Maxwell and his team – to truly push the envelope of current manufacturing techniques. They've created a technology that someday could enhance the very way we live our everyday lives," said Glenn Mara, Principal Associate Director for Weapons Programs.

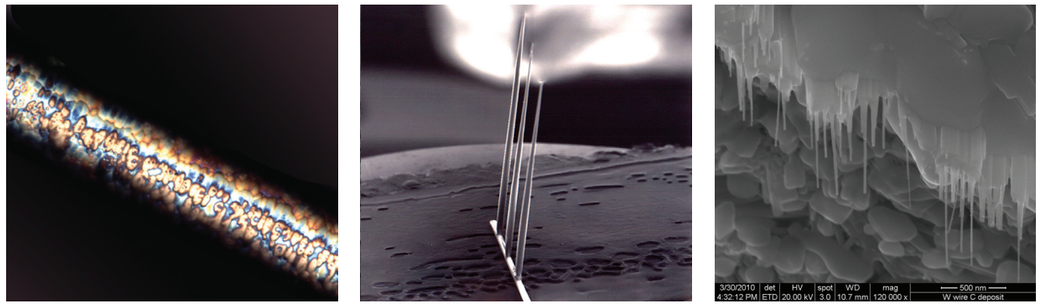
Maxwell's success continued with his 2010 R&D 100 Award for Ultraconductus, a technology that has the potential to increase the conductivity of metallic wiring by at least 100 times. He worked with a team of researchers from across the laboratory, including Fred Mueller of MPA-STC (Superconductivity Technology Center) and Chris Rose of WX-5 (Darht Physics & Pulsed Power Division.)

Ultraconductus can be applied to create high-voltage cables used to transmit power to homes and businesses around the world, as well as motors and generators. Using Ultraconductus-produced cables instead of traditional cables in all new installations would save approximately 150 billion kilowatt-hours of energy and an associated $15 billion in costs per year. Additionally, there is no need for expensive cooling to achieve ultraconductivity, and it creates lighter-weight, smaller cross-section conductors that greatly reduce the infrastructure needed to support heavy cabling.

Industry is paying attention to Maxwell's technologies. His string of R&D 100 Award wins have gained interest and opened doors. "Already, companies are approaching the [LANL] Technology Transfer Division looking to license or incorporate this technology," he said.

Maxwell's successes are driven by a curiosity of the world around him, the wish to serve his country, and the desire to raise living standards by developing superior products and technologies and making them accessible to the general public.

"I learned a long time ago that engineering and science are what ultimately build wealth in societies," he said. "Innovators help society as a whole, and it's very exciting to be a part of that."



Maxwell's R&D 100 Award wins from left to right: Laser-Weave, 2008; Lasonix, 2009; Ultraconductus, 2010.

Innovation at its Best

The Procter & Gamble Company

From Predictive Modeling to Diapers

The Procter & Gamble Company (P&G) continues to fund strategic research and development projects at the Laboratory, extending a vital relationship that began in 1994. A number of projects have progressed to various stages of development in the last two years: two are just getting underway, one is at midstream, and one has just recently completed.

The Colloidal Phase Stability project was just recently completed. It delivered a predictive simulation of phase stability and vesicle rising phenomena – the behavior you see when a liquid such as fabric softener separates into a light creamy layer on top of a clear bottom layer. The P&G and LANL teams together performed basic materials research, and the Laboratory and its University partners developed the world's first multi-scale, multi-material computer simulation of phase separation.

The simulation showed that one particular material was unintentionally causing vesicles to cluster together, and the vesicles were squeezing out the heavier liquid from between them and floating upward together in the solution. The software predicted that by switching to a material of different composition the vesicles would not clump together as much, and the phase separation behavior would be dramatically reduced. P&G now has a more fundamental understanding of the chemistry from which it can save on time, money, and surprises in developing new products.

The Materials project is at midstream in developing a method to economically convert cellulose and hemicellulose into industrial quality chemicals. Success of the effort will reduce industry's dependence on oil. So far, Laboratory scientists have successfully demonstrated means to engineer intermediate chemicals from derivatives of cellulose and hemicellulose, and P&G scientists are confirming the process to transform those intermediate chemicals into the final materials that may be transparently substituted into existing manufacturing supply chains. Also, this technology could allow for the production of new-to-world materials. Ultimately, this project will allow the replacement of materials derived from oil with chemically identical materials (drop-in materials) derived from biomass.

