FEDERAL LABORATORY CONSORTIUM

FLC

FOR TECHNOLOGY TRANSFER

2010 FLC Awards

2010 FLC Awards

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Albuquerque, New Mexico

Adding value to the federal agencies, laboratories, and their partners to accomplish the rapid integration of research and development resources into the mainstream of the U.S. economy.

Welcome to the 2010 FLC Awards

Thank you for coming to salute this year's best and brightest in the world of technology transfer. The individuals you will meet tonight are committed to excellence in all phases of taking innovative technologies from the drawing board to areas as diverse as the operating room, the airport terminal, or the grocery store shelf. This transformation would not be possible without the ingenuity of our scientists and researchers, the tenacity of our technology transfer professionals, and the foresight of our partners in industry, academia, and state and local governments. For all of them, "The Sky's the Limit" is not just a slogan, it's an attainable goal.

Reflecting the diversity of technology transfer efforts within the FLC, we present awards in the following areas:

- Awards for Excellence in Technology Transfer—Presented to scientists and researchers at FLC member laboratories and their partners for successfully transferring federally developed technologies.
- Interagency Partnership Award—Honors the efforts of agency and/or laboratory employees from at least two different agencies who have collaboratively accomplished outstanding work in the process of transferring a technology.
- Outstanding Technology Transfer Professional Award—Recognizes the efforts of a technology transfer professional who has demonstrated outstanding work in transferring a technology.
- Laboratory Director of the Year—Recognizes directors of FLC member laboratories for their contributions to the overall enhancement of technology transfer for economic development and their support of the FLC and its activities.
- FLC Service Awards—Presented to individuals, inside or outside the FLC, who have provided significant support to the technology transfer process, thus furthering the FLC's mission.

The FLC awards are a prestigious honor in the technology transfer world, with dozens of federal laboratories submitting nominations each year. These awards have become a great source of pride for both the laboratories and their government agencies.

As you read this booklet, you will be impressed with the experience, expertise, and resources these award winners used to transfer technologies. I am extremely proud and pleased to present the recipients of the 2010 FLC awards.

Lorraine Flanders
Awards Committee Chair

2010 FLC Awards

Awards for Excellence in Technology Transfer

Novel Fish Vaccines to Prevent Severe Economic Losses in Aquaculture

Department of Agriculture
Agricultural Research Service
Mid South Area

Streptococcal disease is the cause of severe economic losses of farm-raised fish, especially in tilapia aquaculture. The causative bacteria are *S. iniae* and *S. agalactiae*, both of which are ubiquitous pathogens that infect all sizes of fish and for which no effective methods of control are available. These pathogens are reported to cause death rates of 30 to 50 percent in aquaculture operations. The disease is characterized by erratic swimming and behavior, missing or cloudy eyes, deformities and rapid death. The pathogens are highly infectious to brain tissues.

Vaccination is the best method to prevent disease and offers the safest alternative to using antibiotics and chemicals that can contaminate food and the environment. However, no effective vaccines that prevent this disease were available for farm-raised fish. Fish vaccine development is more scientifically challenging than those developed for terrestrial vertebrates.

To mitigate streptococcal disease in farmed food fish, the Agricultural Research Service's (ARS) vaccine team developed two modified killed vaccines that consisted of formalin-killed cells and molecular fractioned extracellular products from *S. iniae* and *S. agalactiae.* The innovative combination of killed cells and extracellular product was demonstrated to provide safe and efficacious immune protection against streptococcal disease, in a manner superior to a vaccine that consisted of killed cells only. This type of cellular vaccine is the standard for the majority of fish vaccines today.

The technology transfer mechanisms used were trust fund cooperative agreements, Cooperative Research and Development Agreements, patents, material agreements, and licensing. PerOs/Benchmark Biolabs received master vaccine cultures by material transfer agreement in 2008, and a license is pending. The company has estimated sales of 50 million vaccine doses at a customer cost of $1.9 million in 2009, with an increase in fish value of $10-12 million annually. The potential economic benefit of these vaccines approaches $50 million annually worldwide.

From left: Dr. Joyce Evans, Dr. Philip Klesius, and Dr. Craig Shoemaker

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Implementation of Phytosanitary Irradiation Treatment Protocols for Tropical Fruit

Department of Agriculture
Agricultural Research Service,
Pacific West Area

The State of Hawaii produces a variety of tropical fruits and vegetables, including bananas, papaya, and sweet potato. However, Hawaiian agricultural production traditionally has had limited export potential, especially to the U.S. mainland, because of agricultural pests such as fruit flies. Quarantine restrictions and phytosanitary measures have therefore been applied to Hawaiian exports, greatly limiting the amount of product that can be shipped from the islands to other markets.

To address this problem, Drs. Peter Follett and Marisa Wall have developed generic irradiation protocols as phytosanitary control measures for a wide variety of quarantine insect pests that infest fresh commodities. This first-ever use of a generic radiation dose for phytosanitary control in Hawaii permits local agricultural producers to expand their fruit and vegetable exports in an expeditious and economical fashion. Currently, Hawaii has approval to export 18 fruits and 6 vegetables with irradiation to the U.S. mainland.

Many years of laboratory research were translated into a commercial reality when an informal collaboration began with a Hawaiian company, Hawaii Pride, LLC. This collaboration turned out to be crucial to technology transfer because Hawaii Pride invested approximately $6 million in an industrial-scale fruit and vegetable irradiator. Without access to this facility—and partnership with Hawaii Pride—Drs. Follett and Wall would not have been able to achieve the USDA's Animal and Plant Health Inspection Service marketing approval for their generic irradiation protocol. This example of technology transfer is a huge leap forward for Hawaiian agriculture since it provides a fast, economical, and efficient means for Hawaiian producers to export their products to previously restricted markets.

From left: Dr. Marisa Wall and Dr. Peter Follett

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Second Generation Treatment System for Management of Livestock Manure

Department of Agriculture
Agricultural Research Service,
South Atlantic Area

From left: Dr. Ariel Szogi, Dr. Patrick Hunt, Dr. John Loughrin, Dr. Patricia Millner, and Dr. Matias Vanotti

The Second Generation Treatment System for Management of Livestock Manure is a cost-effective method for the treatment of livestock waste that is an alternative to open lagoons, the dominant method of treating hog waste throughout the country. It has changed that way of thinking about manure management by solving multiple challenges in modern livestock production. These challenges include atmospheric emission, excess nutrients, pathogens and food safety, odors, and affordability of treatment.

The ARS team has developed and effectively transferred this new technology that can solve all of these problems. The technology also generates value-added organic fertilizer and carbon credits, as well as increased animal productivity. The team actively participated in all aspects of technology transfer, such as the invention of a new waste treatment system, demonstration of on-farm verification, customer workshops and meetings with industry, and interacting with a number of national and international organizations with the common goals of a cleaner environment and profitable agriculture.

As a result of these efforts, the State of North Carolina established a Lagoon Conversion Program to financially assist farmers with converting lagoons to the new environmentally superior technology. This will upgrade existing swine production facilities to cleaner technology.

With executed contracts by the commercial partner in 2009, the technology is being used to treat 70 million gallons a year of concentrated swine effluent generated by 50,000 swine. The second-generation system was mentioned in a 2008 Duke University publication as a technology that could help reduce greenhouse gas emissions and create green jobs in the U.S. In addition, the technology was showcased by the Environmental Defense Fund at the first Middle Class Task Force meeting organized by the White House.

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Rice Varieties for the Processed, Specialty, and Organic Rice Industry

Department of Agriculture
Agricultural Research Service,
Southern Plains Area

Some 3 million acres of rice are planted annually in Arkansas, California, Louisiana, Texas, Mississippi, and Missouri. The U.S. is a major world supplier of rice, with half of the nation's crop being exported. Dr. Anna McClung of the Agricultural Research Service's (ARS) Rice Research Unit in Beaumont, Texas, has worked closely with industry and university partners, including Texas A&M University, to develop rice cultivars with improved disease resistance, yield, and processing characteristics in alignment with the ARS mission to help sustain and improve the competitiveness of the U.S. rice industry.

These formal and informal collaborations have resulted in the development of eight new rice varieties which, over the last five years have been grown in Texas, Mississippi and South Carolina, and are being commercialized by international food companies Mars Foods, Inc.; Riviana Foods, Inc.; and Campbell Soup Company. Texas-based food companies such as Doguet's Rice Mill, Arrowhead Mills, and Texas Organic have also benefited from the new rice varieties.

Over one million pounds of seed rice of these cultivars have been sold for planting by farmers in the south. As a result, a new quick-cooking rice food product has been commercialized, a domestically produced aromatic rice is in the marketplace to compete with imports, new rice cultivars suited for production on organic farms are being grown, a higher yielding cultivar suited for canned rice products is in production, and rice utilization has expanded from the whole grain market to use as a flour by the ingredients industry.

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Development and Transfer of BIOTIC Irrigation Control Technology

Department of Agriculture
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Southern Plains Area

Improved irrigation scheduling represents perhaps the most direct means to conserve scarce water and energy resources in agriculture. In the mid-1980s, a team of USDA Agricultural Research Service (ARS) researchers developed a novel method and device, named BIOTIC, for managing the irrigation of plants using crop canopy temperature measurements. BIOTIC is radically different from other temperature-based irrigation schedulers in that it compares plant temperatures to an estimate of the plant's optimal temperature based on its biochemistry. It is unique among irrigation scheduling methods in that it directly assesses the metabolic status of the plant to determine its water needs and thus has a strong scientific foundation. In its simplest form, the BIOTIC process continuously measures the temperature of the plant and calls for irrigation when the temperature is above the optimal value. A very low-cost infrared temperature monitoring system was developed as part of the technology transfer process and was patented.

This technology transfer was fundamentally an in-house effort by research scientists with no previous experience in such an undertaking. The ARS BIOTIC group implemented a multifaceted approach to transferring its invention to the agricultural community. Prototypes were created and tested on-farm with agricultural producers, extension experts, and consultants to determine the combination of hardware and software that would meet their needs. Cooperator feedback was incorporated over several years to incrementally refine the product. An in-house funded collaboration with an engineering company, Accent Engineering, Inc., resulted in a device that met the needs of the agricultural community. New sensors were identified and incorporated. ARS actively supported the licensee in disseminating the science behind the device.

As a result of the team's technology transfer efforts, the BIOTIC patent has been licensed by Smartfield, Inc. Its SmartCrop® system, based on BIOTIC, is a truly novel product that is now in use by agricultural producers in Colorado, Kansas, Texas, Nebraska, Arizona and California. It is also being used by government researchers in Australia and Canada, as well as an Italian hazelnut producer.

From left: Drs. James Mahan & Donald Wanjura, Dr. Daniel Upchurch, and Dr. John Burke

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Coyote™ Unattended Ground Sensor Network

Department of Defense – Army
U.S. Army Armament Research,
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Unattended ground sensors have been deployed since the Vietnam War to sense military targets such as tanks, tracked vehicles and infiltrators. Today, there is a growing need to use the technology for non-military border and infrastructure security. However, cost has been the limiting factor for wide-scale deployment of advanced sensing technologies, which have to overcome shortcomings of limited detection range, unreliable target characterization, and high associated battery costs. The Coyote™ Unattended Ground Sensor (UGS) Network is a state-of-the-art, joint sensor and communications system that is easy to deploy; resistant to security attacks; can reliably scale from small, focused targets to nationwide networks; and, most importantly, is cost-effective.

