

NEWSLINK

FEDERAL LABORATORY CONSORTIUM FOR TECHNOLOGY TRANSFER

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DOE, NASA, and USDA Lab Heads Share Top Director Honors

Four directors from FLC member labs share the 2000 Laboratory Director of the Year Award—Dr. Jeremiah Creedon of NASA Langley Research Center; Dr. Donald Koeltzlow of the USDA Grain Marketing and Production Research Center; Dr. William Madia, recognized for his tenure as director of the DOE's Pacific Northwest National Lab (PNNL); and Dr. Susan Wood of the DOE's Savannah River Technology Center (SRTC). The directors were honored for their support of tech transfer on May 10 during the FLC National Meeting in Charleston, SC. The awards were given by the FLC's National Advisory Council.

Dr. Jeremiah Creedon

Dr. Creedon has truly earned his reputation as an avid tech transfer supporter. As chair of a task force to determine NASA's role in tech transfer, he created a plan that resulted in the NASA Administrator's strong endorsement of tech transfer and significantly changed how NASA does business. At NASA Langley, Dr. Creedon strongly supported a royalty directive that recognizes NASA inventors while also providing a return on investment to NASA centers. Langley's successful commercialization program leads NASA licensing, patenting, and royalty income. Under Dr. Creedon's leadership, industry partnerships focusing on materials and aviation safety were established. Other examples of Dr. Creedon's support of tech transfer include the annual inventor awards luncheon, the establishment of Langley tech transfer awards, and the development of a web site that helps Langley researchers find answers to tech transfer questions. The Hampton Roads Technology Incubator also benefited from Dr.

Creedon's involvement. In its first year of operation, the incubator obtained four in-house clients and eight other potential clients to support licensing and commercialization of Langley-developed technologies. Since Dr. Creedon became director, more than \$1 million in royalties have been received, and the Commercialization Program Office staff has grown tremendously—experiencing a 40% increase in patent attorneys and a 35% increase in tech transfer personnel.



Dr. Donald Koeltzlow

Since assuming the director role at the Grain Marketing and Production Research Center, Dr. Koeltzlow has tirelessly promoted the idea that research must relate to customer needs. Therefore, he meets with all center scientists to discuss their research and determine who their customers are. Dr. Koeltzlow also meets regularly with these customers to present research results and determine research needs. One of his most important new initiatives was the establishment of a quarterly newsletter called *Research Kernels*. Reporting on new research and tech transfer activities, the newsletter reaches

hundreds of readers. Taking advantage of the lab's close proximity to **Kansas State University (KSU)**, Dr. Koeltzlow launched an annual open house that highlights research and tech transfer activities. Scheduled in conjunction with a KSU football game, the event draws potential customers from Kansas and surrounding states. Other activities include development of a brochure highlighting the center's mission and tech transfer activities and participation in the **Grain Industry Alliance**. Dr. Koeltzlow also actively promotes the center and its tech transfer activities at a variety of industry, customer, and university events. Thanks to Dr. Koeltzlow's efforts, the center received increased funding from the **Agricultural Research Service** and external sources and has seen increases in industry visits and CRADAs. In addition, the dollar amount of CRADAs has grown substantially—from \$3,500 in 1993 to \$161,000 in 1999.

Dr. William Madia

When Dr. Madia became director of PNNL, he initiated three strategic efforts that redefined PNNL tech transfer. First, he shifted from a centralized tech transfer function to a model that broadly engages the staff responsible for technology

Please see DIRECTORS, p. 2

INSIDE

This special edition of *NewsLink* highlights the FLC's 2000 award winners. The June issue—with its focus on electronics, sensors, and photonics—will be mailed in mid-June.

<i>2000 FLC Awards for Excellence in Technology Transfer</i>	2
<i>FLC Service Awards</i>	10

DIRECTORS *from p. 1*

development. Second, he used an advisory council of industry leaders to obtain input on PNNL's strategic agenda. Third, Dr. Madia developed innovative methods for furthering industry-lab partnerships—including co-locating PNNL researchers with industrial partners. Dr. Madia also ensured the continued development of tech transfer by consistently ranking it as a high priority in the lab's strategic plan. Perhaps his greatest achievement was the establishment of the **PNNL Economic Development Office (EDO)**. One of the EDO's greatest successes has been the Entrepreneurial Leave of Absence, which enables lab employees to commercialize PNNL technologies and form a new company while retaining their original position at the lab. As a result of this program, 40 new companies have been launched in just under four years. Other EDO offerings include small business technology programs and a program that matches local businesses with PNNL technologies. During his PNNL tenure, Dr. Madia worked with the DOE and local businesses to develop two state-of-the-art tech transfer facilities—the **Applied Process Engineering Lab** (a start-up center for designing medical, biotech, engineering, and environmental products) and the **Agri-Business Commercialization and Development Center** (which allows entrepreneurs to test and develop agriculture-based technologies using the latest equipment and computing services). In February, Dr. Madia assumed the lab director post at the **DOE's Oak Ridge National Lab**.