Finally, of the two projects just getting underway, one extends the predictive modeling and simulation collaboration and the other develops advanced surface modification processes.

LabStart

From Lab to Industry

In September 2008, Los Alamos National Laboratory and its manager Los Alamos National Security, LLC announced the selection of ARCH Venture Partners and the Verge Fund to collaborate in the Los Alamos Venture Acceleration (LAVA) Initiative, as a result creating LabStart.

LabStart leverages the experience and knowledge of serial entrepreneurs and investment professionals to foster the creation of new companies. ARCH Venture Partners, a venture capital firm established in 1989, has over $1.5 billion total capital under management. The Albuquerque-based Verge Fund invests in seed-stage, high-growth ventures in New Mexico. Both firms contribute a collective team of 20 investment professionals, including seven located in New Mexico and an Entrepreneur in Residence at the Laboratory, Tom Brennan.

Tom Brennan began his career as a technical staff member at AT&T Bell Labs, later joining Sandia National Laboratories (SNL) in 1986 where he became a senior technical staff member focused on the material growth of III-V semiconductor materials and devices. His work included the growth of some of the first "vertical cavity surface-emitting laser" (VCSEL) material in the United States as well as the development of new and unique VCSEL manufacturing techniques.

In 1994, Brennan and a colleague from SNL collaborated with ARCH managing directors, Clint Bybee and Keith Crandell, to cofound MicroOptical Devices (MODE) and commercialize products based on the VCSEL technology, licensed from SNL. Brennan was copresident of MODE through December 1997 when EMCORE Corp. acquired MODE for about $34 million and established a new business unit called EMCORE Photovoltaics. Brennan helped start up the new business and led it as general manager.

Brennan also worked as CEO and president of Zia Laser, chairman of Medical Lighting Solutions, and finally joined ARCH as a venture partner. Through his collaboration with ARCH, Brennan began working with LabStart in 2009 and has been serving as president since April 2010.

Most recently, the LabStart team has worked closely with LANL's Technology Transfer Division to evaluate, screen and incubate several new start-up ideas. At the end of fiscal year 2010, LabStart had reviewed and performed initial due diligence on 54 active projects, some of which are being considered for new company formation.

One example, YXO, Inc. was formed as a Delaware C-Corporation around the Brockwell Structure technology, a proprietary composite structure with the superior strength-to-mass ratio of carbon fiber and the bearing strength of metal. Around $120,000 of funding will be sought by January 2011 and additional funding of $285,000 by June 2011. A CEO is currently being sought for this endeavor, and IP is being requested from DOE in order to file the LANL provisional patent.

Another example includes discussions to form a new company based on VCAT, or Visual Crosswalk Analysis Tool, a knowledge modeling and analysis tool. A test and evaluation license is in process with LANL.

Other high priority projects in the queue for evaluation at the end of fiscal year 2010 include:

- MicroChip LED: ceramic glass and DBR coatings for solid state lighting applications
- Industrial Enzymes: an enzyme engineering platform with emphasis on thermally stabilized proteins
- Petavision: visual recognition systems designed to mimic primates' visual behavior
- RCME V.0: a tool to guide renewable infrastructure decision making use of a multi-variate analysis for wind and solar capacity to determine the optimal renewable plant scenarios
- Exergame: a combination of gaming with exercise that runs as an app on the user's tablet PC (e.g. an iPad)
- Movie Locker: a way to offer movies for sale, like any other online retailer (i.e. Amazon), but would also offer to transfer, free of charge, the digital copy of the movie to your name, and host this digital movie on its webservers, while storing the physical copy in a safe, secure location, also free of charge for some period of time.

In addition, LabStart has brought to bear additional relationships to the TT via their due diligence process and through the connections of LabStart's parent VC companies, Verge and ARCH. These include Boeing, Dow Chemical, NVP Venture Partners, Chart Ventures and Verizon Wireless among others. LabStart has offered 13 projects from its due diligence list to the local VC community for evaluation.

Nurturing Young Talent

Marcus Lucero

"The process of deploying new high-tech technologies through Technology Transfer helps promote science and improve our economy."

Marcus Lucero was born and raised in Santa Fe, New Mexico. He was one of three brothers to attend college in Las Cruces, New Mexico at New Mexico State University (NMSU), where he earned his Bachelor of Science in Mechanical Engineering, and after which, was accepted into NMSU's College of Business for his Master of Business Administration (MBA). After completing his first year in the MBA program, he became interested in Technology Transfer after attending a recruiting event for summer internships by Belinda Snyder, LANL Technology Transfer (TT) Program Manager. The field of technology transfer appealed to Marcus because it is a mix of both science and business. In order to commercialize a technology, you have to have an understanding of the science behind it. Marcus was immediately interested; he applied for the internship and was accepted.

