

NFLC NEWS LINK

A Publication of the Federal Laboratory Consortium for Technology Transfer

FLC Awards
2005



T² F A C T

Dr. Martin Cooper, a former general manager for the systems division at Motorola, is considered the inventor of the first modern portable handset. In April 1973, Cooper made the first call on a portable cell phone to his rival, Joel Engel, head of research at Bell Laboratories. Bell Laboratories introduced the idea of cellular communications in 1947 with its police car technology. However, Motorola was the first to incorporate the technology into a portable device designed for outside an automobile.

-Mary Bellis, About.com

**By 2004, there were 180 million cellular telephone subscribers in the United States.*



T² E V E N T S

Naval-Industry R&D Partnership Conference 2005
Enabling Naval Innovations to Win the Global War on Terrorism
Washington, D.C.
July 26-29, 2005

FLC Midwest Regional Meeting
Chicago, Ill.
August 9-11, 2005

2005 Space and Missile Defense Conference
Huntsville, Ala.
August 15-18, 2005

FLC Mid-Continent/Far West Regional Meeting
Monterey, Calif.
September 13-16, 2005

2005 Technology Transfer Society Meeting
Kansas City, Mo.
Sept. 28-30, 2005

NASVF 2005
Philadelphia, Pa.
September 28-30, 2005

Academic Science Buildings
St. Petersburg, Fla.
October 24-25, 2005

Scripps/Oxford International Biotechnology Conference
Palm Beach, Fla.
November 13-15, 2005

BIO 2006
Chicago, Ill.
April 9-12, 2006

AWARDING T² EXCELLENCE

On May 4, 2005, the FLC celebrated those individuals whose vision and determination led them to great achievements in technology transfer at the FLC awards program in Orlando, Fla.

The success of these award winners is a testament to the idea that innovation is the result of genius, tireless effort, and a determination to enhance our everyday lives through technology.

Whether it is a new way to monitor the freshness of food, a more accurate and efficient method to protect us from biohazards, or a new cancer treatment, FLC award winners have made an impact far beyond the walls of their laboratories.

As the technology transfer efforts within the FLC are diverse in their scope and large in number, the FLC presents awards in the following areas:

- Excellence in Technology Transfer—Presented to individuals in the FLC who have successfully transferred federally developed technologies.
- 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.

- Service Awards—Presented to individuals, inside or outside the FLC, who have provided significant support to the technol-



FLC Vice-Chair Larry Dickens (far left), the Department of Energy's Mike Curtis (2nd from left), and FLC Chair Ed Linsenmeyer (far right) present an FLC Award for Excellence in Technology Transfer to Ian Gross (center) and Alex Fischer of Oak Ridge National Laboratory.

ogy transfer process, furthering the FLC's mission.

The FLC awards are the standard in the technology transfer world, with dozens of federal laboratories submitting nominations each year. These awards are not only a great source of pride for the winning laboratories, but for their parent agencies as well.

As you read this issue, you will be impressed with how our winners collaborated to use their expertise and resources to produce technologies that reflect the wealth of ideas that can be found in federal laboratories.

FLC SERVICE AWARDS

**Norma Cammarata, Army Research Laboratory
Harold Metcalf Award**

Norma Cammarata, FLC representative from the Army Research Laboratory for more than 10 years, was presented with the FLC's Harold Metcalf Award for sustained significant service from an individual FLC Representative to the FLC as an organization.

Cammarata has provided extraordinary service to the Army, the Army Research Laboratory, and the FLC. Cammarata's passion for excellence in technology transfer particularly shone during her tenure as Program Committee Chair from 2000 through 2003.

**J. Susan Sprake, Los Alamos National Laboratory
Representative of the Year Award**

J. Susan Sprake has been involved in the FLC for 20 years, but took on a higher profile and larger role when she was elected Mid-Continent Regional Coordinator in 2000. In this role, Sprake was responsible for bringing many new groups to the table from complementary organizations such as New Mexico Tech, USDA Forest Service, International Association of Fire Chiefs, the National Interagency Fire Center, the DOE's Technology Partnerships Working Group (TPWG), the Clean Cities Program, and the Manufacturing Extension Partnership.

**Ric Trotta, Trotta Associates, Inc.
Outstanding Service Award**

Ric Trotta brings valuable senior-level corporate and management consulting experience in business development and strategic and technology management to his position as chair of the FLC's National Advisory Council (NAC). Under his dynamic leadership, the NAC has reconstituted its membership to include proactive, knowledgeable executives with pertinent senior-level government, industry, and academic experience.

FLC HONORS LABORATORY DIRECTORS OF THE YEAR

Admiral Richard H. Truly
National Renewable Energy Laboratory



Through the leadership of Admiral Richard H. Truly, the National Renewable Energy Laboratory (NREL) enhanced its commitment to the technology transfer mission. Admiral Truly, who has since retired, developed a culture at NREL that supports the interaction of staff with large networks of entrepreneurs, investors, large energy firms, incubators, and state and local organizations to successfully bring clean energy technologies to the marketplace.

Admiral Truly understood the value of building an internal culture to support technology transfer and fostered abundant external technology transfer opportunities. He established new programs to strengthen and expand NREL's technology transfer efforts. Fostering a culture that supports technology transfer develops the transference of NREL-developed intellectual property, knowledge, and know-how through industrial partnerships, and ultimately helps the laboratory bring its energy efficiency and renewable energy technologies to market more quickly.

Dr. John P. Cherry
*USDA Agricultural Research Service
Eastern Regional Research Center*



Since assuming the directorship of the Eastern Regional Research Center (ERRC) in 1984, Dr. John Cherry has continuously cultivated ERRC research to deliver new knowledge and technology that ensure an abundance of high-quality agricultural commodities and products at reasonable prices to meet the needs of all Americans, as well as provide a continued improvement in their standard of living.