Dr. Susan Wood

Since her appointment as director, Dr. Wood has instituted many innovative programs for promoting SRTC technologies.

- ◆ The Strategic R&D Funding Program funds the long-range development of critical projects. So far, 24 projects worth \$4 million were funded—yielding many dual-use technologies.
- ◆ The Summer Law Student Program pairs law students and inventors to prepare high-quality invention disclosures.
- ◆ The Patent Recognition Program rewards researchers with a cash award upon successful completion of a patent disclosure.
- ◆ The Royalty Sharing Program encourages inventors to file disclosures and work with the Technology Transfer Office to increase licensing opportunities. Incentives include the first \$2,000 of royalties and a percentage thereafter.
- ◆ The Mini-Sabbatical Program helps researchers find the time to write and prepare papers for peer-reviewed journals.

As part of her ongoing mission to publicize SRTC's work, Dr. Wood initiated the SRTC Visibility Campaign, which introduced SRTC's R&D to science and technology media outlets. The results have been impressive—with SRTC projects being featured on the Fox News Channel and in *Popular Science* and the *Times of London*. Dr. Wood also encourages SRTC lab personnel to accept high profile positions in professional societies and organizations. Perhaps the definitive measure of Dr. Wood's successful tech transfer mission is the increasing number of licenses issued by the lab. Under Dr. Wood's leadership, this number has increased by more than 500%. **NL**

FLC Award Recipients Highlight the Power of Technology Transfer

On May 10, 105 individuals from 18 labs and 7 federal agencies and departments were recognized for their technology transfer accomplishments when they received FLC Awards for Excellence in Technology Transfer during the FLC's annual awards banquet in Charleston, SC. Thanks to the efforts of this year's recipients, we will all enjoy a safer food supply, improved medical treatments, increased energy efficiency, and a cleaner environment. Their work has also increased U.S. competitiveness and resulted in dramatic cost savings. In addition, revenue for companies that licensed and commercialized these technologies runs into millions of dollars.

A panel of tech transfer experts from industry, state and local government, academia, and the federal laboratory system judged the nominations. One of the most coveted awards in the tech transfer field, the FLC Awards for Excellence in Technology Transfer recognize individuals within federal labs (and their industry partners) who have done outstanding work transferring federally developed technology from the lab to the marketplace.

A Pre-Harvest Certification System for Pork Safety

USDA ◆ Agricultural Research Service (ARS) ◆ Parasite Biology and Epidemiology Lab

H. Ray Gamble developed a system for certifying pork safety and transferred it to the U.S. pork industry—using new technology to document good livestock production practices that ensure fresh pork is safe to eat. Through Cooperative Research and Development Agreements (CRADAs) with the pork industry and several federal research and regulatory agencies, Gamble researched which livestock production practices minimize the risk of pigs being exposed to the parasite *Trichinella spiralis*. Gamble's work resulted in a risk reduced management system, an auditing system for swine management systems, training programs and educational materials, and an enzyme immunoassay to detect *Trichinella* infection. Gamble is currently writing standards for a national program and working closely with packers and producers to ensure the certification system is properly implemented. The benefits of Gamble's work are numerous: the pork industry will increase sales of fresh pork; federal

agencies will be better able to provide a safe food supply; and consumers can confidently purchase fresh pork.

For more info: H. Ray Gamble, 301-504-8300, rgamble@psi.barc.usda.gov

Computerized Cotton Gin Process Control System for Prescription Process Cotton

USDA ♦ ARS Mid-South Area ♦ Cotton Ginning Research Unit

The team developed and transferred a Computerized Cotton Gin Process Control System (CCGPCS)—marketed as Intelligin—that allows cotton to be “prescription processed” based on its needs—a practice that increases profitability by improving cotton quality. For farmers, profits per bale increase by approximately \$20. Thus far, five of the eight patents associated with Intelligin have been licensed to private industry, five CRADAs have been executed, and 70 publications have been written. Based on the 17 systems installed for the 1999 ginning season, farmers could increase their profits by more than \$10 million. If the system were used for the entire U.S. cotton crop, market value could increase by more than \$400 million annually. Intelligin represents one of the most significant improvements in ginning technology since Eli Whitney first developed the cotton gin in 1792.

For more info: W. Stanley Anthony, 662-686-3094, santhony@ag.gov



W. Stanley Anthony and Richard Byler

Innovative Particle Film Technology for Crop Protection and Enhanced Yield

USDA ♦ ARS North Atlantic Area ♦ Appalachian Fruit Research Station

Dr. David Glenn and **Dr. Gary Puterka** created a new pest control concept based on chemically inert mineral particle films. The technology’s feasibility was demonstrated during several trials using materials from the **Englehard Corporation**. The trials led to a CRADA for research on film formation, which included validating the technology’s pest control potential through multiple collaborations with scientists in the U.S. and 10 other countries. A limited commercial launch by Englehard—under the name Surround™ Crop Protectant—controlled the insect pear psylla in pears and reduced sunburn in apples. This year, the company plans to



Dr. Gary Puterka and Dr. David Glenn

expand national sales and initiate international sales. The technology effectively reduces pesticide levels in agricultural and household applications and offers improved protection for farm workers, consumers, and the environment. The technology is expected to have a major impact on production and protection practices for a multitude of crops.