Marcus has described the MBA internship as one of the best experiences of his early professional career. The internship offered real-world experience in technology transfer and allowed him to work directly with companies and scientists. Originally focused on an engineering career, the LANL MBA internship altered Marcus' career path. Marcus was so intrigued by technology transfer that he stayed on part-time while completing his second and final year of his MBA. A few months after graduation, he accepted a full-time position on TT's Intellectual Property Management Team as an IP Analyst.

Currently, Marcus works on one of TT's Technology Management Teams as a Business Development Executive specializing in patent analytics, agreements, business development, and other partnering mechanisms for new high-tech technologies.

Erica Sullivan

"This position is the perfect mix of science and business—technology transfer is the career I was always working towards without ever realizing it before joining the MBA Internship program."

Erica Sullivan earned Bachelor degrees in Biology and Economics from Loyola Marymount University in Los Angeles, California, and a Master in Business Administration (MBA) from San Diego State University's (SDSU) Graduate School of Business in San Diego, California.

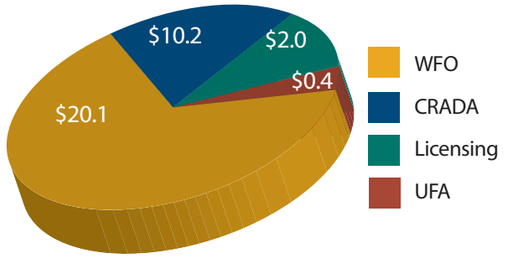
After graduating from SDSU in 2002, she was offered an MBA Internship with Los Alamos National Laboratory's Technology Transfer (TT) Division, where she evaluated the Laboratory's technical capabilities in the area of computational bioscience. Upon completion of the internship, Erica joined full-time as a Business Development Executive with TT's Strategic Partnerships Office. Since then, she has worked in a number of areas, including marketing, regional economic development, program development and most recently, licensing. Erica is currently a Licensing Executive and is the (acting) Industrial Relations Manager for the National Alliance for Advanced Biofuels and Bio-products (NAABB) consortium.

Erica credits the MBA Internship with exposing her to field of technology transfer and the fascinating world of national laboratory research. The MBA Internship allowed Erica to explore the opportunities within a federal laboratory, to contribute meaningfully to the division, and find the right job for her background and personal interests. Erica also enjoys living in the Los Alamos community as well as the natural beauty of Northern New Mexico.

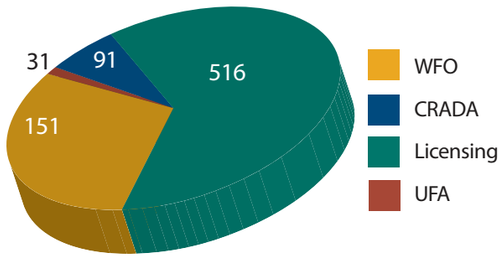
Fiscal Years 2009-2010 Performance

Los Alamos National Laboratory's Technology Transfer Division continued to demonstrate exceptional value to the Laboratory and the nation over the two year period FY09-FY10. In spite of difficult economic times during this period, the level of interaction between the laboratory and the private sector (including state and local governments) remained relatively strong. The following pages depict results from the various metrics of our activities that demonstrate LANL's successful technology transfer program. We look forward to the continuing challenge of successfully transferring laboratory technologies to the private sector.