In 2007, Innovative Wireless Technologies (IWT) approached the Armament Research, Development and Engineering Center (ARDEC) with the idea that UGS technology, which both entities were jointly developing for Army applications, could be applied to other federal agencies and commercial needs. Working under a Cooperative Research and Development Agreement, ARDEC transferred technology to IWT, which provided funding for the sensor signal processing development. The resulting advances in the Coyote™ UGS gave it a greater than 95 percent detection and classification rate—at half the cost and more than five times the battery life of similar systems. IWT and ARDEC developed patents and patent disclosures, and are currently negotiating license agreements. The partners successfully manufactured a prototype in less than a year, and IWT has committed funding to ARDEC for further work to address other applications.

IWT's underlying communications platform allows it to rapidly transition Coyote™ to other applications. The Coyote™ has already been supplied to the Department of Homeland Security. The current result of the marketing has been that the Army has purchased 35 sensors, 2 repeaters, a gateway, and a server for its Homeland Defense Technology Facility, and plans to purchase 25 more sensor units. WIT also sold 16 units to the Canadian government for the Vancouver Olympic Games.

Border security, both here and abroad, represents a multi-billion dollar market for systems, according to *The Wall Street Journal*. The potential exists for tens of thousands of Coyote™ UGS Network systems to be sold in the U.S. alone. With sales to other countries, the market is estimated to be tens of millions of dollars.

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CBRN Unmanned Ground Vehicle

Department of Defense – Army
U.S. Army Edgewood Chemical Biological Center

Military and civilian first responders and HAZMAT teams must enter areas of suspected chemical, biological, radiological or nuclear (CBRN) hazards in order to use their handheld detectors, potentially placing them at risk. Sending a robot to conduct these sensitive site assessments can save lives while collecting the necessary data. The CBRN Unmanned Ground Vehicle (CUGV) enables personnel to conduct CBRN reconnaissance operations from a safe location.

The technology is a robotic integration of a sensor and sampling suite to provide remote detection of chemical warfare agents, toxic industrial chemicals, explosive vapors, gamma radiation, temperature and humidity through the hardware and software integration of commercial and military detection systems. The CUGV also provides the ability to capture evidence-quality air samples to prove the presence of hazardous vapors. The overall physical integration consists of a chassis-mounted payload box, which is the hub of the system, and multiple plug-and-play detector mounts that provide maximum operational flexibility. This system offers significant benefits to both military and civilian first responders and therefore represents a dual-use technology.

The Edgewood Chemical Biological Center (ECBC) Advanced Technology Demonstration (ATD) team was involved in all aspects of these technology transfer efforts, from providing CUGV technical data to other DOD organizations to collaborating with the iRobot Corporation to develop a commercial source of the technology for quick procurement by military and homeland security personnel in times of urgent need.

ECBC has forged new relationships with a number of government agencies via its collaboration with iRobot and the technical data transfers with other DOD agencies. Robots are an objective for the FY11-FY12 program for the military's joint Nuclear Biological Chemical (NBC) Reconnaissance System, as well as state and local entities that have expressed interest in this system. The robot is also featured in the Office of the Secretary of Defense Unmanned Systems Integrated Roadmap (FY2009-2034) as having a central role in meeting our country's security needs.

Although the robot cannot climb ladders or go through portholes, it also is not going to die—which makes it the preferred choice to send into an unknown environment.

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Chemical Agent Simulant Training Kit (CASTK)

Department of Defense – Army
U.S. Army Edgewood Chemical Biological Center

Handling chemical agent contamination is an important part of military and civilian first responder and HAZMAT training. However, exposure to even small amounts of real contaminants is impractical due to the risk of injury. Therefore, the need exists for a relatively harmless training composition that simulates the effects of such chemical contaminants without injuring trainees. The Chemical Agent Simulant Training Kit (CASTK) meets this need. Before, only the physical effect of decontamination procedures (i.e., soap and water, scrub brushes) could be evaluated. Now, training with the CASTK simulates the chemical contamination, its subsequent neutralization and its physical removal from humans and surfaces, all without injuring trainees.

CASTK is comprised of a vapor-generating component, a fluorescent dye detectable by ultraviolet (UV) light, and a solvent producing a uniform dispersion of the vapor and dye components. The specific mixtures are used to demonstrate the liquid or vapor behavior of G (nerve) and H (blister) agents and to simulate their neutralization when exposed to a decontamination solution. The fluorescent dye provides visual confirmation of both contamination and decontamination when irradiated by a UV lamp. CASTK compounds can be further adjusted using a thickener to provide solutions with varying viscosity properties. Hence, CASTK is a unique training system that provides a robust evaluation of a variety of chemical agent contamination conditions and an unprecedented measure of operational decontamination effectiveness using multiple fielded detection methods. More importantly, it supplies compositions that can be used to safely train military and civilian personnel in handling chemical agent contamination and decontamination of G and H agents, and it is nontoxic and environmentally safe.

The Edgewood Chemical Biological Center (ECBC) transferred this technology to Modec, Inc., which provides quality decontamination solutions to its customers. Modec needed a method to simulate contamination and wanted a license that would enable it to rapidly produce the desired product and quickly make it available to first responders. A nonexclusive Patent Licensing Agreement (PLA) was developed with Modec, involving two U.S. patents. Within four months of the PLA, CASTK had been commercialized and made available to Modec's private and government customers. ECBC continues to support Modec in improving the usability and marketability of CASTK. Over the next few years, Modec intends to release other CASTK-related products, especially special applications equipment and robust operational training manuals, to optimize CASTK performance in a variety of training venues. Civilian agencies such as the Department of Homeland Security have expressed interest in this product as a welcome adjunct to their existing hazard response training systems.

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Builder® Sustainment Management System

Department of Defense – Army
U.S. Army Engineer Research and Development Center - Construction Engineering Research Laboratory

From left: Lance Marrano and Michael Grussing

The Builder® Sustainment Management System (SMS) is a patented software application developed by the U.S. Army Engineer Research and Development Center – Construction Engineering Research Laboratory (ERDC-CERL). This technology integrates engineering, architectural, and management methods with database management software to provide facility engineers and managers with a science-based decision support tool for property maintenance and planning programs. The automated capabilities of BUILDER® provide technically sound guidance to users at roughly one-tenth the cost of traditional engineering evaluations. It stores detailed descriptions of individual components, their time in service, material type, and calculated life cycle. BUILDER® is designed to help facility engineers and managers effectively balance maintenance requirements with budget constraints.

In June 2008, the Army signed four technology transfer agreements with CALIBRE Systems, Inc., of Alexandria, Va. These agreements followed successful exploratory technology transfer efforts, including a 2007 Commercial Evaluation License for BUILDER® granted to Unity Consultants, Inc., which was subsequently acquired by CALIBRE. ERDC-CERL and CALIBRE, with assistance from TechLink of Bozeman, Mont., also have negotiated with several prospective users a commercial evaluation license for BUILDER® intellectual property for purposes of evaluating the latest version of the technology. This has proved to be a robust business strategy, and it is being applied to develop new technology partnerships based on BUILDER®. This initiative represents the first formal success based on a strategy of establishing nonexclusive licensing instruments intended to create a competitive market for the SMS. Unlike exclusive patent licensing, this approach supports the ERDC-CERL goal of ensuring that product will remain affordable for all prospective users. In spring 2009, a similar package of intellectual property agreements was signed with The Staser Consulting Group, LLC, of Anchorage, Alaska, providing momentum for this innovative and cooperative technology transfer model. License negotiations are underway with a third partner to broaden commercial distribution and provide BUILDER®-specific training with a customer help line. Five potential partners and licensees are currently interested in commercializing BUILDER®.

BUILDER® is now the enterprise standard for building maintenance for the U.S. Navy and Marine Corps. The Army, which has a compatible established roofing system, is expected to adopt BUILDER® as its enterprise standard in the near future. The Air Force is still piloting BUILDER® for potential service-wide implementation. The DOD is considering department-wide adoption of the product. These deployments would not have required a special technology transfer initiative because DOD owns the technology and software, but ERDC-CERL's technology transfer successes have prompted more extensive implementation of BUILDER® across DOD sites.

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Biological Formations and Techniques for Managing Aquatic Plant Pests

Department of Defense – Army
U.S. Army Engineer Research and Development Center - Environmental Laboratory

From left: Dr. Mark Jackson and Dr. Judy Shearer

Maintaining the quality and adequate flow of waterways is a high priority among landowners, communities, and others responsible for the management of water resources. Hydrilla (*Hydrilla verticillata*) is an especially troublesome aquatic weed that degrades water quality, displaces native aquatic plants, and reduces oxygen levels. Thick mats of hydrilla can reduce water flow rates by 90 percent, seriously impeding the productive use of canals, irrigation systems, and other waterways. Many water resources are diminished because hydrilla infestations cannot be remedied, despite millions of dollars spent annually on its management.

Aquatic-weed management has long been the focus at the U.S. Army Engineer Research and Development Center-Environmental Laboratory (ERDC-EL). ERDC-EL is the primary research entity for developing and evaluating new chemical and biological control techniques for aquatic systems in the United States. Because natural water bodies are sensitive ecological systems, any management technique used to reduce nuisance vegetation must be species-selective, while also minimizing any adverse impact to the aquatic environment and its users.

With the discovery that the biological fungal pathogen *Mycoleptodiscus terrestris* is effective against hydrilla, Dr. Judy Shearer recognized an opportunity to develop an alternative to the chemical herbicides typically employed in hydrilla management. In 2000, ERDC-EL and commercial partner SePRO Corporation of Carmel, Ind., executed a Cooperative Research and Development Agreement (CRADA) for development of the *M. terrestris* pathogen into a biologically based mycoherbicide for hydrilla management. Shortly thereafter, the U.S. Department of Agriculture's National Center for Agricultural Utilization Research (USDA-NCAUR) also entered into a CRADA with SePRO with the same objective in mind. The combined effort resulted in a patent that covers not only the fungus studied, but any fungus that produces microsclerotia in broth culture and can be used for aquatic plant control.

In 2005, this patent was licensed to SePRO Corporation, which then entered into additional CRADAs with each laboratory to support the continued research and development of *M. terrestris* into a commercial bioherbicide. Each new formulation of the mycoherbicide is evaluated at ERDC-EL for its effectiveness controlling hydrilla. The goal of this public-private research effort is the development of a commercial formulation capable of controlling hydrilla in larger bodies of water. Large-scale testing in 2009 brought the product closer to the Environmental Protection Agency's (EPA) required registration and widespread use in U.S. waterways.

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Corrosion-Resistant Ceramic-Porcelain Enamel for Bonding Concrete to Steel

Department of Defense – Army
U.S Army Engineer Research and Development Center - Geotechnical Structures Laboratory and Construction Engineering Research Laboratory

Deteriorating roads, bridges, piers, and airstrips have been ranked by the DOD Office of Corrosion Policy and Oversight as among the top 25 leading contributors to the $25 billion cost of corrosion for equipment and infrastructure as well as military readiness. A new technology transferred by the U.S. Army Engineer Research and Development Center (ERDC) meets the problem of deteriorating infrastructure where it begins—the reinforcing steel used in nearly all concrete construction. Two ERDC laboratories, the Geotechnical Structures Laboratory (GSL) and the Construction Engineering Research Laboratory (CERL), have developed a new coating for reinforcing steel that both reduces corrosion and improves the bond between the steel reinforcement and surrounding concrete.

The transferred technology fixes the corrosion problems through a revolutionary coating process by which advanced porcelain enamels are mixed with Portland cement and fused to the surfaces of structural steel components, such as steel fibers or rebar. The glass-ceramic coating protects the steel from rusting, and yields a concrete-to-steel bond three to five times stronger than the standard bond.