For more info: Dr. David Glenn, 304-725-3451 x321, mglenn@afrc.ars.usda.gov

Diagnostic Test for Important Animal Diseases with Public Health Implications

USDA ♦ ARS Pacific West Area ♦ Animal Disease Research Unit

Dr. Katherine O’Rourke and **Dr. Donald Knowles** successfully developed and transferred three diagnostic methodologies for infectious diseases found in animals. One technology was used to develop the first preclinical diagnostic test for scrapie, a disease found in sheep. The diagnosis reagents were licensed nonexclusively to two companies, **VMRD, Inc.** and **Affinity Bioreagents**.



Dr. Katherine O’Rourke and Dr. Donald Knowles

A second technology involves a diagnostic method that detects bovine anaplasmosis, a disease found in cattle. Three major pharmaceutical companies are interested in licensing the technology, which is expected to be adopted by the cattle industry upon release. The third technology is a test that detects disease-causing parasites in horses. In all three cases, the team worked with the **Animal Plant Health Inspection Service** and the **National Veterinary Services Lab**. These diagnostic methods will dramatically affect animal production and public health. Eradicating scrapie will enhance the export of U.S. sheep and remove a potential source of Mad Cow Disease. The second test will help the U.S. cattle industry accurately identify bovine anaplasmosis carriers—helping to prevent the disease. Finally, the equine parasite testing technology will be a boon to horse breeders and the equestrian and horse racing industries.

For more info: Donald Knowles, 509-335-6001, dknowles@vetmed.wsu.edu

Low Phytic Acid Crops That Reduce Run-off and Protect Water

USDA ♦ ARS Pacific West Area ♦ Small Grains and Potato Germplasm Research Unit

Dr. Victor Raboy discovered a method for producing natural, low phytic acid cereals and legumes. When digested by animals such as chickens, hogs, and fish, less phosphorus is excreted—leading to reduced phosphorus in wastewater from animal production facilities or fields fertilized with animal manure. In 1993, Dr. Raboy entered into a five-year

CRADA with **Pioneer Hi-Bred International** to introduce his methodology into Pioneer's elite corn lines and to conduct extensive agronomic testing and livestock feeding studies. At the CRADA's end, Dr. Raboy developed a licensing strategy for his invention—eventually negotiating nonexclusive licenses with four companies. To continue the tech transfer process, Dr. Raboy is working with numerous corn, barley, rice, and soybean breeders. The most important benefit of the technology is reduced phosphorus run-off in wastewater, which has been linked to outbreaks of *Pfesteria*, a microbe fatal to some fish. Low phytic acid crops also help protect water resources.



Dr. Victor Raboy

For more info: Victor Raboy, 208-397-4162 x151, vraboy@uidaho.edu

Areawide Suppression of the Codling Moth without Chemical Pesticides

USDA ♦ ARS Pacific West Area ♦ Yakima Agricultural Research Laboratory

A team of industry, academia, and ARS researchers successfully implemented an areawide program to suppress the codling moth in apple and pear orchards without the use of pesticides. The program serves as a model for using insect sex pheromones and other "soft" control measures to suppress moth populations. Since 1995, the award recipients have worked closely with growers to ensure that the program can be adopted without government support. As a result, the program expanded from five initial sites to 22 sites—with total acreage increasing from 3,000 to more than 21,000. Because of the program's success, mating disruption as a control strategy has grown dramatically outside the test sites, and chemical use has decreased from 12 pounds per acre annually to about one-fifth of this amount.

For more info: Carol Calkins, 509-454-6570, ccalkins@yarl.gov



Radiation Measurement Standards for Prostate Cancer Brachytherapy

Department of Commerce (DOC) ♦ National Institute of Standards and Technology (NIST)

Prostate cancer is the most common form of cancer in men, and a new treatment that implants tiny radioactive sources (called brachytherapy "seeds") into the diseased prostate is proving to be nearly as effective as surgery—but without the harmful side effects. The seeds emit low-energy x-rays and deliver a short-range



Dr. Bert Coursey, Stephen Seltzer, Paul Lamperti, Dr. Michael Mitch, Dr. Brian Zimmerman

radiation dose to the tumor while sparing healthy tissue. The NIST team developed a number of methods to measure and calibrate the radioactive brachytherapy seed sources and then transferred their findings to industry by providing designated Accredited Dosimetry Calibration Laboratories (ADCLs) with calibrated radioactive seeds, associated calibration reports, and measurement techniques for reproducing the NIST calibrations. The team also worked with manufacturers on quality control and assurance issues. The team's work resulted in a single standard for the calibration of brachytherapy seeds—allowing each manufacturer to economically produce a calibrated product and comply with federal regulations. Besides the benefits to the health and well-being of the public, the team's work reduces health-care costs and helped grow the industry from two manufacturers to 10.

