

T2 INSIDE



NREL's
Energy,
page 2



Jumpstart
Software,
page 3



Air Force
Welding Cart,
page 6

T2 EVENTS

COPENMIND

Copenhagen, Denmark
September 1-3, 2008

•
FLC Mid-Continent
& Far West Regional Meeting
Denver, Colo.
September 9-11, 2008

•
FLC Northeast
Regional Meeting
Upton, N.Y.
September 15-17, 2008

•
SSTI's 12th Annual Conference
Cleveland, Ohio
October 14-16, 2008

•
LES Annual Meeting 2008
Orlando, Fla.
October 19-23, 2008

T2 FACT

Canadian John Hopps invented the first cardiac pacemaker. Hopps was trained as an electrical engineer at the University of Manitoba and joined the National Research Council in 1941, where he conducted research on hypothermia. While experimenting with radio frequency heating to restore body temperature, Hopps made an unexpected discovery: if a heart stopped beating due to cooling, it could be started again by artificial stimulation using mechanical or electric means. This led to Hopps' invention of the world's first cardiac pacemaker in 1950.

- Mary Bellis, About.com

N^{FLC} NEWSLINK

July 2008

The Newsletter of the Federal Laboratory Consortium for Technology Transfer



A field technician maps old-growth ponderosa pine on state land in eastern Washington using an index developed by scientists with the Pacific Northwest Research Station.

Miles Hemstrom

FEDERAL-STATE PARTNERSHIP PROTECTS FOREST RESOURCES, GENERATES FUNDS FOR SCHOOLS, UNIVERSITIES, AND COUNTY SERVICES

by Rhonda Mazza

Timber revenues from forestland managed by the Washington Department of Natural Resources (DNR) are used to fund public schools, universities, county services and other state projects. In 2004, the state legislature directed the DNR to inventory the remaining old-growth forest on its land and to develop management strategies for its conservation.

The management of old-growth forests in the Pacific Northwest has been a contentious issue for decades. Lawsuits in the courtroom and protests in forests have made it a frequent

front-page news story. Legal costs and delays in timber harvests impact state budgets and regional economies.

Tami Miketa, Ecosystem Services Manager for the DNR, turned to scientists from the Pacific Northwest Research Station, USDA Forest Service for help. "We have a legislative requirement to map old-growth forest," said Miketa. "DNR maintains a comprehensive stand inventory of what's growing on our land, but we needed help coming up with an index of characteristics that could be used to define 'old growth'."

Coming up with a definition of "old-growth" in drier eastside forests is harder than one might expect, according to Miles Hemstrom, a research ecologist with the Portland Forestry Science Laboratory. "Washington is divided by the Cascade range. Forests west of the mountains are wetter, whereas forests to the east are generally drier. This difference in climate leads to different forest types, and means westside and eastside old-growth has different characteristics."

Hemstrom points out that it's not feasible
Forest Resources, page 4

LAB IN THE SPOTLIGHT: PIADC



Plum Island Animal Disease Center (PIADC), America's first line of defense against foreign animal diseases, has been protecting American agriculture for more than 50 years.

PIADC works to protect farm animals, farmers and ranchers, the nation's farm economy and export markets and, through these efforts, your food supply.

Since 1954, PIADC has conducted research, including vaccine development, for foot-and-mouth disease (FMD) and other exotic livestock diseases. FMD is extremely contagious among cloven-hoofed animals, and accidental outbreaks have caused catastrophic

PIADC, page 4

SANDIA DEVELOPS MODEL OF IRAQ WATER SYSTEM

In an effort aimed at building technical capacity, resource sustainability, and regional stability, a team of scientists from Sandia National Laboratories spent the past year working with engineers and modelers from Iraq to build a computer model of the country's surface water and related systems.

The model, aimed at assisting a longer-term national water and land planning effort by the Iraqi government, includes transboundary flows from Turkey, Syria, and Iran, along with agriculture, municipal and industrial uses, salinity, and restoration of the ecologically sensitive and culturally rich Mesopotamian marshes in the south.

"The Iraqis recognize very clearly that the long-term
Iraq Water System, page 6

FED LABS FLASH | TECHNOLOGY TRANSFER NOTES

RENEWABLE ENERGY IN MARKETPLACE



Crystalline silicon cells continue to dominate the market for photovoltaic (PV) modules and systems. To support the commercialization of these PV devices, National Renewable Energy Laboratory (NREL) researchers continue to reduce their manufacturing costs and increase their efficiency, but also work to develop thin-film PV cell technology from both silicon and alternative materials.