Widespread implementation of the technology will increase the strength, safety, and cost-effectiveness of roads, bridges, and other structures. At the same time, integration of this technology into construction practices will provide a whole new line of products for the enameling industry, thereby preserving and creating manufacturing jobs across America.

The ERDC team took an active and collaborative role in achieving the transfer—from the invention of the technology, to conceiving and successfully implementing a large-scale demonstration program, to partnering with Pro Perma Engineered Coatings, LLC, which supplied coated steel for the demonstration program, and enlisting the expertise of university faculty to further test and expand the technology. The laboratories used innovative licensing strategies and well-focused Cooperative Research and Development Agreements as their primary process for the transfer. This imaginative and truly revolutionary technology has been recognized by the chairman of the Federal Energy Regulatory Commission and the DOD for its great promise in saving the nation money and energy. It is the first critical step toward a far-reaching transformation that will vastly improve the integrity of our roads, bridges, and other essential structures and that will save resources, and even lives.

Left to right: Sean Morefield and Vincent Hock

Left to right: Dr. Phil Malone and Dr. Charles Weiss Jr., and Michael Koenigstein

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Modular Protective System

Department of Defense - Army
U.S. Army Engineer Research and Development Center - Geotechnical Structures Laboratory

From left to right: Bartley Durst, Jason Roth, Pam Kinnebrew and Toney Cummins

The Modular Protective System (MPS) is a space frame structural support and a lightweight, very high-strength, concrete-based composite armor panel. The system is easily shipped, two-man deployable, and capable of defeating the effects of direct and indirect fire munitions.

The MPS was developed in partnership with Concurrent Solutions, LLC (CS) and U.S. Gypsum (USG). Under a research contract awarded in FY2005, CS was actively involved in the original creation of the MPS frame design and was, in fact, a co-inventor on two patents. It has continued to be active in the development and implementation of the system, working closely with the Geotechnical Structures Laboratory (GSL) and USG, the laboratory's partner in developing the armor panel that fits into the frame system.

GSL entered into a Cooperative Research and Development Agreement with USG in 2005 to develop a manufacturable version of the laboratory's high-strength concrete armor panel. Within two years the partnership had developed a solution consisting of advanced composite materials capable of providing enhanced protection from shoulder-fired rockets, mortars, suicide bombs, small arms, and artillery threats. The frame system and armor panel materials are lightweight, man-portable and low-bulk, thereby reducing the logistics burden by approximately 80 percent over comparable solutions.

The modular protective system performance was demonstrated against rocket-propelled grenades, suicide bombers, and rocket artillery and mortar threats, resulting in Army Test and Evaluation Center-approved Capability and Limitations documentation. This documentation is required before materials can be fielded to the warfighter.

The direct recipients of the MPS technology are USG and CS. The two companies have established a business relationship whereby CS purchases armor panels from USG and assembles the kit, consisting of panels and frames, into an air-droppable package capable of being rapidly shipped and deployed. In 2008, CS successfully shipped the first production units to U.S. forces in Iraq.

The impact of this transfer to USG and CS has been an entirely new product and market for both companies. Although the primary customer at this time is the U.S. military, the market for this protective system includes state and local governments, law enforcement agencies, and any organization with people and assets that require protection from small arms, direct-fire weapons, and blast forces from bombs.

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D-FENS (Disinfectant Sprayer for Foods and Environmentally-Friendly Sanitation)

Department of Defense – Army
U.S. Army Natick Soldier Research, Development and Engineering Center

The U.S. Army has primary responsibility for ensuring food safety for the U.S. military. To protect the health and well-being of warfighters from the spread of food-borne illness in global deployments, the Army seeks or leads the latest improvements in convenient and effective technologies to sanitize foods and food contact surfaces, particularly in battlefield kitchens. Food safety expert researchers from the Natick Soldier Research, Development and Engineering Center (NSRDEC) have been working on solutions to this challenge. Specifically, NSRDEC researchers developed "D-FENS" (Disinfectant-sprayer for Foods and ENvironmentally-friendly Sanitation) as an innovative chlorine dioxide (ClO2) "green" technology that promotes the safety of human health and the environment. While D-FENS is directed toward food surface sanitization, it has additional applications in common living environments (e.g., showers, latrines) or combat surgical hospitals.

D-FENS uses a unique chemical combination and an innovative mixing method for producing ClO2 as an easily dispensable solution in convenient, small, batch-sized delivery systems. When combined with a collapsible spray bottle, the D-FENS technology significantly reduces the logistics issues associated with transporting disinfectants by providing a small, lightweight, "just-add-water" system. The chemical precursors are common reagents that controllably generate ClO2 onsite in neutral pH. ClO2 is a potent but user- and food-friendly disinfectant agent that readily kills molds, fungi, bacteria, and spores while still being safe for foods. Pre-existing commercial ClO2 technologies do not meet Army requirements for food sanitation because they use acids or require capital-intensive ClO2 generators. This conventional manufacturing process is frequently corrosive, costly, cumbersome, and completely unnecessary with D-FENS.

In May 2009, the D-FENS technology was transferred under a Patent License Agreement with ClorDiSys Solutions, Inc., a small business from Lebanon, New Jersey. This qualified licensee is incentivized to further refine the technology and its delivery system for the benefit of the consumer, and in doing so provide an environmentally friendly, noncorrosive product with superior surface-disinfectant properties, no unpleasant odor, and a controlled point-of-use generation of ClO2 with reduced logistics. These benefit both public and military consumers by reducing development risk, establishing economies of scale, and making products available to the government on an off-the-shelf basis.

Left to right: Dr. Christopher Doona and Florence Feeherry

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Self-erecting Bed Net

Department of Defense – Army
Walter Reed Army Institute of Research

An epic technology transfer journey that began as an idea 14 years ago has resulted in the fielding of a new personal protection shelter in Iraq and Afghanistan, and commercialization makes this same innovation available for use in your own backyard. A 1996 Cooperative Research and Development Agreement (CRADA) between the Walter Reed Army Institute of Research (WRAIR) and private industry resulted in a self-erecting bed net that folds down to Frisbee®-sized 12-inch-diameter packages that weigh only two pounds. When released, the bed net instantly pops up to its full size, ready for use on a cot or the bare ground. The invention could benefit millions of people around the world, including the inhabitants of countries plagued by insect-borne diseases, American military personnel, and even your next weekend camping expedition.

Anyone who has ever spent a night in a mosquito-infested environment understands the stress caused by the relentless buzzing and biting of insects. For most of us, the result is lost sleep. However, many parts of the world are held hostage by diseases transmitted through the bites of mosquitoes and other arthropods. Diseases such as malaria, dengue, and Yellow Fever present challenges in many parts of Africa, Asia, and South America. An estimated 500 million people contract malaria each year, and 1 million people, mostly children, die of the disease. Military campaigns have failed because of insect-borne diseases. Even in the 21st century, American military operations have been dramatically hindered by arthropods. Closer to home, West Nile and related afflictions have made headlines in recent years.

Acutely aware of the challenges posed by biting insects and concerned with the shortcomings of the military bed net in use at the time, Col. Raj Gupta of WRAIR assembled a team of outdoor product manufacturing and insect repellent experts under a CRADA in 1996 to develop a better bed net. The result of the collaboration was a revolutionary self-erecting bed net and a patent covering the invention. After years of refinement and testing in far-flung places such as Papua New Guinea and the Amazon Basin, Col. Gupta and the original CRADA partners succeeded in making the bed net available to U.S. troops. In 2008, both partners licensed the patent covering the technology. Today, nearly a decade and a half after the beginning of its technology transfer odyssey, the self-erecting bed net is widely used by the U.S. military and available for purchase by the public. Further enhancements to the bed net design by the licensees have created weatherproof tents that have also been transitioned back to the military and purchased by outdoor weekend warriors.

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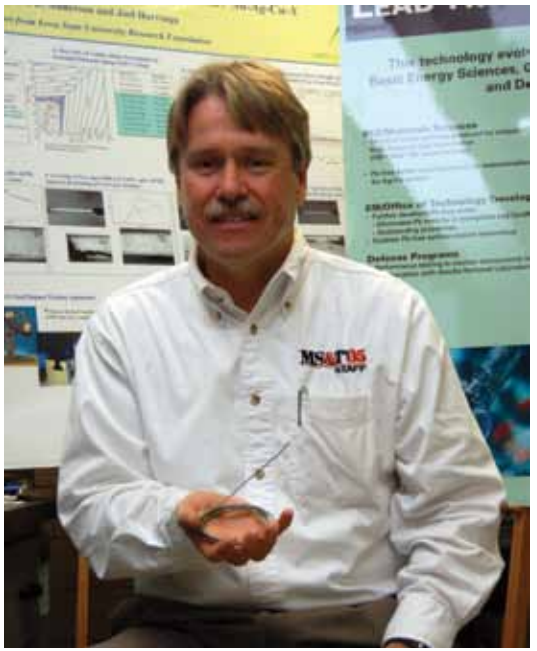
Lead-free Solder: A Revolutionary Solder Alloy

Department of Energy
Ames Laboratory

Dr. Iver Anderson and his team at Ames Laboratory developed a new metal for soft-soldering that combines tin, silver and copper in a novel alloy combination that is low melting, applies easily on typical metal joints, and has a reasonable cost. This revolutionary solder alloy replaces many uses of the traditional tin-lead low-melting solder, reducing further the number of lead toxicity hazards in our everyday environment. Of several lead-free alternatives, the Ames solder alloy formula is now considered a preferred lead-free solder by the worldwide electronics assembly industry, and can be found in many new consumer electronic items, including cell phones, TVs, and VCRs.

Long a proponent of technology transfer, Dr. Anderson worked directly with all three of the original licensees of the technology: Johnson Manufacturing of Princeton, Iowa; Loctite-Multicore Solders of Richardson, Texas and Great Britain; and Nihon-Superior of Japan to find new uses and make improvements. A subsequent sublicensing agreement greatly expanded the number of licensees to well over 60 worldwide, and gave industry and consumers an easy-to-use lead-free solder for many common uses. The rapid commercialization of this lead-free solder has helped reduce the amount of lead used in manufacturing electronics and other consumer goods, and has brought profits and jobs to the licensees and significant royalty income to Iowa State University and Ames Laboratory.

Ever since discovery of the tin-silver-copper solder, Dr. Anderson's group has worked to develop modifications to this base to improve the performance, ease of use, and durability. A subsequent patent was granted for additions, e.g., iron, cobalt, and other similar elements, to permit higher temperature applications of the solder. Most recently, the group has worked with Nihon-Superior support to pursue other solder alloy modifications, e.g., zinc, manganese and aluminum, that can give the tin-silver-copper solder joints enhanced impact resistance as well as high temperature tolerance. In fact, a manganese addition to a particular tin-silver-copper formulation also was found to reduce further the solder alloy melting point, and a patent application has been filed for this improvement. Such manufacturing improvements and higher performance can expand the range of possible consumer applications, for example, more rugged electronic sensors and control assemblies for SUVs and cars.



Dr. Iver Anderson

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ENDURE™ SCR Catalyst

Department of Energy
Los Alamos National Laboratory

From relative obscurity to the oil and gas fields of Wyoming, a Los Alamos National Laboratory (LANL) emissions reduction technology has finally hit the marketplace and found its way into Caterpillar products.