Dr. Cherry has been personally involved in the development of new methods for stimulating the ERRC's commitment to technology transfer. Through his personal involvement, he has encouraged his scientists to actively contribute to transferring technical know-how to stakeholders ranging from traditional industrial partners to grade school children. He has personally developed, arranged, and participated in the interactions with research stakeholders. Due to Dr. Cherry's willingness to set himself as an example, ERRC employees regard technology transfer as a natural and logical extension of their laboratory research.

Ted Glum
Defense Microelectronics Activity



As Director of the Defense Microelectronics Activity (DMEA), Ted Glum has created an organization unlike any other in government—a small, agile, responsive team closely linked with the private sector that serves as a microelectronics "solutions portal" for government, allies and the defense industrial base alike. Within this organization, technology transfer and public-private partnerships are not "other duties as assigned," but rather how business gets done. Glum understands the importance of technology transfer and developed DMEA to fulfill a unique role in the technology transfer spectrum.

Under Glum's leadership, the concept of public-private partnerships has become the means by which DMEA fulfills its DOD charter. Only through extensive interaction with the semiconductor industry can DOD program managers and defense prime contractors be integrated and effective microelectronics solutions achieved.



Federal Technology Transfer 2005

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FLC AWARDS FOR EXCELLENCE IN TECHNOLOGY TRANSFER

BEEF CARCASS ANALYSIS SYSTEM

Department of Agriculture
Roman L. Hruska U.S. Meat
Animal Research Center (MARC)

The MARC Beef Carcass Image Analysis Yield Classification System operates online in a beef packing plant to objectively determine the yield of saleable meat using computerized image analysis.

MARC scientists developed and tested a prototype of the system and then began transferring the technology to the industry. They established a CRADA with IBP, Inc. (now known as Tyson Fresh Meats, Inc.) to further develop the technology from a prototype to a commercial system.

MARC scientists, IBP, and a contracted equipment vendor cooperatively modified the system to optimize it for commercial use. MARC scientists tested each new version online in an IBP packing plant, identified deficiencies, and suggested hardware and software modifications. These efforts led to a patent application jointly filed by ARS, IBP, and the equipment vendor that was granted in June 2004.

Currently, two of the four major U.S. beef packing companies are implementing this system, and the other two are considering its implementation.

For many years the beef packing industry has relied on human graders to subjectively assign to beef carcasses yield grades indicating the relative amounts of saleable product that would come from each carcass. However, because of the subjectiveness of human grading, the industry has been interested in implementing instrument grading technologies for many years.

Field testing has demonstrated that the MARC image analysis system can assess USDA yield grade more accurately and precisely than can be achieved by USDA graders.

Use of this system will allow beef packers to objectively identify value differences between carcasses and to compensate producers appropriately.

The technology will allow producers to better understand the impact of their management decisions on the value of their product. In turn, this information will allow for more efficient production of cattle that excel in leanness, which will improve the profitability of beef production.

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PROTEINS FOR REDUCED CARB FOODS

Department of Agriculture
Agricultural Research Service
North Atlantic Area

Americans consume an average of 30 pounds of cheese per person a year, or about 9 billion pounds. Five billion pounds of dried whey proteins, the co-products of cheese manufacture, are produced, but less than 50% of these are used in food manufacturing.

The rest is used as a low-cost additive to animal feed. Dr. Charles Onwulata realized that if these un-

deritized proteins could be modified, they could be used for many functional applications in foods such as snack products, where the cheese whey proteins would boost the protein content of the snack products, thus increasing the value of whey protein.

Snack foods are a major dietary component for many U.S. consumers, providing over 40% of the total caloric intake. Many crunchy favorites are made from high-starch products such as corn flour. On average, these products consist of 3-5% protein, with the remainder of ingredients comprising mostly carbohydrates, fats, and sweeteners. High carbohydrate snacks are partly blamed for rising obesity.

Dr. Onwulata developed an extrusion process that changes the structure and texture of whey proteins, making them easier to add to foods while still retaining crunchy properties. The newly developed texturized whey proteins can be used to increase by up to 35% the protein in foods such as breakfast cereals, corn puffs, cheese curls, and energy bars. Several high-protein snacks targeted to fight obesity that were developed through a CRADA with Harden Foods, Inc., a minority-owned company in Philadelphia, Pennsylvania, are ready for market.

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CLEANING COTTON GINS

Department of Agriculture
Agricultural Research Service
Mid South Area

A louvered lint cleaner technology, which is commercially marketed under the trade name "LOUVERMAX Lint Cleaner," manually or automatically engages/disengages grid bars in saw-type lint cleaners to reduce fiber waste and associated fiber damage, tailoring the process to meet marketing needs in response to the condition of the raw material.

The invention consists of several independent, movable inserts commonly referred to as "louvers" that are designed to occupy the space between the existing grid bars in lint cleaners when those cleaning points are not required, deactivating their use. The louvers are powered by air cylinders and can close off the cleaning point of the grid bar by moving into the space between adjacent grid bars while the machine is actively processing cotton. By providing control and moderation of the number of cleaning bars (1 to 9) in the lint cleaning process, the LOUVERMAX decreases the fiber loss by as much as 80% in some bales and also reduces fiber damage. As a result, the cotton is more valuable to the farmer and to the textile mill that converts the raw cotton into yarn and ultimately into products such as clothing.

The initial technology transfer mechanism included publications, presentations, demonstrations and patents describing the technology. The patent was licensed to Continental Eagle Gin Company in 2000.