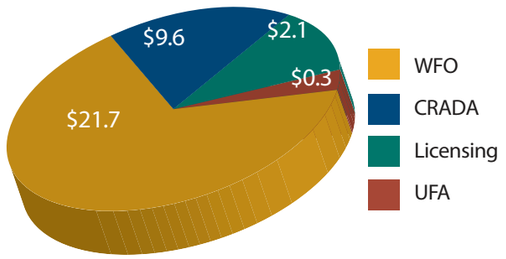
FY 2009 Revenue by Category



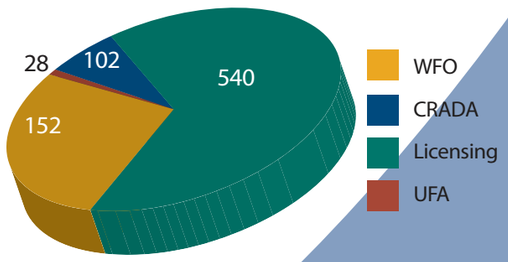
FY 2009 Active Agreements



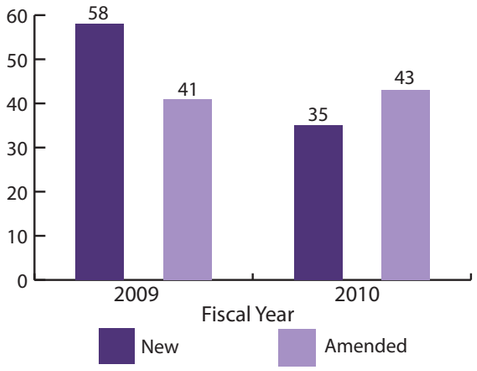
FY 2010 Revenue by Category



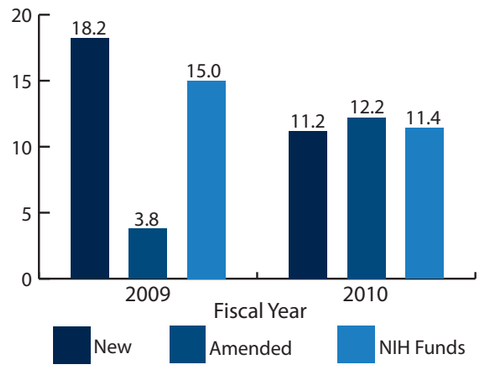
FY 2010 Active Agreements



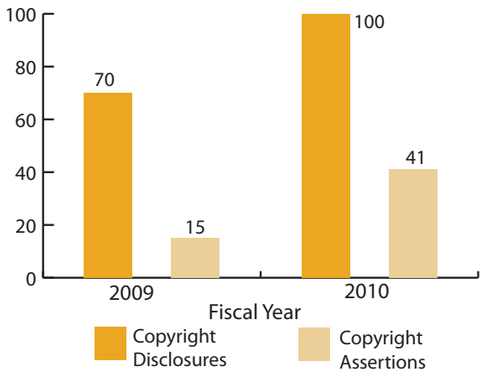
Work-for-Others Agreements (Non-Federal)



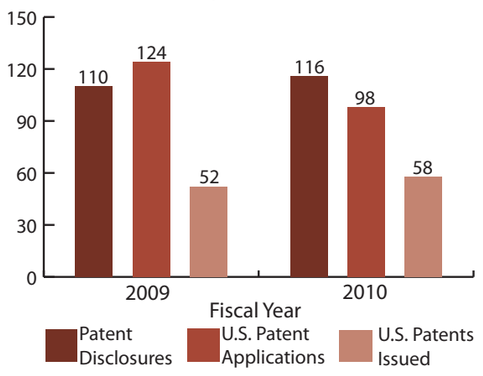
Work-for-Others Agreements Value ($ Millions)