For more info: Dr. Bert Coursey, 301-975-5584, bert.coursey@nist.gov

The SEM Monitor—A Cost-Effective Approach to Instrument Performance Monitoring

DOC ♦ NIST

Scanning electron microscopes (SEMs) have almost replaced optical instruments for the inspection and metrology of critical dimensions on integrated circuits. Because a single SEM can process up to \$1 million of product per hour, most semiconductor lines use several SEMs because a poorly performing instrument can negatively affect product yield and profits. To solve this problem, the NIST team developed an analysis technique and measurement algorithm to analyze and characterize a SEM's real-time performance. The NIST team then transferred this technology to industry. The first transfer was to **SPECTEL Company**, which helped develop a proof-of-concept product. Once the product was ready, it was



Dr. Robert Larrabee



Dr. Michael Postek

made available to the semiconductor industry through **SEMATECH** and its member companies. A public domain version of the monitor was also developed—allowing any SEM manufacturer to incorporate the technology directly into its instrument. A major benefit is increased profits from accurately scanning more wafers. For example, a 10% increase in accurately scanned wafers could increase profits by as much as \$300 million per year.



Dr. Andras Vladar



Dr. Nien-Fan Zhang

For more info: Dr. Michael Postek, 301-975-2299, postek@nist.gov

High-Temp FPE Dielectric Tech Transfer Program

Department of Defense (DOD)-Air Force ♦ Air Force Research Laboratory (AFRL) ♦ Propulsion Directorate

Via a partnership between **AFRL** and the **Wright Technology Network**, **Sandra Fries-Carr** and **Bob Monter** developed a high-temperature, high-performance dielectric film for use in aircraft capacitors—devices that store electrical charges.

Called Fluorene Poly Ester (FPE), the film can be used at temperatures ranging from -55° Celsius to 227° Celsius. The technology fills a need because state-of-the-art aircraft capacitors are the weakest link in the power electronic system due to their limited operating temperatures. The technology



Sandra Fries-Carr and Bob Monter

transfer coupled technical assistance with marketing “push-pull.” The technology was “pushed” into the marketplace by introducing FPE resin manufacturers to potential capacitor manufacturers. The technology was then “pulled” by supplying technical and lifetime test data to capacitor manufacturers and introducing them to supplying manufacturers. Since the partnership was formed, in-depth interactions have taken place among companies concerned with developing FPE resin, film, or capacitor fabrication. Although initial beneficiaries will be military and other government agencies, FPE could also be successfully applied to oil well drilling, automotive, commercial aircraft ignition systems, and medical defibrillators.

For more info: Sandra Fries-Carr, 937-255-6016, sandra.fries-carr@afri.af.mil

Polyhedral Oligomeric Silsesquioxane (POSS) Nanotechnology: The Next Generation of Polymers

DOD-Air Force ♦ AFRL ♦ Propulsion Directorate

To meet the DOD’s demand for lighter weight, higher performance polymeric materials, the team developed new

chemical feedstock technologies based on POSS nanotechnology. The result is a chemical hybrid between inorganic and organic systems—the first new chemical feedstock developed for the polymer industry in 40 years. The technology

transfer took the form of a CRADA between **AFRL** and **Hybrid**

Plastics LLC (a company formed to commercialize POSS technology) and the licensing of Air Force patent rights to a third party. To produce POSS chemical feedstocks commercially, Hybrid Plastics transitioned the technology from the AFRL lab to its own production facilities and provided expertise, resources, and facilities to help investigate POSS polymer properties. AFRL also negotiated with several third-party companies (including **Aldrich Chemical, Inc.** and **Gelest, Inc.**) to provide materials and technical information. POSS could revolutionize the \$140 billion American plastics industry. Commercial chemical companies now sell and distribute POSS monomers, and 25 specialty firms in the polymer industry are incorporating the material into their manufacturing processes.