An increased value to the cotton farmer of \$3 to \$6 per bale of cotton is not uncommon as a result of "tailored processing" with the louvered lint cleaner. Thus, a single large grower (5,000 bales/year) could

receive as much as \$30,000 in increased revenue/year if conditions warrant using fewer cleaning points during processing as a result of this technology.

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PHOSPHATE FOR RESTORATIVE MEDICINE

Department of Commerce
NIST

Composite dental materials that stimulate regenerative repair of defective teeth have been developed. These composites, made of amorphous calcium phosphate embedded in polymers, can efficiently promote the regrowth of tooth structures.

In the presence of saliva, the composite material releases calcium and phosphate ions, forming a crystalline calcium phosphate similar to the mineral found naturally in teeth and bone. This is the first calcium phosphate remineralizing technology to be marketed for dental prevention and restoration.

The transfer and commercialization of this technology were accomplished through a unique collaboration involving the National Institute of Standards and Technology (NIST), the National Institutes of Health (NIH), the American Dental Association Foundation (ADAF), and the H.J. Bosworth Company.

Building on previous research by the ADAF, Dr. Joseph M. Antonucci of NIST, and Drs. Edward Eanes and Drago Skrtic of the National Institute of Dental and Cranial Facial Research (NIDCR) of the NIH developed the polymeric amorphous calcium phosphate technology patented by NIST.

To enhance the commercialization potential, NIST first consolidated rights to the patent in NIST through an Interagency Agreement with the Office of Technology Transfer, NIH, and then issued an exclusive license to ADAF.

ADAF then entered into a commercialization sublicense with the H.J. Bosworth Company of Skokie, Illinois in 2003. The first product, "Aegis Pit and Fissure Sealant," was launched in the spring of 2004, with two additional products, "Aegis Orthodontic Adhesive" and "Aegis Crown and Bridge Cement," launched in the fall of 2004.

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AUTOMATED DECISION-AID SYSTEM

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

James A. Genovese, team leader for the Innovative Development and Engineering Acquisitions Team at Edgewood Chemical Biological Center (ECBC), has invented the Automated Decision-Aid System for Hazardous Incidents (ADASHI).

This computer-based technology improves the ability of local emergency responders to quickly identify,

contain and mitigate the effects of chemical and biological incidents.

Unlike other training and response-support solutions on the market, ADASHI integrates all disparate technical functions required to manage a hazard incident, from assessment to casualty estimation criteria to mitigation, and combines them with decision criteria.

Because it is icon-based, users can easily report what they observe at the scene and quickly receive critical information to help them make what could be life-saving decisions.

Mr. Genovese began working on the concept on his own time. By 2000 it was sufficiently developed for the Army to file the first of three patents to date.

OptiMetrics, Inc. of Ann Arbor, Michigan, became interested in ADASHI early on; some of its scientists who were working with Mr. Genovese on other projects occasionally participated in its development. The company was granted an exclusive license for the technology on January 28, 2002.

A few months later, ECBC and OptiMetrics signed a CRADA to conduct collaborative research and development with the intent of getting ADASHI to market as quickly as possible.

Given the scope of the technology, full development will take years; however, OptiMetrics created a commercialization schedule by which it will market modules of the technology during development.

Two ADASHI software products are currently on the market, and a third was scheduled for release in February 2005.

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SELF-CONTAINED BIO SAMPLING

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

Responding to challenges presented by anthrax contamination at the Hart Senate Office Building, Brentwood Post Office, and other sites, the U.S. Army Edgewood Chemical Biological Center (ECBC) rapidly developed and produced a new biological sampling kit.

ECBC's engineering team designed and produced this portable and disposable biological sampling kit, enabling responders to events involving weapons of mass destruction (WMD) to collect biological contaminants from surfaces while encumbered by protective clothing.

The need for a new, simple sampling kit became obvious when sampling teams were faced with large, complicated sampling situations.

Currently available sampling kits that utilize cotton swabs or sponges made multiple samplings virtually impossible, resulting in precious time consumption and involving copious steps, creating exposure situations and cross-contamination risks.

ECBC's Biological Sampling Kit (BiSKit) addresses the shortcomings of the swab and sponge sampling kits. The BiSKit, designed to sample large areas and be compatible with testing on a variety of technologies, has been evaluated and compared to other surface sampling strategies. Large surface areas sampled with the BiSKit resulted in up to tenfold higher concentrations of *Bacillus anthracis* (BG) in samples compared to other sampling methods.

The BiSKit is self-contained, portable, and disposable. It is designed so that individuals without scientific backgrounds can easily obtain samples.

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FOOD PROCESSING FOR SAFETY AND QUALITY

Department of Defense
U.S. Army Natick Soldier Center

Under the joint leadership of Dr. C. Patrick Dunne of the Department of Defense Combat Feeding Directorate, U.S. Army Natick Soldier Center and Dr. Edmund Ting, Avure Technologies, Inc. of Kent, Washington, partnerships have been forged to foster the development and industrial application of High Pressure Processing (HPP), a revolutionary process in food preservation technology.

HPP is being developed to meet the joint demands of the military for expanding variety and improving the quality of combat rations and for civilian sector convenience foods containing whole muscle meats and other thermally sensitive items, such as eggs, potato and pasta products.

Since 2001, a number of HPP foods have begun to appear in the marketplace as a direct result of technology transfer between the Army and Avure.

The use of high hydrostatic pressure has proven to be a very effective means of controlling the activity of both spoilage and disease-causing microorganisms in refrigerated food

items. High-pressure processed foods meet today's consumer demands for minimally processed, additive-free foods with fresh-like characteristics while providing the ultimate in safety.