For several years, LANL has been collaborating with Santa Fe, New Mexico-based CleanAIR Systems, Inc., to commercialize a novel technology that virtually eliminates nitrogen oxides (NOx) from engine exhaust streams. In 2008, CleanAIR signed an agreement with the Laboratory for an exclusive patent license for use of the technology.

Developed by Dr. Kevin C. Ott, the ENDURE™ SCR Catalyst operates over a full range of temperatures—from 150 degrees Celsius to more than 540 degrees Celsius—and reduces NOx emissions by up to 95 percent. Unlike competing solutions, the ENDURE™ system does not consume additional fuel, retaining diesel's inherent efficiency. CleanAIR is developing the technology for applications in stationary diesel and natural gas engines, pipeline compressors, on- and off-road equipment, and gas turbines.

Established in 1993, CleanAIR Systems manufactures emissions control systems that are distributed worldwide. Its products are designed to control air pollution such as diesel particulate matter, carbon monoxide, and NOx from internal combustion engines and gas turbines. The company recently introduced a new product that incorporates the LANL technology called the E-POD™—a hybrid technology designed for large diesel and natural gas stationary engines that dramatically reduces emissions. Installation of the new system has recently been completed on seven Caterpillar 3512 diesel generator set units operating on drill rigs in Wyoming's Pinedale Anticline Project Area (PAPA).

In 2008, the Caterpillar Corporation announced its selection of CleanAIR as its strategic alliance partner for emissions control products. CleanAIR President Michael Roach said, "The alliance will increase our market exposure as well as introduce CleanAIR products to Caterpillar dealers around the world." CleanAIR is one of a few companies that manufactures its products locally with high-paying jobs and good benefits—in an industry that is also clean.

Dr. Kevin Ott

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Hyperion Power Module

Just as the personal computer changed the world of main frames and grew into the Internet, so will the Hyperion Power Module (HPM) reactor change the world of civilian power reactors and grow into true distributed electrical generation. This technology transfer from Los Alamos National Laboratory (LANL) will change the way the world looks at nuclear power specifically and electrical infrastructure in general.

Imagine the availability of a clean, safe, affordable nuclear power generator for remote locations across the globe that avoids the need for the costly and complex construction of massive conventional fossil-fueled or nuclear power plants. Conventional nuclear reactors cost billions of dollars to build and are designed to serve large regions. The HPM will be the world's first small mobile reactor—taking advantage of the natural laws of chemistry and physics while leveraging all of the advances in engineering and technology achieved over the past 60-plus years.

Conceived at LANL, the intellectual property portfolio for the HPM was licensed exclusively to Hyperion Power Generation, Inc., in 2008.

The HPM uses the energy of low-enriched uranium fuel and meets all of the nonproliferation criteria of the Global Nuclear Energy Partnership. Each unit will produce 70 megawatts or 27 megawatts electric—enough to provide electricity for 20,000 average American-sized homes or the industrial equivalent. Approximately 1.5 meters (slightly less than 6 feet) wide by 2 meters tall (slightly over 6 feet), the units can be transported by ship, rail, or truck to produce power for five to seven years depending on usage.

Over a hundred letters of interest to purchase the HPM have come in from communities and industries on every continent. The HPM will be installed wherever power is needed—remote industrial operations, remote military installations, communities looking to supplement grid-supplied power, and oil and gas recovery sites. The HPM can make clean, affordable power a reality in places where it was never before thought possible.

From left: Dr. Turner Trapp and Dr. Otis Peterson
Not pictured: Patrick McClure

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VE-PSI: Virtual Engineering Process Simulator Interface

Department of Energy
National Energy Technology Laboratory

From left: Kenneth Bryden, Dr. Douglas McCorkle, Dr. Stephen E. Zitney, and Terry Jordan

The National Energy Technology Laboratory (NETL) and its R&D collaboration partners, Ames Laboratory and Reaction Engineering International, developed Virtual Engineering Process Simulator Interface (VE-PSI) software to facilitate the collaborative design of next-generation energy plants within a virtual engineering environment.

Meeting the increasing demand for clean and affordable energy while addressing climate change is arguably the most important challenge facing the world today. Using VE-PSI, energy plant design engineers can integrate, analyze, and optimize a wide variety of modeling and simulation data within an immersive, interactive, three-dimensional (3D) virtual environment. Such capabilities provide engineers with the ability to create virtual prototypes of new plant designs more quickly and efficiently, and at less cost than ever before, as well as improve existing designs before expending time and materials on physical prototypes. At NETL, system analysts are applying the VE-PSI technology to develop high-efficiency, near-zero emission plants such as the DOE's FutureGen coal-fired, gasification-based plant with combined-cycle electricity generation, and capture and sequestration of carbon dioxide emissions.

To facilitate effective technology transfer, VE-PSI is offered as open-source software within the Virtual Engineering Suite (VE-Suite), and it is available for download at http://www.vesuite.org. This has allowed flow of the technology to academia, national laboratories, and industry, as well as enabled a reverse flow of technology into VE-PSI from external researchers. At the DOE's Idaho National Laboratory (INL), researchers are applying VE-PSI to develop integrated virtual engineering simulations for bioenergy applications. Together with researchers from Ames, NETL is applying VE-PSI to couple Aspen Plus® process simulations and FLUENT® CFD equipment models with 3D plant-wide CAD models of integrated gasification combined-cycle (IGCC) systems in VE-Suite software. At ALSTOM Power, a major worldwide industrial player in equipment and services for power generation, design engineers are applying VE-PSI for a wide variety of advanced energy applications, including natural gas combined cycles, coal-fired oxy-combustion power plants, and chemical looping combustion and gasification systems.

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High-Pressure Enzymatic Digestion System

Department of Energy
Pacific Northwest National Laboratory

Protein analysis is vastly important to biological sciences, as it allows researchers to examine the makeup and function of tissues and organisms on a subcellular level. This area of study permits virtually limitless applications, including disease detection, genetic evaluations, and pharmaceutical development. Analysis methods in the previous 20 years have evolved significantly in terms of speed, measurement, accuracy and sensitivity. By contrast, the upstream portion of protein analysis—protein digestion—has seen limited evolution and has been a barrier to high-throughput protein analysis.

In traditional protein digestion methods, a specialized group of enzymes, proteases, cuts the proteins into peptides. For these reactions to be as complete as possible, the reactions are completed overnight. The high-pressure enzymatic digestion system, developed by researchers at Pacific Northwest National Laboratory (PNNL), uses elevated pressure supplied by a Barocycler® to complete protein digestion in less than 60 seconds and, in some cases, results in a greater number of peptides for analysis. Because of its speed, the high-pressure protein digestion allows higher throughput, which increases the volume of studies involving protein digestion, reduces the cost of analyses, and allows for a quicker diagnosis in clinical applications. Other contemporary methods may take hours and often do not provide quality consistent with the high-pressure enzymatic digestion system or with traditional overnight protein digestion.

This technology was licensed to Pressure BioSciences, Inc. (PBI), a publicly traded company that specializes in products for use in biological applications. Licensing negotiations began in October 2008 and concluded in December 2008. The speed at which the agreement was placed reflects the business-oriented relationship between the two organizations. It also emphasizes that a federal laboratory is agile and responsive to the needs of its business partners.

PBI and PNNL also collaborated to develop the technology for market applications. As a result of this joint work, PBI introduced three products directly related to the technology transfer shortly after the execution of the license agreement. PNNL researchers continue to assist PBI in the development of this technology, and both organizations also continue to collaborate in marketplace awareness. As an example, PNNL scientists have been introduced via PBI to new contacts in the proteomics and biological research community. These contacts include scientists from the Harvard School of Public Health, the Harvard School of Dental Medicine, and Thermo Fisher Scientific, Inc.

Daniel López-Ferrer

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Laser Shock Peening for Pilger Dies

From left: Eric Lund, David Lahrman, Elizabeth Stephens, Robert Johnson, Richard Tenaglia, Mark T. Smith, and Curt Lavender

A team of personnel from Pacific Northwest National Laboratory (PNNL), Sandvik Special Metals, LLC (SSM), and LSP Technologies, Inc. (LSPT) collaborated on a laser shock peening (LSP) method to increase the life of tool-steel dies used in the cold-pilgering process. The demonstrated increase in tool-steel die life improved productivity, created new market opportunities, and enhanced PNNL's ability to support its energy mission.

Cold pilgering, or tube reducing, is a room-temperature, cyclic metal-forming process by which metal tubing is reduced in cross-section by a combination of wall thinning and diameter reduction. The pilgering process normally produces seamless, high-strength tubing used in critical applications such as aircraft hydraulic lines, where high fatigue strength is necessary. Additional applications for pilgered tubes include commercial heat exchangers, zirconium nuclear fuel cladding, and aircraft engines.

The cyclic process of rolling a set of pilger dies multiple times to reduce tubing leads to failure of the dies by fatigue, stress cracking, and/or corrosion fatigue. The expected failure mechanisms for pilger dies can be mitigated by introducing a surface compressive residual stress. However, conventional methods that produce compressive residual stresses in metals are limited to low-strength materials such as aluminum or titanium, produce shallow stresses removed during polishing, or cannot accommodate complex geometries.

LSP is a new process that uses a series of high-intensity laser pulses to generate deep, compressive residual stresses in a specified location on a component surface. The application of these stresses mitigates the expected failure mechanisms that reduce pilger die life and allows the die to be ground, polished, or "benched" after application of the LSP process. Depending on the die configuration and LSP processing conditions, pilger die life has been increased by up to six times that of an untreated pilger die.

Enhanced pilger die life has reduced tooling cost and the need for tool changes at SSM, resulting in increased productivity and improved worker safety. Increased pilger die life and the ability to generate deep, compressive stresses in tool steels was published in the *Journal of Materials Processing Technology* in 2008 and has created additional market opportunities for LSPT. The demonstration of deep, compressive stresses in tool steels has given PNNL the opportunity to create a series of new projects in the transportation sector in support of the U.S. Department of Energy's mission for reduced greenhouse gas emissions, reduced dependence on foreign oil, and overall fleet fuel economy improvements.

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Red Storm Massively Parallel Processor Supercomputer Architecture

Department of Energy
Sandia National Laboratories

In 2004, renowned supercomputer maker Cray, Inc., launched the initial product in what would become the most successful commercial massively parallel processing systems in history. The Cray XT supercomputer resulted from a unique partnership between Sandia National Laboratories and Cray. Sandia supplied the system's architectural design and several fundamental technologies to Cray. They then collaborated closely to deploy the prototype system, called Red Storm, at Sandia. Under the partnership, Sandia and Cray hold some Red Storm patents jointly, while others are used under license. Cray commercialized the Red Storm architecture as the Cray XT3, which has since led to two follow-on products, Cray's flagship XT4 and XT5 systems.

The success of the technology transfer relationship can be measured in several ways. First, Red Storm enabled Sandia and the Department of Energy to meet their computing needs for modeling and simulation in science, engineering, and national security. These complex simulations can require tens of thousands of processors working in parallel for several weeks on a single problem. The Red Storm architecture was designed to provide a level of scalability and performance beyond anything available at the time, and the system that embodied this architecture did just that. Remarkably, the time from Red Storm's initial development until its deployment was less than three years—well short of the typical vendor schedule for constructing a system from scratch.

The economic benefits of the Sandia/Cray partnership are significant. Before collaborating with Sandia, Cray was struggling in the small and volatile supercomputing market. In the four years since introducing the XT, Cray sold more than 1,000 XT cabinets to more than 30 sites, making it their most successful product ever. The XT line put Cray on a path to profitability, returning it to viability in supercomputing, with approximately $800 million in revenue, representing 80 percent of their business since 2004.