For more info: Dr. Shawn Phillips, 661-275-5416, shawn.phillips@ple.af.mil



Justin Leland, Dr. Rusty Blanski, Dr. Shawn Phillips, Pat Ruth, and Timothy Haddad



Dawn Hilton, Michael Carr, Dr. Joseph Lichtenhan, Dr. Joseph Schwab (Not pictured: Traudi Walker)

Digital Eye Screening—Today’s Technology for the Public’s Health

DOD-Army ♦ Aviation and Missile Command ♦ Missile Research, Development, and Engineering Center (MRDEC)

Refractive photography has been used to diagnose eye diseases for years. However, picture quality is uncertain until the film is developed, and the entire process can take several weeks. In 1997, **Vision Partners** visited the **U.S. Army Aviation and Missile Command’s MRDEC** to investigate automating and improving the refractive process using advanced imaging and signaling processing. **Wayne Davenport** immediately went to work on the problem and, through a CRADA with Vision Partners, designed a smaller and lighter system that provides real-time feedback and increases accuracy. Called the iScreen, the device can screen for a variety of eye diseases in a matter of seconds. Once developed, Davenport built five devices himself—eventually transitioning this process to **SPARTA, Inc.** Currently, 35 units are being tested in doctors’ offices—with another 250 units available for doctors’ offices and schools. Immediate

beneficiaries are young children who undergo mandatory screening by pediatricians. However, the general public will also benefit because children will be able to be screened through state-run programs, which will make the process more affordable.

For more info: Wayne Davenport, 256-876-8183, davenportw@redstone.army.mil

Acoustic Physiological Monitoring Sensor

DOD-Army ♦ Army Research Laboratory (ARL)

The acoustic physiological monitoring sensor developed by **Michael Scanlon** is a breakthrough technology with life-saving potential. The sensor provides excellent acoustic coupling of heart and breath sounds; collects information concerning heart, lungs, and digestive tract functions; and detects changes in voice or sleep patterns, motor activity, and mobility. Technology transfer occurred when **Vestaguard Corporation** and **Personal Electronics Devices (PED), Inc.** licensed Scanlon's invention. Vestaguard will develop a SIDS and apnea monitor and will continue to develop the technology through a CRADA. PED will market the device for "ambulatory monitoring for exercise purposes." Scanlon is negotiating with four other companies to license the technology in other fields. The primary beneficiaries are infants, adults suffering from sleep apnea, and those who monitor their bodily processes during exercise. As additional licenses are initiated, quality of life could be improved for the infirm, hospital patients, and the elderly. Almost half of the U.S. population could benefit from Scanlon's technology.

For more info: Michael Scanlon, 301-394-3081, Mscanlon@army.mil

The LASFORM™ Rapid Prototyping System

DOD-Army ♦ ARL

A team of **ARL** and **AeroMet Corporation** engineers successfully transferred a new rapid prototyping technology—the LASFORM™ laser forming system. The flexible, one-step process results in prototyped parts with excellent strength and toughness and offers size capabilities unavailable elsewhere. The transfer effort was executed via a CRADA between ARL and AeroMet (a subsidiary of **MTS Systems Corp.**), which was founded to commercialize LASFORM. To that end, AeroMet installed the large-scale laser-forming system in its 16,000-square-foot facility. Other companies are now evaluating the technology for reducing the cost of traditionally cast and forged components. Nontraditional partnerships have also been formed



Dr. Donald Krantz, Dr. Frank Arcella, Walter Roy, Fred Stenton, Robert Dowding, Daniel Snoha

with companies such as **General Electric** and **Wyman Gordon** to share data and reduce the cost of exploiting new manufacturing processes. AeroMet was also awarded a contract from **Boeing** to demonstrate LASFORM's viability in producing and repairing hard-to-get titanium spares. Users are seeing costs for parts production decreasing by as much as \$50 million.

For more info: Walter Roy, 410-306-0830, wroy@arl.mil

A Maximally Secure Computer Network for Processing Highly Sensitive Data

DOD-Navy ♦ Naval Air Warfare Center Weapons Division (NAWCWD)

Information in a computer or server is often an organization's most valuable resource. In 1997, NAWCWD entered into a CRADA with **Market Central, Inc.** and **Radionics, Inc.** to investigate methods

for achieving very high levels of computer security within a flexible system architecture that can be adapted to any computer-intensive industry. The result was the development of two security products—Radionics's Readykey® Information Security System for Computers™ and Market Central's SecureSwitch™ Information Security System (SISS)—and seven licensed inventions. The system is unique because until access authorization is determined, unique electronic switches physically isolate the computers and servers. Under the CRADA, Market Central and the Navy codesigned and developed three switches to control electrical power and network connections, and Radionics provided the hardware/software expertise to interface the switches with existing access control products. The CRADA provided a framework for the successful transfer of cutting-edge security technology to the private sector—ultimately resulting in a higher level of security throughout the information technology infrastructure.