The U.S. Army Natick Soldier Center and Avure Technologies have formed a consortium involving major food producers to build a base for HPP technology. This consortium was formed under the auspices of the Army's Dual Use Science and Technology (DUST) program. An approved high pressure-assisted sterilization process is expected to be approved by regulatory agencies within one year.

The process has been called the biggest innovation in food processing since Clarence Birdseye developed frozen foods in the 1920s; as a result, Avure Technologies was awarded the Institute of Food Technologists' industrial innovation award in 2002.

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INFLATABLE COMPOSITE STRUCTURES

Department of Defense
U.S. Army Natick Soldier Center

Flexible composite textile technology provides structures that are extremely lightweight, rapidly deployable, and require minimal storage space during transit.

Transferred from the Army to the Air Force, Navy, and NASA developers through both government and industry interaction, the technology has led to products that weigh 66% less than conventional metal items, take up less than 25% the volume when stored or shipped, and cut set-up time by 60%.

Flexible composite structures are referred to as airbeams; however, applications are extremely broad. These include arches to support tents, inflatable antennas and booms for space applications, fins for aircraft ejection seats, and fenders for use in sea-based operations.

An advanced understanding has been developed of the performance of inflatable composite structures through the use of classical structural analysis and finite element computer modeling tools, as well as the validation of these tools by establishing and conducting physical tests.

Spinoffs from the manufacturing technologies include low-cost rigid composite nose cones for missiles and next-generation chemical and biological agent-resistant laminated fabric.

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AQUATIC EARLY WARNING SYSTEM

Department of Defense
U.S. Army Engineer R&D Center
Environmental Laboratory

Engineer Bruce Sabol of the U.S. Army Engineer Research and Development Center, Environmental Laboratory (ERDC-EL) has developed a cost-effective hydroacoustic system to detect and map submersed aquatic vegetation. Called the Submersed Aquatic Vegetation Early Warning System (SAVEWS), the patented technology has been licensed

and commercialized by BioSonics, Inc., of Seattle, Washington. The system is being marketed under the name EcoSAV in a suite of software designed for use in aquatic habitat and resource assessments.

What was once an arduous, costly, labor-intensive exercise to locate and map aquatic vegetation has now become technologically more efficient and infinitely more viable commercially as a result of the unique integration of state-of-the-art hydrosonic equipment, GPS mapping technology, computer software, and a custom algorithm.

Originally conceived as a tool to assist in the early detection and management of Hydrilla, a noxious aquatic plant seizing control of the Tennessee Valley Authority (TVA) reservoir system, the SAVEWS/EcoSAV system has gone on to empower government agencies and private consulting firms entrusted with the responsibility of managing the nation's waterways.

Waterways like those managed by the South Florida Water Management District proximate to the Everglades have benefited from use of the mapping system.

With more effective tools, management of our waterways becomes more effective. And with a technology like SAVEWS, the ultimate consumer benefit generally goes unseen, for it is the taxpaying public that benefits from better management of aquatic resources and the ecological services provided by aquatic habitats and ecosystems.

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PROTECTING AGAINST BACILLUS ANTHRACIS

Department of Defense
Naval Medical Research Center

Drs. Darrel Galloway and Al Mateczun of the Naval Medical Research Center have developed and successfully transferred to industry a DNA-based vaccine against anthrax. Anthrax has been used in bioterror attacks and is also a problem in the livestock industry.

The inhaled method of contracting anthrax, the preferred method of bioterrorists, is highly lethal.

The bacterium responsible for the disease can be modified into a "super" stain that thwarts current vaccines.

The new vaccine technology makes it possible to respond to specific engineered anthrax attacks much more rapidly and inexpensively than existing methods.

The technology also advances all future anthrax vaccines by demonstrating the importance of the anthrax "lethal factor" in generating immunity; previous vaccines relied primarily on the "protective antigen."

Drs. Galloway and Mateczun have shown that vaccines incorporating both elements will provide better immunization than previous vaccines that include only the protective antigen.

Finally, the new technology also eliminates many of the issues associated with vaccinating with traditionally developed vaccines.

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BULLET TRAPPING FOR LIVE FIRE

Department of Defense
U.S. Army Engineer R&D Center
Geotechnical and Structures Laboratory

Dr. Charles A. Weiss, Jr., Dr. Philip G. Malone and Joe G. Tom developed, patented and introduced into the commercial sector a foamed fiber-reinforced concrete that can be cast in blocks and panels that capture impacting bullets without producing dangerous ricochets.

The concrete formulation was originally developed for use in Army live-fire training mazes and enclosures for grenade training.

The development team modified the composition of the concrete to minimize the leaching of lead and other potential pollutants from the foamed concrete, resulting in a non-hazardous material for disposal purposes.

The estimated savings to the Army is \$180 million per year. In order to transfer the technology to the private sector, the federal team worked with industry partners through CRADAs to improve the technology and to benefit from the partner's experience marketing the new material.

To promote product identity, the Army filed for and was issued the trademark SACON® for this unique concrete product.

In 2003, the first civilian firing range constructed using SACON® was built in Springfield, Ohio.

In 2004, in a ground-breaking agreement, the Geotechnical and Structures Laboratory issued a license to Mississippi Prison Industries Corporation. This license was unique in that it provided federally developed technology to a state-owned, not-for-profit corporation, making SACON® economically available to law enforcement groups across the country.

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PORT SECURITY BARRIER SYSTEM

Department of Defense
Naval Facilities Engineering
Service Center

A team led by Robert Taylor of the Naval Facilities Engineering Service Center (NFESC) has developed a modular port security barrier (PSB) system to protect the U.S. Navy fleet—valued at approximately \$300 billion—from waterside attack.

The floating fence comprises synthetic netting attached to a pontoon base, moorings and deadweight anchors. Gates can be added as needed. Relatively simple to fabricate and install, the technology has been proven to stop nearly 100% of high-speed boats.