Red Storm's impact on the scientific community has been substantial and far-reaching. Systems based on the Red Storm architecture provided numerous scientific breakthroughs and allowed applications to achieve unprecedented scalability and performance. In addition to building several of the most powerful supercomputers in the world, Cray fielded an XT platform at Oak Ridge National Laboratory that was used in winning the most prestigious parallel computing performance award, the Gordon Bell Prize, in 2009.

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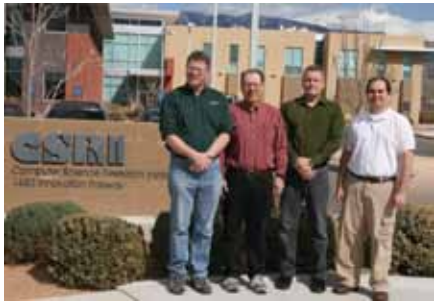

From left: Lee Ward, Jim Tomkins, Jim Laros, and Kevin Pedretti
Not pictured: Bill Camp, Bob Balance, Bob Benner, Trammell Hudson, Paul Iwanchuk, Mike Levenhagen, Lee Ann Riesen, Len Stans, Keith Underwood

From left: Ruth Klundt, Courtenay Vaughan, Patricia Brown, Dr. Cynthia Phillips, Gerald Quinlan, Linda Bonnefoy-Lev, Dr. Vitus Leung, Ron Brightwell, Dr. Rolf Riesen, Sue Kelly, and Dr. John VanDyke

Stirling Energy Systems Strategic Partnership

The technology transferred in Sandia National Laboratories' strategic partnership with Stirling Energy Systems, Inc., consists of jointly developed unique expertise in concentrating solar power (CSP) and related intellectual property (IP) created and owned by Stirling. Sandia provided use of the unique, state-of-a-art user facility, the National Solar Thermal Test Facility (NSTTF), thereby making available space, equipment, and access to qualified technical personnel to assist Stirling with developing, testing and refining its dish engine CSP system. The longstanding partnership between Sandia and Stirling has resulted in full commercialization of a new CSP system, SunCatcher™.

The Sandia CSP team provided Stirling with technical assistance and consultation, which led to a Cooperative Research and Development Agreement providing Stirling with a user facility for ongoing iterative testing of designs. In addition, Sandia leveraged a DOE contribution of $1 million, complemented by $100 million from Stirling in the form of CSP hardware, software, and personnel onsite; guided a redesign of the solar optics to improve efficiency and increase manufacturability; and consulted on ways to reduce the complexity, weight, and volume of parts in the system to cut maintenance costs.

Moreover, the DOE fostered the partnership by waiving Sandia's rights to any IP developed—a big incentive for Stirling. Another innovative technology transfer method was hands-on collaboration, which helped to ultimately improve and create a better understanding of solar optics, engineering efficiency, manufacturing feasibility, balance-of-systems, and environmental impact. This collaboration and mutual exchange meant that the technology transfer mutually benefitted both public and private entities.

The benefit to the company and the nation is the introduction of SunCatcher™, a viable technology option for efficient electricity generation. SunCatcher™ begins large-scale commercial deployment in 2010 in California, generating more than 400 construction jobs, 180 permanent jobs, and millions of dollars in wages and taxes. By the end of 2012, these dishes will produce 1,000 megawatts, enough energy to power 800,000 homes.

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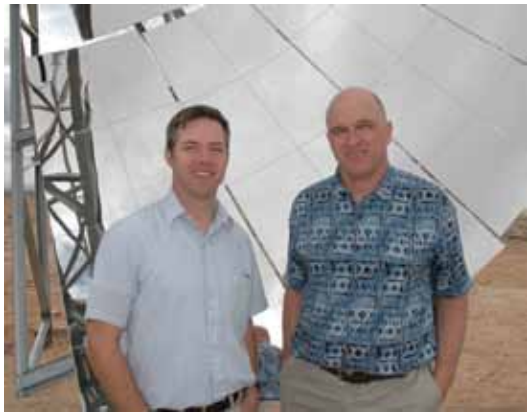


From left: Kirby Hunt and Dr. Charles Andraka

Dan Sanchez

HIV Incidence Assays: Distinguishing Recent from Long-Term HIV Infections

Department of Health and Human Services
Centers for Disease Control and Prevention

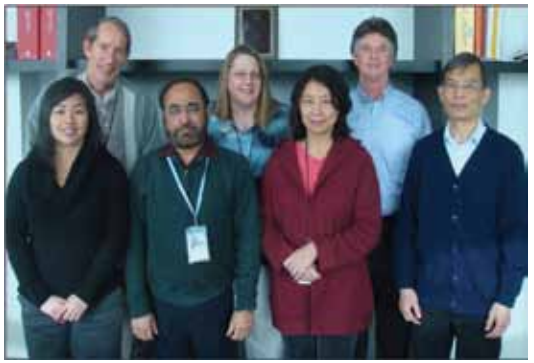
The 2008 report on the global AIDS epidemic found that since 1981 HIV caused an estimated 25 million deaths worldwide. Despite the success of antiretroviral drugs in slowing the rate of AIDS deaths, HIV still remains a very challenging public health problem. As of 2007, about 33 million people in the world were living with AIDS. There is an incredible need for improved diagnostics to provide more rapid and sensitive identification of the virus and help control the continued spread of HIV.

New HIV infections occur faster than people can be treated, and such infections must be prevented to control the epidemic. Recognizing the most recent infections at the individual level would allow prevention programs to target those areas more effectively. This could then slow the HIV infection rate dramatically.

Dr. Bharat Parekh of the Centers for Disease Control and Prevention (CDC) led a team that developed several unique tests that not only detect HIV-1, but also identify how recently a person has been infected with it, thus allowing for identification of HIV infection hot spots. The CDC scientists created a unique multi-subtype recombinant protein, developed from HIV-1, that could identify all strains of HIV-1. The new protein can be expressed and purified from E. coli, which greatly simplifies the production process while enabling production of substantially larger quantities of protein.

Dr. Parekh disclosed his inventions to the CDC Technology Transfer Office, which resulted in licenses to companies in the United States, Ireland, India, and China. He provided these companies with information and biological materials to replicate the tests. His laboratory members trained key scientists from the companies in a hands-on approach to ensure the successful transfer of technology. CDC staff worked closely with company personnel to ensure the consistency of the test kits developed for all of the testing assays.

Dr. Parekh's efforts led to groundbreaking assessments of new infection rates in the United States and South Africa. His tests have been used in many countries, including Brazil, India, China, Thailand, Botswana, Ethiopia, Germany, Peru, and Canada. Currently, he is transferring new technologies to the companies for newer improved test kits. The result of this technology transfer will lead to better detection and surveillance of HIV, thereby indicating where prevention programs should be implemented.



From left: (front row) Yen Duong, Bharat Parekh, Xierong Wei, Chou-Pau Pong, (back row) Steve McDougal, Trudy Dobbs, Timothy Granade
Not pictured: Susan Kennedy, Xin Liu, Debra Kuehl, Shon Workman

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Innovative Techniques and Reagents for Improved Genetic Engineering

Department of Health and Human Services
National Cancer Institute

The development of restriction enzyme technology in the 1970s was a breakthrough in genetic engineering. For the first time, scientists were able to cut DNA at specific sites and insert sequences with matching ends. However, the technology was limited to insertion at particular sites in the host vector, and the size of the inserted DNA quickly became a limiting factor. The National Cancer Institute's (NCI) solution is a technology that consists of three specialized bacterial strains and seven plasmids, developed around a genetic system in *E. coli* that was harnessed into an enabling platform technology, allowing for highly efficient, rapid, and direct manipulation of larger DNA sequences (up to 100kb) than previously enabled by conventional molecular biology methods. This system, called recombineering, has revolutionized genetic engineering techniques, including the modification of genes on bacterial artificial chromosomes (BACs) and the generation of conditional knockout mice.

The research community has enthusiastically received this technology, and over 1,100 nonprofit researchers thus far have received the materials. The technology transfer efforts initially focused on the negotiation of individual Material Transfer Agreements with each recipient. However, growing interest created the need for a simple and streamlined process, leading to deposit of the materials in the NCI's Preclinical Repository in 2007 and making the NIH Simple Letter Agreement available online. This has greatly expedited transfer of the materials. In addition, the inventors have three issued patents and several applications pending, and the technology has been nonexclusively licensed to 18 commercial entities.

The NCI team continues to develop the technology, making improvements to the initial bacterial strains that have resulted in a "second generation" set. The laboratory continues to use the technology in research on gene regulation and initiation of transcription and translation, and it has been the subject of over 125 publications by both the inventors and outside investigators. Other diverse uses of the technology include stem cell research, genetic studies in model organisms, creation of research tools such as transgenic mice and specialized imaging vectors, and high-throughput screening.

Dr. Donald Court and Nina Constantino

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Cell Line Bank for Cancer Research

Cell lines are important biomedical tools that have revolutionized the way researchers study diseases. Human tumor cell lines can be used as in vitro model systems of cancer that are able to simulate how the disease behaves in the body. The National Cancer Institute (NCI) has approximately 439 human tumor cell lines that have an important application as research tools to study a variety of cancers. The majority of the cell lines were cultured from lung cancer tissue, but they can be used to study many tumor types.

The cell line bank, which began in 1976, is the result of exhaustive efforts by NCI scientists to provide the research community with comprehensive biological tools to study several cancer types. These cell lines contain a mutation that makes the cells sensitive to the presence of growth-inhibiting drugs, and they are valuable in identifying compounds with a therapeutic potential against cancer. Scientists can use the cell lines to screen thousands of compounds for anti-cancer activity. Five of the cell lines were made a part of the NCI 60 cell line screen, the most extensively profiled set of cancer cells in existence.

Transfer of these cell lines to the research community involved a variety of mechanisms, including consolidating them into one umbrella Invention Report in 2007. This aggregation allowed researchers easier access to any of the 400 plus lines contained in the invention without having to negotiate separate agreements for each line.

In order to transfer the cell lines to nonprofit entities, 63 Material Transfer Agreements (MTAs) were negotiated by NCI's Technology Transfer Center. Additionally, thousands of MTAs for the cell lines have been executed by American Type Culture Collection, a repository for biological materials. The cell lines were distributed to for-profit entities through 17 Biological Material Licenses negotiated by the National Institutes of Health's (NIH) Office of Technology Transfer. Four Commercial Evaluation Licenses were used to grant the nonexclusive right to evaluate the technology's commercial potential. In addition, nine licenses are currently being negotiated.

Although the technology is a research tool, significant tangible benefits have already been realized from its transfer. These cell lines have been the subject of more licenses than any other biological material at NCI and have netted approximately $350,000 in royalties that will be used to further NIH's mission. Several of the cell lines have each been cited in over 100 publications and numerous patents. In fact, numerous etiologic lung cancer genes published over the past two decades were either discovered or validated using these cell lines. Significant breakthroughs have resulted from the transfer of this technology, and it appears there is wide potential for future research and further opportunities for technology transfer.

Not pictured: Dr. Frederick Kaye, Dr. John Minna, and Dr. Bruce Johnson

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PROSTVAC, a Therapeutic Vaccine for Treating Prostate Cancer

Department of Health and Human Services
National Cancer Institute

Dr. Jeffrey Schlom

Prostate cancer is the most common non-skin cancer of males in the U.S., and is responsible for more deaths than any other cancer, except lung cancer. Cancer vaccines, which harness the body's immune system to identify and destroy cancer cells, have emerged as a promising new approach to fighting prostate cancer. One approach to cancer vaccination involves identifying antigens from cancer cells and immunizing cancer patients against those antigens to stimulate the body's immune cells to attack and kill the cancer cells.