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For more info: Ross Seybold, 760-939-5025, seyboldre@navair.navy.mil



Standing: Ross Seybold, Steve Bouthillier (deceased). Seated: Robert Sulkowski, Brian Dodge. Not pictured: Dana Kellogg, Randall Morse, Sydney Blowers, Kenneth Wesche, John Seybold, James Pinnell

Ceramicrete Technology

Department of Energy (DOE) ♦ Argonne National Laboratory

Ceramicrete uses a nontoxic, nonflammable binder to form products that are impermeable to groundwater and have

twice the strength of cement. Applications include road repair, commercial products based on recycled benign wastes, and safer nuclear operations. Although originally developed to treat radioactive and hazardous wastes for safe disposal, **Arun Wagh** and **Dileep Singh** recognized its versatility and sought to expand its usefulness by extensively publicizing the technology via media coverage and talks to community leaders, professional societies, universities, national labs, and private industry. To respond to the resulting inquiries, Wagh and Singh offered Ceramcrete powder samples for sale, developed a pilot-scale production plant, and made touchable specimens to demonstrate the technology's versatility. Based on these efforts, several companies have licensed or entered into CRADAs with Argonne.



*Dr. Arun Wagh and
Dr. Dileep Singh*

For more info: Arun Wagh, 630-252-4295, wagh@anl.gov

Accelerator-Based Particle Therapy to Safely Destroy Cancerous Tumors

DOE ♦ Lawrence Berkeley National Laboratory (LBNL)

The addition of proton therapy to the arsenal of cancer treatments promises new hope to cancer patients everywhere. Using focused, high-energy proton beams to deliver highly localized doses, this therapy destroys tumors better than other treatment options. For the past five decades, LBNL has performed pioneering research in the clinical use of accelerated protons for cancer treatment. Recently, the technology was privatized, and accelerator facilities are being built worldwide. The first commercialized proton therapy center in the U.S. is being built in large part because of the efforts of **Dr. William Chu**, an LBNL physicist who has made important contributions to radiation medicine, including: directing pioneering research in physics, biology, and the clinical use of accelerated particles; publishing reports on constructing hospital-based medical accelerators; and working with the private sector to build these facilities. Under a CRADA, Dr. Chu worked with **General Atomics** to build the **Northeast Proton Therapy Center** at **Massachusetts General Hospital** in Boston. Expected to be operational in 2001, this is the first hospital-based facility in the U.S. built entirely by the private sector.



Dr. William Chu

For more info: Dr. William Chu, 510-486-7735, WTChu@lbl.gov

UV WaterWorks

DOE ♦ LBNL

Two-thirds of the world's population get their water from water sources that are severely polluted, and few developing

countries can afford piped water systems that deliver safe drinking water. To help solve this problem, LBNL researcher **Ashok Gadgil** invented and transferred to private industry a remarkably effective device—UV WaterWorks, which uses readily available, energy-efficient, low-maintenance technologies and materials to disinfect water. For less than 2 cents per metric ton of water, the ultraviolet (UV) light from a single 40-watt compact UV bulb disrupts the DNA of contaminating bacteria and viruses within 12 seconds. The entire process takes place within a sealed enclosure—ensuring that deadly bacteria and viruses are safely killed. Gadgil licensed his invention to two companies—**WaterHealth International** and **Urminus Industries**—and, as of late 1999, almost 100,000 people in the Philippines, Mexico, India, Bangladesh, and South Africa were drinking water disinfected by UV WaterWorks. As a result, the children will have better survival rates, and communities will see less wage-earner downtime caused by ill health.



Ashok Gadgil

For more info: Ashok Gadgil, 510-486-4651, AGadgil@lbl.gov

LaserShot™ Peening System

DOE ♦ Lawrence Livermore National Laboratory (LLNL)

A metalworking process that uses a powerful laser developed at LLNL is expected to lead to safer airplanes. LLNL and **Metal Improvement Co., Inc.** entered into a licensing agreement and CRADA to adapt the laser technology to peen (or surface treat) metal. Historically, metals were peened by bombarding the material with tiny metal balls. Although first developed in the 1980s, laser peening never went into large-scale production because of high cost and slow lasers. However, the LLNL team's neodymium-doped glass laser can fire 10 pulses per second (compared to one pulse every two seconds from the best commercial lasers). Because Metal Improvement Co. performs conventional peening for the majority of aircraft engine and airframe builders worldwide, it is working with LLNL to develop a prototype production peening system to treat production-scale parts at production rates. Once operational, LLNL's technology will be used to build production laser systems—ultimately benefiting developers of high value metal and composite parts that require high strength and resistance to fatigue and stress—including the aircraft, auto, petroleum, aerospace, sporting goods, and medical industries.



*Lloyd Hackel, Ralph Jacobs, John Wooldridge
Not pictured: Curt Theisen, Daryl Gzybicki*

For more info: Curt Theisen, 925-423-0366, theisen1@llnl.gov

Radiation Dose Calculation Therapy System

DOE ♦ LLNL

A new approach to planning radiation therapy for cancer patients, PEREGRINE™ is an advanced software program and hardware system that uses a mathematical technique called Monte Carlo to track radiation. By simulating and tracking the paths of radiation particles that enter a cancer patient's body, PEREGRINE™ accurately models the radiation dose absorbed. The team collaborated with the nation's premier cancer treatment centers to validate PEREGRINE™ dose calculations and then transferred the technology to **NOMOS Corporation**, which is using the system to enhance its radiation treatment planning systems. PEREGRINE™ will primarily benefit the thousands of cancer patients who die each year with active disease near their tumor site, which suggests the tumor was undertreated. Because PEREGRINE™ allows for dose calculations of unprecedented accuracy, treatments will be more effective—thereby saving more lives.