Development of a net barrier system became a top priority for the Navy following the attack on the USS Cole on Oct. 12, 2000.

The pace of development was accelerated following the attacks of September 11, 2001.

Remarkably, Mr. Taylor's team took the PSB system from concept to prototype in just eight months. Funding was granted by the Office of Naval Research in April 2001, and the first installation was completed at the

See Port Security, page 4

Port Security, from page 3

southern entrance of the U.S. Navy Submarine Base in Kings Bay, Georgia, in December.

The government has identified at least 11,600 likely waterside terrorist targets in the U.S., including military facilities, dams, nuclear power plants, oil platforms and more. An attack on any of these targets could result in significant loss of life as well as extensive property damage. Given the risk to civilian and commercial entities, NFESC determined that PSB needed to be commercialized as quickly as possible.

Harbor Offshore, Inc. (HOI), a Ventura, California-based marine construction firm under contract with NFESC to fabricate and install the fencing, approached NFESC expressing interest in licensing PSB. Having proven its capability and motivation to enhance the barrier's success, HOI was granted an exclusive license on December 29, 2003. Within a month, HOI had installed its first commercial system at Port Everglades, Florida, to protect the Queen Mary II at her winter port, as well as to add another layer of protection for the port's three petroleum slips.

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TREATING AUTOIMMUNE DISEASE

Department of Defense
Naval Medical Research Laboratory

While assigned to the Naval Medical Research Center, Navy immunologist Dr. Carl June made a profound discovery—the key to a hypothesized second signal in T-cell stimulation. June's discovery of the function of the CD28 molecule in that second pathway led to major advances in the search for safe and effective therapies for autoimmune disorders.

Academic and industrial collaborations centering on this fundamental discovery have resulted in the development of revolutionary new methods for treating autoimmune diseases such as rheumatoid arthritis, lupus, multiple sclerosis, and scleroderma.

These methods, using a genetically engineered form of a molecule nearly identical to CD28 (CTLA4-Ig), have been effectively transferred into the private sector, as exemplified by U.S. Patent No. 6,685,941, approved February 3, 2004. The patent is assigned to the Navy and the University of Michigan and licensed exclusively to Repligen Corporation. CTLA4-based therapy for rheumatoid arthritis is completing the final phase of FDA-approved trials.

Before the promising work with CTLA4-based therapies, treatment for autoimmune disorders required that the entire immune system be suppressed. Not only do these new methods promise effective treatment of disease itself, they allow for continued immune function even during treatment.

The work done under the auspices of the Naval Medical Research Center by Dr. June and his collaborators caused a sea change in the understanding and treatment of autoimmune disorders, as evidenced by the recently approved patent. The value and significance of the work cannot be overstated.

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CORROSION- RESISTANT COATING

Department of Energy
Idaho National Laboratory

Imagine military equipment that lasts twice as long in the field before needing repairs and that resists corrosion in today's most demanding environments. Imagine reducing the potential of catastrophic failure for the Space Shuttle or rockets in our space program. Imagine aircraft engines that are stronger, yet one-third lighter, creating substantial fuel efficiencies while improving safety.

Super Hard Steel™ coating, researched and developed at the Idaho National Laboratory (INL), is a breakthrough material that bears the fruits of the emerging field of nanotechnology. Its application to metal parts, devices and machinery offers a quantum-leap improvement in metal systems strength, hardness, toughness and low friction.

Through funding and R&D provided by INL, a partnership emerged with Milcom Technologies, a venture firm, which created The NanoSteel Company to market the new technology.

Super Hard Steel™ forms a tough, low-cost, wear- and corrosion-resistant coating that outperforms traditional high-performance materials in applications where combinations of wear, corrosion and impact destroy or damage industrial parts.

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10-GIGABITE ETHERNET ADAPTER

Department of Energy
Los Alamos National Laboratory

Have you ever tried to download a high-resolution graphic, movie, or video game from the Internet?

Such downloads can take hours, and if you're lucky, your computer won't lock up and the download will come through successfully.

Now imagine that by installing a simple adapter into your computer you could transfer information up to 148,000 times faster than a high-speed modem connection and up to 23,000 times faster than a DSL connection. This super-adapter's plug-and-play installation, reliability, and unprecedented speed will revolutionize how computers and the Internet have a positive impact on our lives.

Los Alamos National Laboratory (LANL) optimized Intel's® PRO/10GbE LR Server Adapter and its associated subsystems, thereby enhancing its performance by 300%. The 10-Gigabit Ethernet Adapter (10GbE) consists of an Intel® 82597EX 10GbE controller, 512 kilobytes of flash memory, and Intel® 1310-nanometer serial optics. Such enhanced speed benefits numerous markets, including entertainment, worldwide modeling and simulation, and medical applications.

10GbE could revolutionize the impact of computers and the Internet on our lives, allowing compute and storage nodes distributed around the world to be interconnected and serve as the basis for supercomputers.

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NEUTRON SOURCE FOR CANCER THERAPY

Department of Energy
Oak Ridge National Laboratory

The Miniature Californium-252 Neutron Source for Cancer Therapy was developed at Oak Ridge National Laboratory (ORNL).

Because the source is so small, physicians can insert it through a catheter to deliver high-dose neutron irradiation directly to a tumor site. The ORNL team was able to reduce the diameter of the source by more than half from the previous standard of about 2.8 millimeters, making it possible to reach and treat tumors that previously could only be treated with conventional photon and gamma therapy or with external beam treatments.

Isotron, a company located in Norcross, Georgia, funded the research through a \$2-million funds-in-CRADA. Isotron is dedicated to developing new tools, methods, and applications in neutron brachytherapy for therapeutic purposes.