This technology describes PROSTVAC, a therapeutic vaccine developed by Dr. Jeffrey Schlom and his colleagues that induces a specific, targeted immune response that attacks prostate cancer cells. PROSTVAC was initially developed by the NCI through a Cooperative Research and Development Agreement (CRADA) and license partnership with another company. Once the CRADA ended, NCI then worked diligently to enable PROSTVAC development to continue. BN ImmunoTherapeutics (BNIT), a small U.S.-based vaccine pharmaceutical company, was selected as the commercial partner.

The collaboration has led to the development of a therapeutic vaccine with the potential to revolutionize how researchers and physicians fight prostate cancer. Numerous clinical trials have shown that in addition to having a very good safety profile, PROSTVAC appears to be an effective option for the treatment of advanced prostate cancer. Data from a multicenter, randomized Phase 2 study of 125 patients with metastatic prostate cancer showed that individuals treated with PROSTVAC increased overall survival by 8.5 months compared to the control group. This promising data will be used to improve all aspects of the technology, including safety, efficacy, and clinical trial design.

A variety of clinical studies are ongoing and being planned to develop PROSTVAC to the point where it can benefit the general public suffering from prostate cancer. A Phase 3 study for FDA approval is scheduled to begin this year.

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Balanced Flow Meter

The balanced flow meter is a unique, multi-hole orifice plate that determines the fluid flow rate in piping, channel, and conduit systems. It provides highly accurate flow metering, flow limiting, or flow conditioning in any fluid flow system. The balanced flow meter's design provides ten times the accuracy of standard orifice-based fluid flow meters, resulting in significant cost-savings to industries such as gas and oil refineries. The technology also has none of the moving parts that are in other metering systems, making it more reliable, less likely to malfunction, and less expensive to manufacture. Other significant benefits include considerable noise reduction and an ability to be used in different systems without modifying the hardware.

This patented technology was transferred by the Marshall Space Flight Center (MSFC) to Quality Monitoring and Control (QMC) of Kingwood, Texas. QMC participated in testing and evaluation while under contract to MSFC, often utilizing its Compressed Air Gas Flow Facility. The company developed the commercialization plan, licensed the technology from MSFC, ultimately created A+FlowTek to commercialize the devices, and has marketed and sold the product globally.

The transfer of the balanced flow meter technology has proven successful. Users of the NASA innovation are experiencing ten-fold accuracy and dramatic cost savings due to decreased energy consumption. This lower energy consumption is also reducing the pollution produced by the many plants and industries that have applied the balanced flow meter. Sales have been made across the U.S., and in countries such as Venezuela, Chile, Saudi Arabia, and China. Using its first-year measured savings, one chemical company has projected a three-year life-cycle cost savings of $5.4 million—all for an initial investment of only $5,000!

With the development of the balanced flow meter, MSFC has either established new or expanded existing relationships with a wide variety of entities, including the U.S. Consumer Product Safety Commission, the National Institute of Standards and Technology, U.S. Navy, Texas A&M University, and private companies such as XCOR Aerospace, Aerojet, and Trilogy Pools.

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2010 FLC Awards

Evaluator Panel—Awards for Excellence in Technology Transfer

Representing a cross-section of federal laboratories, industry and academia, the members of the Evaluator Panel enthusiastically devoted their time and effort to judge the dozens of nominations submitted for the Awards for Excellence in Technology Transfer. Selecting the winning technologies was a difficult task, but these evaluators admirably rose to the challenge. The FLC recognizes their tireless efforts and expresses its gratitude.

Tom Anyos, Technology Ventures Corporation

Sharon Borland, U.S. Geological Survey

Alison Brown, NAVSYS Corporation

Lee Cheatham, Washington Technology Center

Joshua Forbes, TechLink

Alex Johnson, Marger Johnson & McCollom PC

Danny Kowalski, Department of Defense

Mark Langguth, Argonne National Laboratory

Landris Lee, U.S. Army Corps of Engineers

Andrew Loebl, Oak Ridge National Laboratory

Terry Lynch, National Institute of Standards and Technology

Susan McRae, Army Space & Missile Defense Command

Marlene Owens, Department of Homeland Security

Brad Parish, Industrial Development Institute

Keith Quinn, Air Force Research Laboratory - Propulsion Directorate

Johnette Shockley, U.S. Army Corps of Engineers

Maurice Smith, National Nuclear Security Administration - Kansas City Plant (retired)

Dr. Herbert Spiegel, Applied Science & Technology Associates, Inc.

Susan Sprake, Los Alamos National Laboratory

Dr. Thomas Stackhouse, National Cancer Institute

Larry Steele, Skymetrics, Inc.

John Stockinger, National Nuclear Security Administration - Kansas City Plant

Mark Surina, The MITRE Corporation

Kathryn Townsend, Naval Meteorology and Oceanography Command

Tim Wittig, Technology Management Advisors - SAIC

2010 FLC Awards

Interagency Partnership Award

Department of Agriculture

Agricultural Research Service

Department of Defense

U.S. Army Medical Research Unit, Kenya

U.S. Central Command

Walter Reed Army Institute of Research

Department of Health and Human Services

Centers for Disease Control and Prevention

CDC Kenya Medical Research Unit

National Aeronautics and Space Administration

Goddard Space Flight Center

To address the threat of the globalization of Rift Valley fever (RVF), a very serious, often fatal, viral disease of domestic animals and humans that occurs throughout sub-Saharan Africa and the Middle East, a team of scientists from the U.S. Department of Agriculture's Agricultural Research Service (ARS), NASA, the Department of Defense (DOD), and the Centers for Disease Control and Prevention (CDC) developed a highly innovative and effective method to forecast RVF outbreaks based on global climate conditions that determine the local and regional ecological conditions leading to the emergence of the virus in Africa.

Using satellite measurements of global and regional elevated sea surface temperatures, and subsequent elevated rainfall and satellite derived-normalized difference vegetation index data, the team developed a model and surveillance system to predict, with lead times of two to four months, specific areas where outbreaks of RVF in humans and animals were expected in the Horn of Africa, Sudan, and Southern Africa at different time periods from September 2006 to February 2009. Predictions were first confirmed by entomological investigations and subsequently by field investigations of virus activity in the areas the team identified by reported cases of RVF in human and livestock populations.

The team's early warning technology was transferred via direct alerts to international and national agricultural and health authorities, websites, and international presentations and publications. The United Nations Food and Agricultural Organization (FAO) and World Health Organization (WHO) issued, for the first time in their history, warnings of an impending RVF outbreak. In response to this international warning, national authorities in Kenya and neighboring countries, and collaborating components of the CDC, DOD, and ARS initiated surveillance activities in risk areas, eventually detecting the virus in mosquitoes in December 2006, weeks prior to subsequent reports of unexplained hemorrhagic fever in humans in this area.

Subsequent response and mitigation efforts in at-risk areas included initiation of enhanced surveillance activities, distribution of mosquito nets, dissemination of public information to mobilize social and cultural activities directed at reducing human contact with infected animal products, and implementation of domestic animal vaccination and mosquito control programs. As a result, the number of human and animal cases of RVF that occurred was 10- to 100-fold fewer than previous outbreaks when no early warnings were given.

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From left: Allen Hightower, Dr. Kenneth Linthicum, Dr. Robert Breiman, Dr. Seth Britch, and Edwin Pak

From left: Dr. Compton James Tucker, LTC Jason Richardson, Jennifer Small, and MAJ David Schnabel

Department of Defense

Office of Naval Research

Air Force Research Laboratory

Department of Energy

Los Alamos National Laboratory

National Energy Technology Laboratory

Oak Ridge National Laboratory

Dream teams are what legends are made of—and not just in the sports arena. Take, for instance, the highly productive, skilled, motivated, and independent players who successfully came together to transfer critical technology resulting in yttrium barium copper oxide (YBCO) high temperature superconductor (HTS) coated conductor wire. This union between the Department of Defense (DOD) and the Department of Energy (DOE) comprised personnel from science, technology, military, industry, and business under the administration of the Defense Product Act (DPA) Title III program. The overall Title III program directive is to create viable commercial production capabilities and capacity of HTS YBCO, an enabling technology for several military and industrial applications that will eventually save billions of dollars annually by increasing energy efficiency and reducing pollution.

In this project, Title III and the DOE identified and ultimately worked with two commercial vendors to produce HTS YBCO wire: American Superconductor (AMSC), based in Devens, Mass.; and SuperPower, Inc., based in Schenectady, N.Y. Each company sought to utilize its unique manufacturing capabilities to achieve the goals set forth by the joint steering group comprised of individuals from DOD and DOE, national laboratory representatives, and Title III. These goals included sets of performance metrics such as conductor length, critical current, engineering current density, production capacity, and business metrics for long-term viability such as sales, production capacity, and cost.

While creating affordable production lines of HTS YBCO coated conductor wire was important, having a market in which to sell it was essential. To ensure market viability, system integrators and manufacturers worked together to provide "no kidding" demonstrations of the HTS YBCO wire's capabilities to industrial users, utility companies, and the military that, once implemented, stand to save billions in energy costs.

Both SuperPower and AMSC are working with multiple customers using HTS YBCO wire. Among the products that have greatly benefited are power generators, motors, power cabling, transformers, fault current limiters, and magnets. Notable production projects include the recently announced renewal energy market hub to be built in Clovis, New Mexico. AMSC joined forces with the Tres Amigas Project to unite America's three power grids for the first time, enabling faster adoption of renewable energy.

This partnership created a mechanism and a forum for very different missions to come together to produce a valuable product with immeasurable potential impact. The added benefit of having two independent businesses working to produce and deliver HTS YBCO ensures the DOD and other customers an ample supply of HTS conductor. The successful production of high-volume, high-quality, and affordable HTS YBCO is a direct result of the teamwork exhibited throughout this project.

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From left: Dr. Charles Oberly, Dr. Dean Peterson, Debbie Haught, and Donald Geiling

From left: Dr. Paul Barnes, Robert Hawsey, Scott Littlefield, Ted Finnessy, and Timothy Peterson

2010 FLC Awards

Outstanding Technology Transfer Professional Award

Dr. Richard Brenner

U.S. Department of Agriculture
Agricultural Research Service

Dr. Richard Brenner oversees and manages the Agricultural Research Service (ARS) Office of Technology Transfer (OTT). In this capacity, he represents the Secretary of Agriculture on issues pertaining to the management of intellectual property arising from USDA research, and he has the delegated authority for licensing inventions developed through intramural research in any of the USDA agencies.

Dr. Brenner provides leadership and the structure for ARS-OTT, which is centralized in policy and procedures but maintains 100 locations nationwide to provide one-on-one customer service to ARS researchers. From technology transfer coordinators to patent advisors to licensing specialists, he has first-line and secondary supervisory authority over these professionals and is involved daily in issues that directly affect the technology transfer process. During FY 2009, the organization that Dr. Brenner oversees signed 69 Cooperative Research and Development Agreements (CRADAs), bringing the total of active CRADAs to well over 200, with revenues of more than $6.3 million. During this same period, ARS-OTT filed 117 patent applications and received 21 patents from the U.S. Patent and Trademark Office, in addition to signing 25 license agreements.