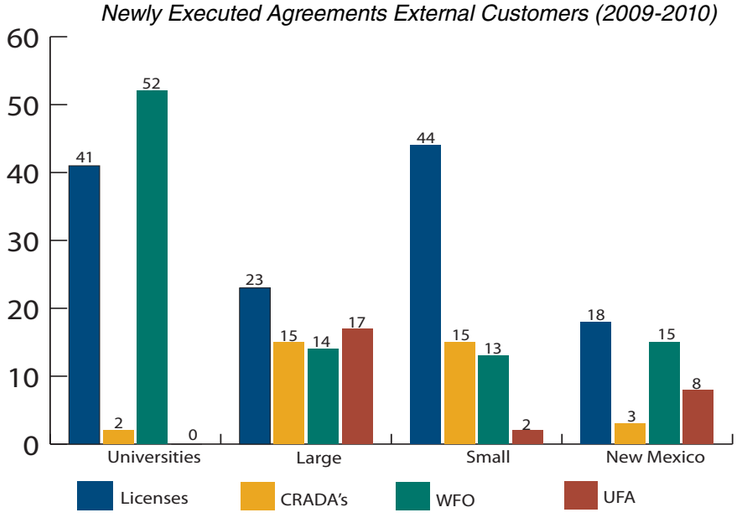
Copyrights per Fiscal Year



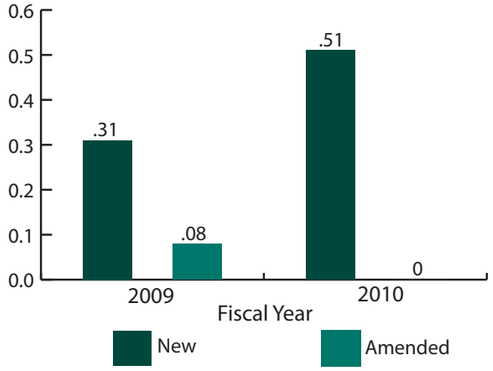
Patents per Fiscal Year



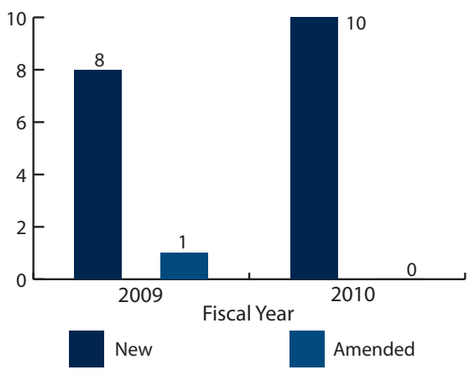
Newly Executed Agreements External Customers (2009-2010)



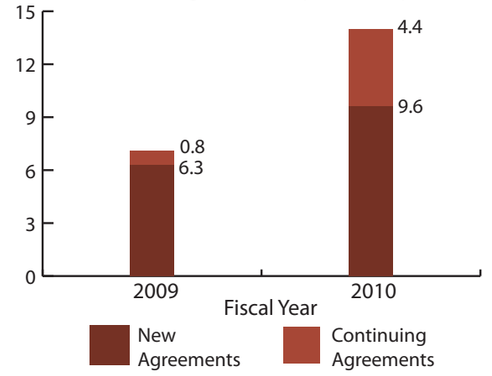
User Facility Agreements ($ Millions)



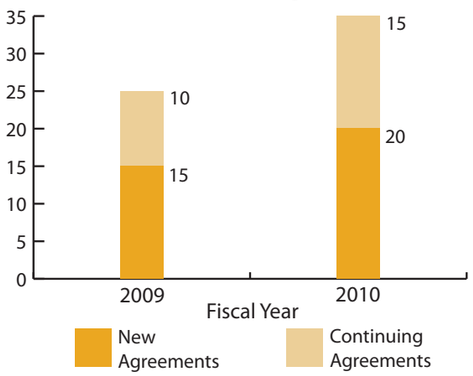
User Facility Agreements



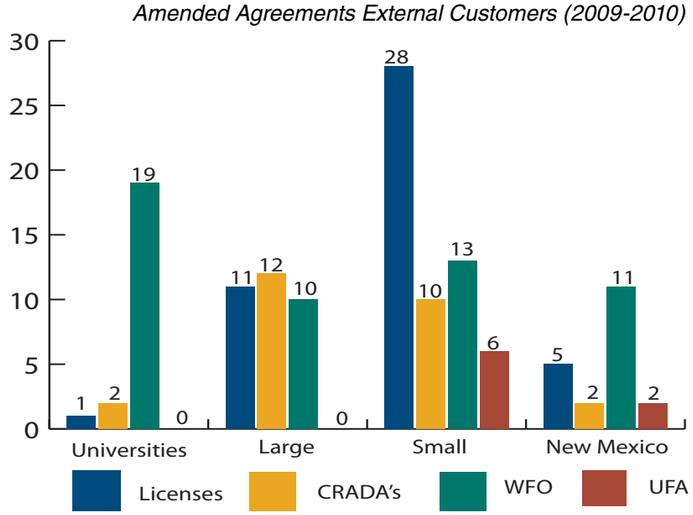
CRADA Agreements ($ Millions)



Number of CRADA Agreements



Amended Agreements External Customers (2009-2010)



New Patents Issued in 2009

Compositions and Methods for the Treatment of Pierce's Disease
U.S. Patent # 7,432,419

Electrochromic Salts, Solutions, and Devices
U.S. Patent # 7,436,570

Anion-Conduction Polymer, Composition, and Membrane
U.S. Patent # 7,439,275

Method and System for Hydrogen Evolution and Storage
U.S. Patent # 7,439,369

Membrane Architectures for Ion-Channel Switch-Based Electrochemical Biosensors
U.S. Patent # 7,442,403

Durable Electroopic Devices Comprising Ionic Liquids
U.S. Patent # 7,450,292

Electrochromic Salts, Solutions and Devices
U.S. Patent # 7,450,293

Analysis of Macromolecules, Ligands, and Macromolecule-Ligand Complexes
U.S. Patent # 7,469,036