For more info: Dr. James Sommercorn, 925-423-9724, sommercorn1@llnl.gov



Ralph Patterson, Dr. Jim Sommercorn, John Wooldridge, Sarita May

Advanced Direct-Contact Condensers

DOE ♦ National Renewable Energy Laboratory (NREL)

The NREL team took an abandoned technology governed by crude “rules of thumb”—advanced direct-contact condensers (ADCC)—and transformed it into a sophisticated science governed by precise engineering design. The result is a system that increases power production efficiency, generates capacity, and decreases costs for emissions abatement at geothermal or fossil fuel power plants. Two partnerships helped bring ADCC to market. The first was with **Pacific Gas and Electric Company**, which entered a CRADA to refurbish a direct-contact condenser at one of the world's largest geothermal complexes. When ADCC was implemented, power production efficiency improved by 5%, potential generating

*Dr. Desikan Bharathan
Not pictured:
Dr. Vahab Hassani,
Dr. Yves Parent,
Dr. Frederica Zangrando,
Ed Hoo*



Dave Cooley

capacity increased by almost 17%, and chemical costs for emissions abatement were cut in half. **Alstom Energy Systems** licensed the technology and, in doing so, gained the edge it needed over Japanese competitors to regain the world market share for geothermal plant condenser sales.

For more info: Dr. Desikan Bharathan, 303-384-7418, desikan_bharathan@nrel.gov

Molecular Science Software Suite

DOE ♦ Pacific Northwest National Laboratory (PNNL)

A team of PNNL scientists developed a revolutionary collection of computational chemistry software and made it available to the entire chemical research community. The Molecular Science Software Suite (MS³) is the first general purpose software that provides access to the high-performance, massively parallel computers of chemists on a broad



David Dixon, Rebecca Wattenburger, Raymond Bair, Theresa Windus, Jeffrey Nichols. Not pictured: Deborah Gracio, Thom Dunning

range of applications. Although initially developed to support the DOE's environmental cleanup efforts, the team quickly realized MS³ had a much wider range of applications. The MS³ tech transfer process is unique because there is no single partner. Instead, thanks to the team's outreach efforts, hundreds have come to PNNL to use the software to solve their problems. Today, MS³ is used by more than 37 universities and supercomputing centers, 14 national labs, and 15 industries. MS³ will enable the scientific community to solve complex environmental problems more quickly and cost-effectively. In addition, it will be used to develop new drugs, improve agricultural productivity, and provide insights into how organisms work at the molecular level.

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Plasma Enhanced Melter for Waste Conversion

DOE ♦ PNNL

The Plasma Enhanced Melter (PEM) integrates plasma arc and glass melter technologies—creating a system that converts waste into useful products and maximizes recycling potential. Because it lacks the adverse environmental effects of incineration, PEM is an attractive alternative for municipal waste treatment and radioactive waste cleanup. Producing very little waste, the process generates a clean-burning fuel and excess electrical energy, which can run the system or be sold to energy brokers. Other by-products can be marketed as bricks, tiles, or material that blasts barnacles off boats. The PNNL team convinced a private investor to invest more than \$14 million to commercially develop the technology; he subsequently became a business partner and funded a start-up

company, **Integrated Environmental Technologies (IET)**, to manufacture and sell PEM. In four years, IET has expanded and continues to grow.



Jeffrey Surma, David Lamar, Michael Elliott

PEM enables municipalities to convert waste cleanly and effectively—consuming tons of waste per day and accepting all kinds of waste at once. This will help reduce greenhouse gases, extend the life of landfills, and create clean energy without smokestacks or giant garbage pits.

For more info: Jeffrey Surma, 509-946-5700, inentec1@inentec.com

Superplastic Forming (SPF) Process for Automotive Component Manufacturing

DOE ♦ PNNL

The team transferred a new understanding of the superplastic forming (SPF) process—a metal-forming process that reduces the weight and cost of manufactured devices.

Unlike conventional methods, SPF metals form unique structures in a one-step process—simplifying parts and operations and enabling aluminum to be used instead of steel. The transfer took the form of three CRADAs. **General Motors (GM)** needed cost-effective materials to meet its high-rate, high-volume production needs; **MARC**



*Mark Smith, Dr. Moe Khaleel, Bruce Harrer, Ken Johnson
Not pictured: Gary McVay*

Analysis developed the finite element model that GM used for its parts forming process; and **Kaiser Aluminum** adapted an existing alloy into an improved, less expensive product. These partnerships significantly reduced the technical and economic impediments to using SPF processes for auto and other manufacturing. The final results? GM will use SPF parts in its 2001 models, MARC's model has become the leading computer code of its type, and Kaiser has a new, highly marketable lightweight alloy. Manufacturers requiring lightweight yet strong components will benefit from this technology, which should help improve auto safety, fuel efficiency and emissions.