Another of Dr. Brenner's accomplishments was establishing the Agricultural Technology Innovation Partnership (ATIP) program to facilitate the adoption by private-sector companies of ARS research outcomes for the commercial production of goods and services. In launching ATIP, Dr. Brenner felt it essential to have a strong founding member, and so he turned to the Maryland Economic Development Corporation (TEDCO). He then continued to expand ATIP by selecting members based on geographic region and their ability to serve small businesses by providing assets complementary to ARS research and innovation capacities. The additional ATIP membership now includes the Mississippi Technology Alliance, Wisconsin Security Research Consortium, and National Association of Seed and Venture Funds.

The ATIP program has been successful in transferring ARS technology to the private sector, with seven affiliates (companies that have either licensed ARS technology or entered into a CRADA) established. One of these affiliates, CrispTek, licensed an ARS technology involving a rice flour-based batter that has resulted in product sales.

2010 FLC Awards

Laboratory Director of the Year

Dr. Kenneth Linthicum

Department of Agriculture
ARS Center for Medical, Agricultural, and Veterinary Entomology

Dr. Kenneth Linthicum is Director of the Agricultural Research Service's (ARS) Center for Medical, Agricultural and Veterinary Entomology (CMAVE). The Center, located in Gainesville, Fla., is the first national center for insect research and the largest entomology laboratory in the world that conducts real-world, problem-solving research and technology transfer aimed at reducing or eliminating the harm caused by insects to crops, stored products, livestock, and humans.

Since becoming Director in 2004, Dr. Linthicum renewed and reestablished the longtime historical technology transfer connection between CMAVE and the Department of Defense, a connection that dated back to World War II. Dr. Linthicum's leadership and vision enabled the Center to recruit the best scientists, technicians and support staff, and to instill in them the drive to conduct operational research that solves the entomological problems of stakeholders in American and international agriculture, industry, and government.

The Center consists of four research units employing almost 200 staff with 100 advanced degrees, including 60 Ph.D. scientists and more than 140 highly skilled biological technician, maintenance, administrative, safety, and environmental staff. Dr. Linthicum's superb leadership of CMAVE's technology transfer mission since 2004 is exemplified by more than 2,100 publications and 40 patent applications. In addition, CMAVE scientists have participated in over 60 Cooperative Research and Development Agreements and specific cooperative agreements, resulting in a 75-percent increase in revenue.

Dr. Linthicum is recognized as a leader and authority in the field of medical entomology, as well as arthropod-borne viruses, malaria, and scrub Typhus. He is a pioneer in using remotely sensed data, geographic information systems, and global climate to forecast environmental conditions that lead to animal and human disease outbreaks, thus allowing early disease mitigation studies. Dr. Linthicum is extensively involved in research programs throughout the U.S., and has served as a consultant for the World Health Organization, Food and Agriculture Organization, and the Organization of African Unity, among others.

Dr. Robert Wiltrout

Department of Health and Human Services
National Cancer Institute
Center for Cancer Research

Dr. Robert Wiltrout is Director of the National Cancer Institute's (NCI) Center for Cancer Research (CCR), which is home to more than 250 scientists and clinicians conducting intramural research at NCI. The Center is organized into over 50 branches and laboratories, each grouping scientists with complementary interests. CCR's investigators are basic, clinical, and translational scientists who work together to advance our knowledge of cancer and AIDS, and to develop new therapies against these diseases. CCR investigators collaborate with scientists at the more than 20 other institutes and centers of the National Institutes of Health (NIH), as well as with extramural scientists in academia and industry.

Each year, the Center stimulates and supports new technology development worldwide by sending in excess of several thousand shipments of research materials, including newly developed transgenic animal models, cell lines, plasmids, vectors, software/databases and state-of-the-art research tools, to numerous industrial and academic research programs and centers. Dr. Wiltrout's efforts have resulted in NCI's continued technology transfer advances. He provided oversight of the Center's intellectual property and technology transfer portfolio, and supported the infrastructure necessary to ensure continued new and creative collaborations. In FY 2008, the Center had over 275 active clinical trials, more than 120 active Cooperative Research and Development Agreements (CRADAs), and 120 new commercial licenses, which increased the Center's net income to $36 million.

Dr. Wiltrout has a strong belief in the importance of building strong scientific partnerships with public and private institutions, and he strives to accelerate the movement of scientific discoveries to the marketplace for the ultimate benefit of public health. To this end, Dr. Wiltrout has created several initiatives to maximize partnerships and stimulate communication across the Center's 53 laboratories and clinical branches, as well as serve as a focal point for high impact collaborations. Through these partnerships, the Center has been able to develop cancer therapeutics and treatments to improve the quality of life for cancer and HIV/AIDS patients.

Dr. Wiltrout serves as the principal investigator on four highly successful CRADAs with industry and is actively pursuing three additional CRADA opportunities. Under his leadership

and oversight, more than 30 clinical and basic research protocols to develop valuable research and clinical agents have been approved. These industrial collaborations will contribute directly to the development of novel clinical compounds with the potential for positive impacts on public health.

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2010 FLC Awards

Service Awards

Dr. Theresa Baus

Harold Metcalf Award

Department of Defense – Navy
Naval Undersea Warfare Center, Division Newport

In the spring of 2009, Dr. Theresa Baus was elected Vice-Chair of the Federal Laboratory Consortium for Technology Transfer (FLC). From her new position in the FLC, Dr. Baus will be able to look back with great pride at her accomplishments during the three very successful years she served as Regional Coordinator for the Northeast Region (which comprises approximately 35 laboratories in Maine, Vermont, New Hampshire, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, and Puerto Rico). Each day of her tenure as Regional Coordinator was an opportunity for Dr. Baus to fulfill the FLC's vision of "actively promoting the fullest application and use of federal research and development by providing an environment for successful technology transfer."

During her service as Northeast Regional Coordinator, Dr. Baus instituted and nurtured several unique projects that carried out the FLC's goals in her region. She increased the number of FLC regional meetings to give laboratories an additional chance to participate in events that provided up-to-date training and education; the latest information on changes and advancements in technology transfer procedures; and access to new opportunities. Other regional projects she undertook included developing a "road show" with patent attorneys to provide education about patents, licenses, and disclosures; and participating in a number of conferences to increase awareness about the laboratories in her region and the available opportunities for partnerships in technology transfer.

In her position as Head of the Technology Partnership Enterprise Office (TPEO) and Technology Transfer Manager for the Naval Undersea Warfare Center (NUWC), Newport Division, Dr. Baus has been responsible for the execution of 44 Cooperative Research and Development Agreements (CRADAs) and 37 Education Partnership Agreements (EPAs) since 2006. The CRADAs have brought in over $5 million of income for the lab, and the EPAs have engaged regional colleges, universities, school districts and educational nonprofits in NUWC research and development efforts. Overall, as NUWC's Technology Transfer Manager, Dr. Baus has overseen more than 100 CRADA partnerships between the lab and a broad cross-section of private-sector companies and organizations. In addition to these agreements, 11 patent license agreements with private industry have been signed under Dr. Baus' adept leadership, bringing in revenues of $4 million.

Lorraine Flanders

Department of Defense - Navy
Naval Surface Warfare Center, Dahlgren Division

Representative of the Year Award

Lorraine Flanders likes a challenge. In her role as FLC Awards Committee Chair in 2009, she met a formidable challenge head-on. Seeking to level the playing field among all member organizations, large and small, Flanders and the Awards Committee dared to challenge convention. By introducing revisions to the awards criteria, simplifying and streamlining the application process, and expanding selection categories, all FLC member organizations, no matter their size, are now assured an equal representation in the competition of the FLC awards program. Without Flanders' direction and administration of the FLC awards program, many worthy innovators, emerging synergistic relationships, and novel ideas or approaches in the technology transfer process might otherwise be overlooked in the program.

During her tenure as a member of the FLC Executive Board and Awards Committee Chair, Flanders has been an agent for change, always seeking creative and innovative ways to make improvements for the good of member organizations. She spearheaded outreach efforts to member organizations in the geographically outlying zones of the region to form collaborations in specific technology clusters. Federal labs, academia, industry, and economic development organizations were brought together as working groups to share information, collaborate, and foster relationships to facilitate the technology transfer process. Flanders was instrumental in the conception, implementation, and sustainability of the initiative, and its model was widely shared with other FLC regions.

In her work, Flanders encourages partnerships and the professional development of others in innovative and productive ways. She is constantly on the lookout for ways to apply what she learns from others in her personal and professional life. She personifies the characteristics of teacher and mentor, encourages excellence in others, and tirelessly promotes the benefits of hard work and development of the skills necessary for success. Naval Surface Warfare Center, Dahlgren Division (NSWCDD) developed a Science, Technology, Engineering, and Mathematics (STEM) Learning Module Process that is currently being implemented in four NAVSEA labs across three states, touching the lives of 9,000 students. Flanders' efforts were integral in the process development and facilitation of this Education Partnership Agreement with local school systems. By utilizing laboratory scientists and engineers to provide students with hands-on experiences, including in-school robotics curricula tied into social hot-button issues, middle school students were introduced to the essence of STEM. This model is being propagated to other DOD Army and Air Force labs through the 21CEETP program. Moreover, this model has been shared in various FLC regional and national venues.

2010 FLC Awards

Regional Award Winners

The FLC congratulates the following FLC regional award winners who were recognized in 2009.

Far West Region

Outstanding Partnership Award
Lawrence Livermore National Laboratory
Oak Ridge National Laboratory
"Large Area Imager (LAI)"

Lawrence Livermore National Laboratory
Defense Threat Reduction Agency
Nucsafe, Inc.
"GeMini"

Outstanding Technology Development Award
Lawrence Livermore National Laboratory
"Advanced Vision Systems for Minimally-Invasive Surgeries"
"Carbon Nanotubes for Water Desalination and Filtration"

NASA Ames Research Center
"Java Pathfinder"

SPAWAR Systems Center Pacific
"Wireless Haptic-Glove Apparatus"
"Advanced Dynamic Fluxgate Magnetometer (ADFM)"

Outstanding Commercialization Success Award
NASA Ames Research Center
"Chimera Grid Tools"
"NASA World Wind Java SDK"

SPAWAR Systems Center Pacific
"Soil and Topography Information, LLC"

Outstanding Commercialization Success & Partnership Award
SPAWAR Systems Center Pacific & FirstLink
"Robotics Relay Communication System"

FLC Far West Laboratory Representative of the Year
Dr. Stephen Lieberman
SPAWAR Systems Center Pacific

Mid-Atlantic Region

Regional Excellence in Technology Transfer Award
National Cancer Institute
"Cell Line Bank for Cancer Research"*
"Innovative Techniques and Reagents for Improved Genetic Engineering"*

National Energy Technology Laboratory
"Clay Liquid CO2 Removal Sorbent"
"VE-PSI: Virtual Engineering Process Simulator Interface"*

National Institute of Standards and Technology
"Advanced Combinatorial Test Suites (ACTS) for Testing Software"

USDA Agricultural Research Service, Beltsville Area
"Development of an Operational System for Regional Crop Production Assessment"
"Dietary Supplement Ingredient Database"

USDA Agricultural Research Service, North Atlantic Area
"QuEChERS Approach for Pesticide Residue Analysis of Foods"
"Development and Commercialization of the Rotatable Cross-Arm Trellis"

Outstanding Technology Transfer Professional Award
Karen Maurey
National Cancer Institute

Dr. Richard Brenner*
USDA Agricultural Research Service

*Also a 2010 national award winner

Laboratory Director of the Year
Dr. Robert Wiltrout*
NCI Center for Cancer Research