Chemical Synthesis of Chiral Conducting Polymers
U.S. Patent # 7,476,765

Radiofrequency Attenuator and Method
U.S. Patent # 7,479,843

Primary Explosives
U.S. Patent # 7,498,446

Apparatus and Method for Tracking a Molecule or Particle in Three Dimensions
U.S. Patent # 7,498,551

High Current Density Electropolishing in the Preparation of Highly Smooth Substrate Tapes for Coated Conductors
U.S. Patent # 7,510,641

Flow Method and Apparatus for Screening Chemicals Using Micro X-Ray Fluorescence
U.S. Patent # 7,519,145

Detection of Malicious Computer Executables
U.S. Patent # 7,519,998

Field Enhanced Electrodes for Additive-Injection Non-Thermal Plasma (NTP) Processor
U.S. Patent # 7,521,026

Nanocomposite Scintillator, Detector, and Method
U.S. Patent # 7,525,094

Planar Optical Waveguide Based Sandwich Assay Sensors and Processes for the Detection of Biological Targets Including Early Detection of Cancers
U.S. Patent # 7,541,196

Planar Optical Waveguide Based Sandwich Assay Sensors and Processes for the Detection of Biological Targets Including Protein Markers, Pathogens, and Cellular Debris
U.S. Patent # 7,541,197

Base Metal Dehydrogenation of Amine-Boranes
U.S. Patent # 7,544,837

Enhanced Pinning in Mixed Rare Earth-123 Films
U.S. Patent # 7,547,661

Nanocomposite Scintillator and Detector
U.S. Patent # 7,547,888

Method of Making Metal-Polymer Composite Catalysts
U.S. Patent # 7,550,223

Gold-Coated Nonoparticles for Use in Biotechnology Applications
U.S. Patent # 7,556,863

Permeable Polyaniline Articles for Gas Separation
U.S. Patent # 7,563,484

Direct Imaging of Neural Currents Using Ultra-Low Field Magnetic Resonance Techniques
U.S. Patent # 7,573,268

Airborne Particulate Discriminator
U.S. Patent # 7,573,571

Tape-Cast Sensors and Method of Making
U.S. Patent # 7,575,708

Method of Improving Fuel Cell Performance
U.S. Patent # 7,575,824

Structure-Based Receptor Mimics Targeted Against Bacterial Superantigen Toxins
U.S. Patent # 7,576,183

Preparation of Carbon Nanoparticles and Carbon Nitride from High Nitrogen Compound
U.S. Patent # 7,582,273

Anion-Conducting Polymer, Composition, and Membrane
U.S. Patent # 7,582,683

Synthesis of [1-13C]Pyruvic Acid, [2-13C]Pyruvic Acid and Combinations Thereof
U.S. Patent # 7,582,801

Portable Multiplicity Counter
U.S. Patent # 7,583,776

Protein Subcellular Localization Assays Using Split Fluorescent Proteins
U.S. Patent # 7,585,683

Chalcogen Catalysts for Polymer Electrolyte Fuel Cell
U.S. Patent # 7,588,857

Method for Implantation of High Dopant Concentration in Wide Band Gap Materials
U.S. Patent # 7,589,004

Composite Materials and Method of Making
U.S. Patent # 7,589,047

Anti-Sulfotyrosine Antibodies
U.S. Patent # 7,589,182

Preparation of Tungsten Oxide
U.S. Patent # 7,591,984

Explosive Complexes
U.S. Patent # 7,592,462

Segmented Superconducting Tape Having Reduced AC Losses and Method of Making
U.S. Patent # 7,593,758

Electrolytes for Electrooptic Devices Comprising Ionic Liquids
Japan Patent # 4,214,112

Deposition of Coatings Using an Atmospheric Pressure Plasma Jet
European Patent # EP 1,090,159

New Patents Issued in 2010

Biaxially Oriented Film on Flexible Polymeric Substrate
U.S. Patent # 7,601,430

System and Method that Suppresses Intensity Fluctuations for Free Space High-Speed Optical Communication
U.S. Patent # 7,603,038

Polymer-Assisted Deposition of Films
U.S. Patent # 7,604,839

Near Single-Crystalline, High-Carrier-Mobility Silicon Thin Film on a Polycrystalline/Amorphous Substrate
U.S. Patent # 7,608,335

Device for Hydrogen Separation and Method
U.S. Patent # 7,611,565

Mass Spectrometry-Based Method for Detection and Differentiation of Botulinum Neurotoxins
U.S. Patent # 7,611,856