The technology is embodied in two invention disclosures for which patent applications have been filed. These two inventions are associated with novel methods for producing small-diameter Cf-252 source wires and for attachment of those sources to small-diameter cables to enable brachytherapy in previously inaccessible tissues. Isotron has exercised its licensing option under the CRADA to acquire exclusive commercial rights to these two inventions via an exclusive license with ORNL.

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REAL-TIME WATER MONITORING

Department of Energy
Oak Ridge National Laboratory

AquaSentinel provides early warning of chemical toxin and selected biotoxin contamination in primary-source water supplies.

It monitors naturally occurring algae and applies the fundamental principles of photosynthesis and state-of-the-art light-measuring instruments to provide continuous, unattended surveillance of both standing and flowing water supplies. The AquaSentinel technology delivers a very large return on a modest investment.

It can be deployed anywhere in the world drinking water is drawn from sources that are exposed to sunlight. AquaSentinel collects real-time data in the field and sends it by remote encrypted wireless transmissions to a command center. Results are obtained in minutes and can give decision makers hours in which to respond to potentially abnormal conditions.

United Defense, L.P., of York, Pennsylvania, has acquired an exclusive commercial license in the United States for the AquaSentinel technology and is currently marketing a device named WaterSentry™ that is based on this technology. The Department of Energy Office of Basic Energy Sciences provided major funding for the early research. The Defense Advanced Research Projects

Agency (DARPA) funded the proof-of-principle research for four years. Then, United Defense began funding at ORNL through a companion Work for Others agreement.

United Defense started the license negotiations, obtained its license, and launched a large-scale marketing campaign of its WaterSentry™ device. It continues to fund R&D at ORNL to further develop this licensed technology.

ORNL has been analyzing water samples from different states in an ongoing effort to support United Defense's WaterSentry™ marketing campaign. Thus far, the Tennessee Department of Homeland Security plans to install a WaterSentry™ system near Nashville, and the U.S. Army plans to install one at Fort Bragg, North Carolina. They will be added as water sensors in the nationwide ORNL SensorNet Program. York, Pennsylvania currently has a WaterSentry™ unit in operation. The cities of Jacksboro and Caryville, Tennessee are in final negotiations for three WaterSentry™ units (\$50,000 each) and a control station.

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EXPLOSIVES DETECTION

Department of Energy
Sandia National Laboratories

The Explosives Detection Personnel Portal was developed by Sandia National Laboratories through funding by the Federal Aviation Administration (FAA) to rapidly screen people for trace amounts of explosives at sites such as airports.

The person enters the portal and pauses while rapid puffs of air dislodge vapor and particles from the person's clothing, skin, hair, and shoes. The portal draws the air and particles into a preconcentrator that concentrates the explosive sample before delivery to a chemical detector.

The portal's major advantage is Sandia's systems approach to the problem: collecting and delivering an excellent sample enhances the success of the detector.

The portal can detect common explosives with a high sensitivity (up to parts per quadrillion) and can detect whether people have been handling explosives or if they are carrying concealed explosives.

Sandia developed the portal for the FAA, and licensed the sample collection and preconcentration technology to Barringer Instruments, Inc., which was acquired by Smiths Detection. Smiths Detection now manufactures the SENTINEL explosives detection portal, which is in use at several nuclear power plants in Canada and the U.S., and at several correctional institutions in Greece, Mexico, and the U.S. for drug-detection applications.

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SUPER-EFFICIENT COMPUTING

Department of Energy
Los Alamos National Laboratory

Green Destiny is the world's most efficient computer—up to 10 times higher performance/power ratio than other supercomputing plat-

See Efficient Computing, page 5

Efficient Computing, from page 4

forms. Conventional supercomputers require customized, expensive infrastructure; and because many projects and institutions do not have the money to invest in or sustain the total cost of ownership of conventional supercomputers, the supercomputing capacity and efficiency provided by Green Destiny is recognized worldwide as an affordable and environmentally sustainable alternative. In 2003, Green Destiny received an R&D 100 Award, which *R&D Magazine* gives to the world's top 100 scientific and technological advances that show the most significant commercial potential.

BLAST, an open-source software package distributed by the National Center for Biotechnology Information, has become the ubiquitous genomic-sequencing tool in molecular biology. With mpiBLAST, its open-source parallelization of BLAST, Los Alamos National Laboratory (LANL) has dramatically enhanced BLAST's throughput.

Dr. Ernst Dow, senior information consultant for Eli Lilly and Company, said, "As both a standalone application and as a part of a larger pipeline of software tools, mpiBLAST will enable our senior scientists to get robust results in a fraction of the time it took in the past. As a result of tools like mpiBLAST, the bioinformatics team at Lilly is able to provide a flexible, robust computing environment never before seen by scientists."

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BIOMOLECULAR SEPARATION

Department of Energy
Oak Ridge National Laboratory

The Photo-Molecular Comb™ Biomolecular Separator separates proteins and other biomolecules for identification and analysis.

The entire device is miniature; separations take place in a thin sieving layer on the surface of a semiconductor chip. The sieving layer-semiconductor interface is electrified, and a low-power light source directs the current spatially, causing molecules to separate in three dimensions. Unlike microfluidic devices, the Photo-Molecular Comb™ does not require prefabricated channels in the semiconductor.

Oak Ridge National Laboratory (ORNL) researchers conceived, developed, and patented the Photo-Molecular Comb™ technology. Protein Discovery, Inc., of Knoxville, Tennessee, has licensed the technology from ORNL and developed a product, the Serum Profiler™.