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PHOSter™

DOE ♦ Savannah River Technology Center (SRTC)

The SRTC-developed PHOSter™ system allows the controlled addition of phosphorus—a critical nutrient—into sites

contaminated with organic compounds. This stimulates the growth of natural microorganisms—resulting in rapid and optimum *in situ* decontamination via the breakdown, immobilization, or detoxification of contaminants. The tech transfer took the form of patent licenses issued to six companies, which represent a range of large and small businesses based in the U.S. and abroad. PHOSter™ was appealing because the cost of traditional hydrocarbon cleanup methods typically exceeds the value of the industrial site property—forcing operators to abandon contaminated sites, depleting state soil cleanup funds, and increasing environmental liability. By contrast, PHOSter™ can clean up sites for a cost equivalent to their post-cleanup value. Public and private benefits will be realized whenever sites resistant to remediation can be returned to productive use. Thousands of contaminated sites previously considered unlikely remediation candidates are now being rehabilitated and providing social and economic benefits.

For more info: Brian Looney, 803-725-3692, brian02.looney@srs.gov



Dr. Brian Looney, Robert Marchick, John Olschon

Embedded Web Technology

NASA ♦ Glenn Research Center

Embedded Web Technology (EWT) incorporates World Wide Web technology into embedded systems—allowing these systems to act as a web server and enabling remote users to communicate with the system using only a standard web browser. A key feature allows remote users to obtain a graphic interface to control and monitor the embedded system using the Internet.



Lisa Lambert, David York, Joseph Ponyik, Maria Babula

Tempest is the HTTP-compliant embedded web server that serves as the cornerstone of EWT. The EWT team formed partnerships with various tech transfer organizations to successfully transfer EWT. Activities included conducting demonstrations at technical conferences and partnering with the **Great Lakes Industrial Technology Center**, which coordinated an EWT peer review and organized EWT workshops for interested customers. Because EWT is an enabling technology, its benefits are wide-ranging. The projected embedded systems market will be \$100 billion by 2005, and EWT's industrial applications will allow remote access to machines, facilities, training, and maintenance information—thereby saving money and valuable worker time.

For more info: David York, 216-433-3162, David.W.York@grc.nasa.gov

2000 FLC Service Award Winners

Each year, the FLC recognizes significant contributions to the organization via the FLC Service Awards. This year, two individuals were honored for their service and support.

Outstanding Service Award

This year's Outstanding Service Award was given to **Robert Saba** of the **Mid-Atlantic Technology Applications Center**. Mr. Saba was instrumental in bringing together **NASA** and the **Pittsburgh Bureau of Fire** to develop technologies to improve firefighter effectiveness and safety. Since this initial partnership, other cities and federal labs/agencies have gotten involved—resulting in the **Fire Fighting Task Force (FFTF)**. Although the **FLC Mid-Atlantic Region** supports FFTF with funding, the initiative's success is due primarily to Mr. Saba's enthusiasm and rapport with firefighters, federal labs, and industry. A proven public safety initiative, FFTF has successfully located federal technologies that meet the lifesaving needs of fire personnel—such as enhanced communication and vision systems, monitoring and tracking systems, improved fire apparatus, and sensors for sampling hazardous combustion gases. Mr. Saba's constant and vocal support of federal labs and willingness to serve as a champion for their technologies with the fire fighting community has resulted in many inspiring success stories. The true payoff of his endeavors will be in years to come when more citizens are saved and firefighter deaths are reduced.

Rep of the Year Award

The 2000 Rep of the Year Award went to **Cynthia Gonsalves**, the DOD's Technology Transfer Program Manager. In this position, Ms. Gonsalves has made considerable contributions to federal tech transfer and the FLC. Her involvement and support of various DOD and interagency working groups have resulted in consistent process improvements in policy, management, communication, coordination, and training. Some of her accomplishments include: leading the revision of the agency's tech transfer web site (dramatically increasing site traffic); spearheading the drafting of a new DOD tech transfer directive and initiative; sponsoring a landmark analysis of CRADAs to identify how they contribute to the DOD mission; and initiating DOD-wide workshops to facilitate the exchange of best practices among DOD tech transfer professionals. Ms. Gonsalves has also demonstrated an unflinching commitment to a congressionally funded effort to transfer DOD technology to organizations in the Northwest via the Tech Link Center. An active participant in numerous FLC activities, Ms. Gonsalves has extolled the benefits of tapping into FLC resources to agency representatives, laboratory directors, and ORTAs. Highly regarded and respected by her peers, Ms. Gonsalves is singularly proactive in identifying, initiating, and completing efforts to benefit every FLC member agency and lab. **NL**

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