Radiofrequency Attenuator and Method
U.S. Patent # 7,615,267

Fuel Injector Utilizing Non-Thermal Plasma Activation
U.S. Patent # 7,625,531

Apparatus and Method for Mapping an Area of Interest
U.S. Patent # 7,627,448

Radiation Portal Monitor System and Method
U.S. Patent # 7,633,062

Durable Electrooptic Devices Comprising Ionic Liquids
U.S. Patent # 7,633,669

Electrochemical Detection of Single Molecules Using Abiotic Nanopores Having Electrically Tunable Dimensions
U.S. Patent # 7,638,034

Method of Transferring Strained Semiconductor Structures
U.S. Patent # 7,638,410

Method for Improving Performance of High Temperature Superconductors Within a Magnetic Field
U.S. Patent # 7,642,222

Non-Contact Pumping of Light Emitters via Non-Radiative Energy Transfer
U.S. Patent # 7,642,557

Acid Catalyzed Dehydration of Amine-Boranes
U.S. Patent # 7,645,902

Thermally Stable Compositions Including, 4, 8, 10-Tetranitro-5H-Pyrido[3′,2′:4,5][1,2,3] Triazolo[1,2-a] Benzotriazol-6-ium, Inner Salt.
U.S. Patent # 7,651,577

Nanophosphors for Large Area Radiation Detectors
U.S. Patent # 7,651, 633

Synthesis of 13C and 2H Substituted Methacrylic Acid, 13C and 2H Substituted Methyl Methacyrilate and/or Related Compounds
U.S. Patent # 7,662,993

Protein-Protein Interaction Detection System Using Florescent Protein Microdomains
U.S. Patent # 7,666,606

3-Dimensional Imaging at Nanometer Resolutions
U.S. Patent # 7,675,045

Nanophosphor Composite Scintillator with a Liquid Matrix
U.S. Patent # 7,679,060

Suppression of Pyroelectric Excitations with External Magnetic or Electric Fields
U.S. Patent # 7,687,775

Ultra-Low Field Nuclear Magnetic Resonance and Magnetic Resonance Imaging to Discriminate and Identify Materials
U.S. Patent # 7,688,069

Catalyst and Reduction of Nitrogen Oxides
U.S. Patent # 7,691,769

Preparation of Nanostructured Materials Having Improved Ductility
U.S. Patent # 7,699,946

Metal Aminoboranes
U.S. Patent # 7,713,506

Preparation of Graphitic Articles
U.S. Patent # 7,713,577

Particle Detection Systems and Methods
U.S. Patent # 7,714,297

Nanocrystal/Sol-Gel Nanocomposites
U.S. Patent # 7,723,394

Architecture for Coated Conductors
U.S. Patent # 7,727,934

Method for the Chemical Separation of Ge-68 from its Daughter 68Ga
U.S. Patent # 7,728,310

Noise Cancellation in Magnetoencephalography and Electroencephalography with Isolated Reference Sensors
U.S. Patent # 7,729,740

Method and Apparatus for Depositing a Coating on a Tape Carrier
U.S. Patent # 7,736,438

Composition and Method for Storing and Releasing Hydrogen
U.S. Patent # 7,736,531

Method of Synthesis of Proton Conducting Materials
U.S. Patent # 7,736,547

Buffer Layer for Thin Film Structures
U.S. Patent # 7,736,761

Coated Conductors
U.S. Patent # 7,737,085

Enhanced Pinning in YBCO Films with BaZrO3 Nanoparticles
U.S. Patent # 7,737,087

Lead-Free Primary Explosives
U.S. Patent # 7,741,353

Multifunctional Nanocrystals
U.S. Patent # 7,741,120

Charge-Free Method of Forming Nanostructures on a Substrate
U.S. Patent # 7,759,229

Preparation and Purification of Ionic Liquids and Precursors
U.S. Patent # 7,763,186

System and Method for Treating Produced Water
U.S. Patent # 7,767,078

Enrichment of Light Hydrocarbon Mixture
U.S. Patent # 7,771,569

Aligned Crystalline Semiconducting Film on a Glass Substrate and Method of Making
U.S. Patent # 7,781,067

Chalcogen Catalysts for Polymer Electrolyte Fuel Cell
U.S. Patent # 7,781,364

Quantitative Method of Determining Beryllium or a Compound Thereof in a Sample
U.S. Patent # 7,781,589