This technology allows scientists and clinicians to simultaneously detect and monitor thousands of disease markers ("biomarkers") in contrast to existing diagnostics that measure biomarkers one at a time. In the near future, clinicians will use this technology to detect the presence of disease from a drop of blood, scientifically predict how it will progress, and tailor treatment options accordingly. Thus, the commercial potential for this technology is outstanding, estimated by industry analysts at \$800 million in 2004 and projected to grow to over \$1.5 billion by 2008. A CRADA is active with ORNL for continued research and development.

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HOLOGRAPHIC BODY SCANNER

Department of Energy
Pacific Northwest National Laboratory

The transfer of the Millimeter Wave Holographic Body Scanner to the commercial sector has been a success for Pacific Northwest National Laboratory (PNNL) and for the two companies that have licensed the technology.

In security applications, the body scanner detects any item worn in or under clothing, including plastics and ceramics, without exposing the body to ionizing radiation. No other scanner is as safe, as thorough, or has the capability to detect the broad array of items that might be concealed under clothing. This device brings a new level of safety to airports and other public places where terrorists might try to use weapons. But not only is the scanner being used for security purposes, as originally envisioned, it is quickly achieving success in the apparel industry, where it is being used by several nationwide clothing chains to determine customers' exact measurements.

This scanner provides dozens of precise measurements in less than 10 seconds while the person remains dressed in their own clothing.

An aggressive marketing campaign was launched, advertisements were placed in *Commerce Business Daily*, and a website was created. The commercialization team performed market and competitive analyses and established a value chain.

The vigorous marketing and business analysis by the PNNL commercialization team has helped in successfully licensing the technology and establishing commercial partnerships with two new and growing companies.

Several scanners are now being used by major clothing chains, and many more have been ordered. The device is now being produced and marketed for both security and apparel applications in this country and in Europe.

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MICRO TOMOGRAPHY FOR BIO RESEARCH

Department of Energy
Oak Ridge National Laboratory

The MicroCAT™ converts two-dimensional views of small research animals such as mice into three-dimensional digital images of their internal structures.

MicroCAT™ allows researchers to perform more effective biological and pharmaceutical studies using fewer animals. Because it can image living animals (does not require euthanasia), a test subject can serve as its own control because it can live on and undergo subsequent imaging studies. Thus, for example, the effectiveness of experimental therapeutic drugs can be ascertained.

Customers include research universities and hospitals, biotechnology companies, and pharmaceutical companies with small animal research programs to perform genetic, disease, and drug discovery research.

The two researchers who developed the MicroCAT™ at Oak Ridge National Laboratory (ORNL) formed

ImTek in 1998 as a means to commercialize the technology. Also in 1998, ImTek obtained licenses from ORNL for the copyrighted software packages and the MicroCAT™ trademark.

In June 2003, Philips Medical Systems, a Tier 1 medical imaging company, entered into a sales and marketing partnership with ImTek, Inc.

Since ImTek's formation in 1998, the MicroCAT™ has become an essential part of human health research programs at more than 30 sites, including some world-leading research companies and luminary universities. Commercial sales in 2003 exceeded \$2 million; 2004 sales were expected to exceed \$4 million.

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CONTROLLING MERCURY IN FLUE GAS

Department of Energy
National Energy Technology Laboratory

Electric power generation within the United States is accomplished primarily by the combustion of fossil fuels.

This produces air pollutants, including such acid rain precursors as sulfur dioxide or nitric oxides. These pollutants are regulated by existing laws. Mercury is a major pollutant that has caused much concern because of its toxicity and appearance in the ecology, for example in the food chain via fish. Mercury is not currently regulated.

Although only about 48 tons of mercury are emitted from all U.S. power plants over the course of a year and the mercury concentration is exceedingly small in flue gas, EPA has deemed that regulations will be enacted in 2005.

The technology that was transferred came from an in-house research effort at the National Energy Technology Laboratory (NETL). The nominees were able to patent a novel technique to enhance the removal of elemental mercury from flue gas, which uses the capability of mercury to photochemically react in the presence of ultraviolet light of a specific wavelength. The nominees publicized these results via professional conferences, peer-reviewed journals, and DOE press releases. A company that could utilize this patented technique realized that this was more efficient and less costly than one they were using. After representatives of the company contacted NETL, an exclusive license for the patent was negotiated for the technology transfer. The potential market for the technology could be \$3 billion.

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SOFTWARE FOR PROTEIN RESEARCH

Department of Energy
Los Alamos National Laboratory

Have you ever watched a television show with poor reception? The fuzzy picture on the screen often makes it difficult to discern the characters and the action, making for a frustrating evening at home.

In the world of proteomics, SOLVE/RESOLVE software helps researchers get clear pictures of protein structures, allowing the researchers to develop new pharmaceuticals and to understand how proteins work.

SOLVE allows scientists to create 3-D images of protein molecules. This ability is in high demand in the biotech and healthcare fields because of the importance of these models in the design of new drugs and the engineering of new enzymes for commercial use. Licenses granted for SOLVE include more than 40 government-use licenses, 375 noncommercial licenses to educational and non-profit institutions worldwide, and 25 commercial licenses for use in the biotech and pharmaceutical fields. SOLVE has generated more than \$1.2 million in royalties for LANL in the last five years while supporting a strong educational component.

With SOLVE/RESOLVE, scientists worldwide are building models to see the shapes of proteins and from these to determine which molecules might bind to a given protein and how the protein might work. As a result, medical researchers are taking the first steps in developing pharmaceuticals and treatment options that will significantly address and perhaps even eliminate diseases that range from arthritis and hemophilia to diabetes and cancer.

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EVALUATOR PANEL

Representing a cross-section of federal laboratories, industry, and academia, the members of the Evaluator Panel enthusiastically devoted their time and effort to judging the dozens of nominations submitted for the Awards for Excellence in Technology Transfer. The FLC recognizes their tireless efforts and expresses its gratitude.