Belinda Collins
National Institute of Standards and Technology

Mid-Continent Region

Excellence in Technology Transfer Awards
Ames Laboratory
"Lead-free Solder"*

National Renewable Energy Laboratory and Planar Energy Devices
"PowerPlane UX Microbattery"

National Renewable Energy Laboratory and SkyFuel, Inc.
"SkyTrough™ Parabolic Trough System"

Rocky Mountain Oilfield Testing Center and Technology International, Inc.
"SeismicPULSER™ System"

Sandia National Laboratories
"Flash-Bang"

USDA Agricultural Research Service, Southern Plains Area
"BIOTIC for Managing Irrigation"*

Distinguished Service Award
Joseph R. Chavez
Air Force Research Laboratory, Phillips Research Site - Space Vehicles Directorate

Outstanding Regional Partnership Award
Sandia National Laboratories
Los Alamos National Laboratory
State of New Mexico
"NM Small Business Assistance (NMSBA) Program"

Outstanding STEM Mentorship Award
David Foster
Los Alamos National Laboratory

Mike Martin
Air Force Research Laboratory
Phillips Research Site - Space Vehicles Directorate

Adah Leshem-Ackerman
Ames Laboratory

Notable Technology Development
John S. Wilkes
U.S. Air Force Academy – Department of Chemistry's Chemistry Research Center
"Ammonia-Hydride Hydrogen Generator and Storage Device"

James Locke, William Schneider and Horacio de la Fuente
NASA Johnson Space Center
"Portable Hyperbaric Chamber"

George Zyvoloski
Los Alamos National Laboratory
"FEHM: Finite Element Heat and Mass"

J. Chris Forsythe
Sandia National Laboratories
"Sandia Cognitive Framework"

*Also a 2010 national award winner

D. Andy King, Steven D. Shackelford, and Tommy L. Wheeler
USDA Agricultural Research Service, R.L. Hruska U.S. Meat Animal Research Center
"Top Steaks: Beef Clod and Tip Center Steaks"

Midwest Region

Excellence in Technology Transfer Award
USDA National Center for Agricultural Utilization Research
Air Force Research Laboratory, Human Effectiveness Directorate
NASA Glenn Research Center

Partnership Award
Center for Applied Research at the University of Southern Indiana
"Handwipe Removal Method for Metals"

Northeast Region

Excellence in Technology Transfer Award
Air Force Research Laboratory, Information Directorate
"RAPT-R Automated Audio Transcription and Reporting System"

Regional Laboratory Award
John A. Volpe National Transportation Systems Center

Regional Coordinator's Excellence Award
Franklin Hoke, Air Force Research Laboratory, Information Directorate

Southeast Region

Excellence in Technology Transfer Project of the Year
Oak Ridge National Laboratory
"Surface Sampling Probe for Mass Spectrometry"

Excellence in Technology Transfer Award
Oak Ridge National Laboratory
"Laser-induced Fluorescence Fiber Optic Measurement of Fuel in Oil"
"Position Sensitive Detector (PSD) Electronics System & Neutron Detector Assembly"

NASA Marshall Space Flight Center
"Balanced Flow Meter Development and Application"*

USDA Agricultural Research Service, Mid-South Area
"Novel Fish Vaccines to Prevent Severe Economic Losses in Aquaculture"*

USDA Agricultural Research Service, South Atlantic Area
"Second Generation Treatment System for Management of Livestock Manure"*

Partnership Award
Naval Air Warfare Center Training Systems Division
Federal Law Enforcement Training Center

*Also a 2010 national award winner

2010 FLC Awards

Honorable Mention

The FLC recognizes the following nominees for their commitment to technology transfer and support of our mission.

Department of Agriculture

Agricultural Research Service, Beltsville Area
"Development of an Operational System for Regional Crop Production Assessment"
"Dietary Supplement Ingredient Database"

Agricultural Research Service, Mid South Area
"Chinese Adoption of USDA Cotton Processing and Classification Techniques"
"Pterostilbene: Blueberry Constituent That Lowers Cholesterol and Improves Cognitive Function"

Agricultural Research Service, Midwest Area
"MaizeGDB: The Maize Genetics and Genomics Database"
"SoyBase: An Informatic Toolbox for Soybean Genetic and Biological Data"

Agricultural Research Service, North Atlantic Area
"Concept, Development, and Technology Transfer of Blackberry Trellis System"
"QuEChERS Approach for Pesticide Residue Analysis of Foods"

Agricultural Research Service, Pacific West Area
"Detection of the Antibiotic Ceftiofur and Its Metabolites in Milk"
"Fruit and Vegetable Food Wraps for Enhanced Nutrition"

USDA Wildlife Services, National Wildlife Research Center
"Enhancing Bird Detection and Response to Aircraft Approach"

Department of Commerce

National Institute of Standards and Technology
"Advanced Combinatorial Test Suites (ACTS) for Testing Software"
"Building and Fire Code Changes by the International Code Council"
"68Ge-based PET 'phantom' with NIST traceability for PET scanner calibration"
"PIV-CRADA Interoperability Standards Development and Dissemination"

National Oceanic and Atmospheric Administration, Oceanic and Atmospheric Research, Global Systems Division
"Development of GPS-Met and Integrated Blended Total Precipitable Water (TPW)"

Department of Defense – Navy

Naval Surface Warfare Center, Indian Head Division
"Joint Modular Intermodal Container (JMIC)"

SPAWAR Systems Center Pacific
"Robotic Relay Communication System"
"Ultra-High Sensitivity Optical MEMS Displacement Sensor"

Department of Defense – Air Force

Air Force Research Laboratory, Directed Energy Directorate
"Center of Excellence for High-Energy Lasers"

Department of Energy

Los Alamos National Laboratory
"Genie Pro (GENetic Imagery Exploitation)"

National Energy Technology Laboratory
"Basic Immobilized Amine Sorbet (BIAS) Process for CO2 Capture"
"Clay Liquid CO2 Removal Sorbent"

National Renewable Energy Laboratory
"Ultra-Accelerated Weathering System"

Oak Ridge National Laboratory
"Automated In-Motion Vehicle Evaluation Environment (AIMVEE)"
"Nell 1-Based Diagnosis and Treatment of Musculoskeletal and Cardiovascular Conditions"
"Position Sensitive Detector (PSD) Electronics System and Neutron Detector Assembly"
"Surface Sampling Probe for Mass Spectrometry"

Pacific Northwest National Laboratory
"Blood Cell Storage – Blood pH Reader"
"FADE: Fused Analytic Desktop Environment"

Rocky Mountain Oilfield Testing Center
"Low-frequency Drill-bit Seismic While Drilling"

Sandia National Laboratories
“Flash-Bang Fuel Air Diversionary Device”
“General Atomics Strategic Partnership”

Thomas Jefferson National Accelerator Facility
“Energy Efficient Cryogenic Cooling Process”

Department of Health and Human Services

Centers for Disease Control and Prevention
“Reverse Genetics System for Attenuated Rabies Vaccines”

National Cancer Institute
“A Therapeutic Vaccine for the Treatment of Melanoma”

National Institute of Allergy and Infectious Diseases
“Attenuated Vaccine Viruses Useful for Vaccine Development”

Department of Homeland Security

Transportation Security Laboratory
“Bulk Explosives Simulant Development Efforts”

Department of Transportation

Volpe National Transportation Systems Center
“Maritime Safety and Security Information System”

Environmental Protection Agency

Environmental Protection Agency
“Highly Efficient Series Hydraulic Hybrid Commercial Vehicles”

National Risk Management Research Laboratory
“Reduction of Inorganic Contaminants from Waste Streams”

National Aeronautics and Space Administration

Ames Research Center
"Chimera Grid Tools Version 2.0

"Inductive Monitoring System (IMS)"
"NASA World Wind: Infrastructure for Geospatial Data"

Glenn Research Center
"Radio Frequency (RF) Telemetry System for Bio-MEMs Sensor Technology"

Honorable Mention | Interagency Partnership Award

The FLC recognizes the following nominees for their joint efforts in technology transfer.

Idaho National Laboratory and the Environmental Protection Agency

U.S. Army Edgewood Chemical Biological Center and the Environmental Protection Agency

Naval Air Warfare Center Training Systems Division and the Federal Law Enforcement Training Center

Air Force Research Laboratory – Human Effectiveness Directorate , Mike Monroney Aeronautical Center, Federal Aviation Administration, Northrop Grumman, General Dynamics, and Cherokee CRC

Ames Laboratory and U.S. Army Armament Research, Development and Engineering Center

Volpe National Transportation Systems Center, Federal Aviation Administration, and Ames Research Center

Honorable Mention | Outstanding Technology Transfer Professional Award

The FLC recognizes the following nominees for their efforts advancing technology transfer at their facilities.

Department of Defense – Navy
John Dement
Naval Surface Warfare Center - Crane Division

Dr. Charles Schlagel
Naval Medical Research Center

Department of Defense – Air Force
Dr. Dean Eklund, Dr. Douglas Davis, Dr. Daniel Risha
Air Force Research Laboratory - Propulsion Directorate

David Sikora, Dennis Strobel, Kent Jackson, Tricia Randall, Keith Quinn, Clarence Frazier, Jr.
Air Force Research Laboratory

Department of Energy
R. Diane Newlon
National Energy Technology Laboratory

Department of Health and Human Services
Karen Maurey
National Cancer Institute

Environmental Protection Agency
Brian Gullett, G. Blair Martin, Sarah Bauer, Laura Scalise

Honorable Mention

Laboratory Director of the Year Award

The FLC recognizes the following nominees for their efforts in making maximum contributions to the overall enhancement of technology transfer for economic development.

Department of Defense – Navy
Duane Embree
Naval Surface Warfare Center - Crane Division

Captain Mark Kohlheim, Carmela Keeney, Gary Wang
Space and Naval Warfare Systems Center Pacific

Department of Defense – Air Force
Douglas Bowers
Air Force Research Laboratory - Propulsion Directorate

Susan Thornton
Air Force Research Laboratory - Directed Energy Directorate

National Aeronautics and Space Administration
Dr. Woodrow Whitlow, Jr.
NASA Glenn Research Center

Honorable Mention

Service Awards

The FLC recognizes the following nominee for his noteworthy support in furthering the mission of the FLC.

Representative of the Year Award

Department of Defense – Air Force
Franklin Hoke, Jr.
Air Force Research Laboratory - Information Directorate

FLC Awards Program Calendar

The calendar year for the FLC awards program runs from June to May.

Each year, awards are presented in the following categories:

- Awards for Excellence in Technology Transfer
- Laboratory Director of the Year
- FLC Service Awards
  - Harold Metcalf Award
  - Representative of the Year Award
  - Outstanding Service Award
- Outstanding Technology Transfer Professional Award
- Interagency Partnership Award

The following timeline reflects the awards program's activity as of press time. Please refer to the FLC website (www.federallabs.org) for updates.

June/July
Criteria for all awards are reviewed and revised as needed.

August/September
Nomination forms for all categories are distributed via e-mail, standard mail, FLC roundtables, and the FLC website.

October
Completed nominations for all categories are submitted to the Management Support Office for processing.

November/December
Judging period for submitted award nominations in all categories.

January
Notification of award winners and non-winners in all categories.

February/March/April
Award winners register for FLC national meeting; non-winners of the Awards for Excellence in Technology Transfer receive written feedback from award evaluators.

May
Awards presented at FLC national meeting.

2010 FLC Awards