Linear Electric Field Time-of-Flight Ion Mass Spectrometers
U.S. Patent # 7,781,730

Nanostructures Metal-Polyaniline Composites and Applications Thereof
U.S. Patent # 7,786,037

Desensitization and Recovery of Metastable Intermolecular Composites
U.S. Patent # 7,789,981

Noninvasive Characterization of a Flowing Multiphase Fluid Using Ultrasonic Interferometry
Japan Patent # 4,535,872

Awards

Los Alamos Technology Transfer Awards

Distinguished Patent Award

- **Ultrasonic Analyte Concentration and Application in Flow Cytometry (2009)**: Greg Kaduchak, Greg Goddard, Gary Salzman, Dipen Sinha, John Martin, Christopher Kwiatkowski, and Steven Graves, International and Applied Technology, and Material Physics and Applications divisions
- **Controlling the Pressure within an Annular Volume of a Wellbore (2010)**: Robert Hermes, Technology Transfer Division

Distinguished Copyright Award

- **RADIUS™ (Rapid Automated Decomposition of Images for Ubiquitous Sensing) (2010):** Lakshman Prasad, Space and Remote Sensing Group, and Sriram Swaminarayan, Applied Computer Science Group

Distinguished Licensing Award

- **ENABLE (Energetic Neutral Atom Beam Lithography / Epitaxy) (2009)**: Mark Hoffbauer, Chemistry Division
- **Take-Off (2010): Pat Unkefer, Bioscience Division**

Programmatic Impact Award

- **Subsurface Flow and Transport Team (2009)**, Earth and Environmental Sciences Division, for its work on the Finite Element Heat and Mass Transfer Code (FEHM)
- **Mark Wallace**, Global Security Programs, **Shawn Tornga, Andrew Hoover, David Palmer, and Mark Galassi**, Space Science and Applications Group, **Larry Schultz**, Applied Modern Physics Group, and **Michal Mocko**, Los Alamos Neutron Science Center (LANSCE), for their efforts in the Stand-Off Radiation Detection System (SORDS) Program (2010)

Regional Impact Award

- **Knowledge Reef Systems, Inc. (2009)** of Santa Fe, NM, Marko Rodriguez, Theoretical Division, Jennifer Watkins, International and Applied Technology Division
- **Chevron Energy Technology Company (2010)** of Richmond, CA, and Daniel Neagley, Don Coates, Clark Thompson, Dave Beck, Pat Rodriquez, Jake Archuleta, Bill Coulter, Bob Williford, and George Nichol, the Laboratory retirees who formed Chevron's Area 52 research facility (2010) in Santa Fe, NM

Federal Laboratory Consortium Awards

Award for Excellence in Technology Transfer Winners

- **Portable Acoustic Flow Cytometer (2009)** – John Martin, Robert Habbersett, Steven Graves, Gregory Goddard, and Mark Naivar
- **ENDURE™ SCR Catalyst (2010)** – Kevin Ott
- **Hyperion Power Module (2010)** – Turner Trapp, Otis Peterson, Patrick McClure

Mid-Continent Regional Awards

- **Notable Technology Development (2009)** – Hyperion Power Generation, Inc.
- **Notable Technology Development (2010)** – FEHM: Finite Element Heat and Mass – George Zyvoloski
- **Outstanding Regional Partnership Award (2010)** – Sandia National Laboratories, Los Alamos National Laboratory, State of New Mexico, and "NM Small business Assistance (NMSBA) Program"
- **Outstanding STEM Mentorship Award (2010)** – David Foster

Interagency Partnership Award

- (2010) Office of Naval Research and Air Force Research Laboratory, Department of Defense; and Los Alamos National Laboratory, National Energy Technology Laboratory, and Oak Ridge National Laboratory, Department of Energy

R&D 100 Awards

2009 Winners

- Artificial Retina Project: Restoring sight through science
- High Resolution UV Relay Lens A New Lens for Particle Size Distribution
- Lasonix: A New Method to Fabricate Three-Dimensional Microelectronics
- MagViz: MRI for Carry-On Liquids
- SIMTECHE: CO_2 Capture Process
- TeraOps Software Radio: Supercomputing Power for Space Applications

2010 Winners

- DAAFox: Environmentally Friendly Secondary Explosive
- Movies Of eXtreme Imaging Experiments (MOXIE)
- Solution Deposition Planarization (SDP)
- Ultraconductus: The World's Ultimate Electrical Conductor
- Ultrasonic Algal Biofuel Harvester