Dr. Tom Anyos
The Technology Group

Maryam Azarion
Army Medical Research Institute of Infectious Diseases

C. Dan Brand
FLC Chair (1997-2001)

Linda Cauffman, *BWXT-Pantex*

Neil Chaudhry, *BuyCasings, Inc.*

Joe Culver, *National Energy Technology Laboratory*

Jennifer Ferragut
National Security Agency

Dr. Edgar King
Agricultural Research Service

Roger Lewis, *Department of Energy*

J. Terry Lynch,
National Institute of Standards and Technology

Margaret McNamara
University of Buffalo

Susan McRae
Army Space and Missile Defense Command

Geoffrey Phillips
Defense Microelectronics Activity

J. Susan Sprake
Los Alamos National Laboratory

Martha Steinbock
Agricultural Research Service

Tara Weaver-Missick
Agricultural Research Service

FLC REGIONAL AWARD WINNERS

Far West Region

Laboratory Representative of the Year
Chuck Briggs, Idaho National Laboratory

Outstanding Partnership Award

TechLink – “Moving Technology from Minds to Market”

Special Award of Appreciation

J. Susan Sprake, Los Alamos National Laboratory

Mid-Atlantic Region

Award for Excellence in Technology Transfer
NASA Goddard Space Flight Center – “Recursive Hierarchical Segmentation Pre-processing Engine for Analyzing Imagery Data”

NASA Goddard Space Flight Center – “GPS Enhanced Onboard Navigation System”

USDA ARS Eastern Regional Research Center – “Extruder Texturized Whey Proteins for Use in Reduced Carbohydrate Foods”

USDA ARS Food Surveys Research Group – “Automated Multiple Pass Method: An Improved Method for Collecting Dietary Intakes”

USDA ARS Hydrology and Remote Sensing Laboratory – “A Real Time Assessment System for Spring Wheat Production in Siberia”

Regional Appreciation Award

Bradley DeRoos
West Virginia High Technology Consortium

Regional Industry Award

West Virginia High Technology Consortium
Foundation, Fairmont, West Virginia

Regional Laboratory Award

Naval Medical Research Laboratory
Silver Spring, Maryland

Mid-Continent Region

Outstanding Laboratory Award
Institute of Telecommunications Sciences
Boulder, Colorado

USDA ARS Great Plains System Research Unit
Fort Collins, Colorado

Outstanding Technology Development Award

DOE Ames Laboratory
“Midwest Forensics Resource Center”

Los Alamos National Laboratory/USDA-FS Rocky Mountain Research Station
“FIRETEC: A Physics-Based Wildfire Model”

Los Alamos National Laboratory
“Reagentless Optical Biosensor”

National Renewable Energy Laboratory
“Advanced Vehicles and Fuels”

National Renewable Energy Laboratory
“Vehicle Thermal Comfort”

Sandia National Laboratories
“Radioactive Source Registry Tracking System”

Sandia National Laboratories
“Using Science and Technology to Solve High-Consequence Fire Problems”

Distinguished Service Award

Lawrence (Marty) Murphy, Ph.D.
National Renewable Energy Laboratory

Dr. Benjamin P. Warner
Los Alamos National Laboratory

Dr. Edward S. Yeung
DOE Ames Laboratory

Award of Appreciation

Dr. Roger J. Zimmerman
NOAA National Marine Fisheries Service

Southeast Region

Project of the Year

Oak Ridge National Laboratory
“MicroCAT™ X-ray Micro Computed Tomography for Biological Research”

Excellence in Technology Transfer Award

Oak Ridge National Laboratory
“AquaSentinel Real-Time Water Supply Protection Monitor”

Oak Ridge National Laboratory
“Photo-Molecular™ Biomolecular Separator”

USDA ARS Mid South Area, Southern Regional Research Center, Formosan Subterranean Termite Research Unit

“Bait Matrices for Controlling Formosan Subterranean Termites and Ants”

U.S. Army Engineer R&D Center, Geotechnical and Structures Laboratory
“Introduction of Bullet Trapping Foamed Concrete for Live-Fire Training Ranges”

JOB ANNOUNCEMENT!

FLC Washington, DC Representative

The FLC, a nationwide Congressionally chartered network of federal laboratories for promoting and facilitating technology transfer, is seeking a Washington, DC Representative. Responsibilities include providing coordination with federal agencies and Washington-based representatives of aligned communities (e.g., trade associations, nonfederal government associations, industry, etc.); promoting technology transfer to the private sector; establishing dialogue and coordinating action on technology transfer issues with congressional committees and representatives of federal agencies, laboratories, and nonfederal organizations; and identifying innovative technology partnerships for federal laboratories.

Minimum qualifications are a bachelor's degree with a major in science, engineering, or business; a minimum of five years experience in R&D, R&D program management, or technology transfer; and a working knowledge of the

FLC's programs and organization. Skill in verbal and written communication; an ability to establish person-to-person relationships at all levels in the public and private sector; and ability to work effectively as a member of a team are essential. A graduate degree and familiarity with the R&D-to-commercialization cycle are desirable but not required.

The position is a two-year assignment, but may be extended up to two additional years. Salary range is equivalent to SES, GS-13/14 grade level (approximately \$100,000 per year). Candidates for the position should submit a letter and resume by mail, fax, or e-mail to J. Susan Sprake, FLC Selection Committee, Federal Laboratory Consortium, 950 North Kings Highway, Suite 208, Cherry Hill, NJ 08034. Email (MS Word docs) applications to flcmso@utrs.com OR fax to (856) 667-8009. Applications must be received no later than July 25, 2005.