A recent collaborative research effort between NREL and Ampulse, a venture-backed company with funding from Battelle Ventures and its affiliate, Innovation Valley Partners, will take silicon technology one step further with a new, innovative approach.

"The partnership with Ampulse aims to make inexpensive silicon PV film with the efficiency of today's crystalline silicon cells," said NREL researcher Howard Branz. "It also will help Ampulse, which focuses on film PV on flexible substrates,

to enter the marketplace with commercially viable products. We are confident that the NREL team has the combined talent, skill and experience to create potentially breakthrough products with market-leading efficiencies and advantageous economics," said Glenn Kline, Innovation Valley Partners' general partner and Ampulse acting CEO.

The NREL and Ampulse partnership is evolving through a \$500,000 Cooperative Research and Development Agreement (CRADA). The CRADA received support from the Department of Energy's Technology Commercialization Development Fund (TCDF) Program, which has provided NREL with \$4 million to establish such commercialization efforts.

"Without TCDF Program support, this commercialization opportunity would not have happened," said Tom Williams, NREL Technology Transfer Office Director. "In addition to the program funding," Williams said, "the flexibility and speed possible under the TCDF were essential to moving the collaboration forward with all the key stakeholders."

Oak Ridge National Laboratory, which has a similar work-for-others agreement with Ampulse, will participate with NREL and Ampulse on this collaborative effort.

More info: Theresa von Kuegelgen,

LBNL HONORED

Four of *R&D* magazine's prestigious R&D 100 Awards for 2008, which recognize the 100 most significant proven technological advances of the year, have gone to researchers at the Department of Energy's Lawrence Berkeley National Laboratory (LBNL) and their colleagues.

The 2008 award designees are:

- Berkeley Lab PhyloChip—a DNA microarray that quickly, comprehensively, and accurately identifies species within microbial samples.

- Biomimetic Search Engine—Mimics the human cognitive process to find hidden and contextually relevant information in literature, databases, music, and other digital content.

- FastBit Bitmap Index—the fastest indexing technology for accelerating searching operations of massive databases.

- Nanostructured Polymer Electrolyte for Rechargeable Lithium Batteries—Enables the development of rechargeable lithium metal batteries with energy density that is at least a factor of two larger than that of existing technology.

"Winning four awards is a tremendous achievement that speaks very highly of the strength of our science and its relevance to solving complex global problems," said Cheryl Fragiadakis, head of LBNL's Technology Transfer and Intellectual Property Management Department.

More info: www.lbl.gov

WORLDWIDESCIENCE.ORG

The Department of Energy (DOE) announced in June the establishment of a multilateral alliance to govern the rapidly growing online gateway to international scientific research information—*WorldWideScience.org*.

Officials from organizations representing 38 countries formalized their commitment in Seoul, Korea, by signing a WorldWideScience Alliance agreement to sustain and build upon joint efforts to provide a single, sophisticated point of access for diverse scientific resources and expertise from nations around the world.

"WorldWideScience.org is already a wonderful tool for communication, bringing scientific databases from many countries to the fingertips of those advancing the frontiers of knowledge across the globe. It is well on its way towards becoming a complete, comprehensive, international source for scientific inquiry," DOE Under Secretary for Science Dr. Raymond L. Orbach said. "Unleashing global scientific discovery, through WorldWideScience.org, will accelerate scientific progress. That is why we are so excited about this alliance and the global access to science it will provide."

TVA SPONSORS MORE THAN 250 ENERGY EFFICIENT HOMES

The Tennessee Valley Authority (TVA) assisted more than 250 Tennessee Valley homes last year with energy efficiency improvements that collectively will save more than \$110,00 each year on utility bills. As a result, TVA received a 2008 Energy Star Leadership in Housing Award from the Environmental Protection Agency, recognizing TVA's contributions to energy-efficient construction and environmental protection.

"TVA, in partnership with local power distributors, has a history of

helping make homes more energy efficient through its energy right[®] program, and we intend to do even more going forward," said TVA Vice President of Energy Efficiency and Demand Response Joe Hoagland. "We are working to reduce the growth in power demand by the end of 2012 by 1,400 megawatts—about the amount of power needed to serve all the homes in a city the size of Nashville."

Under the energy right[®] program, TVA offers financial incentives to home owners and builders through local power distributors for energy efficiency

improvements made to all-electric homes.

Energy Star, introduced by the EPA in 1992, is a voluntary market-based partnership program to reduce greenhouse-gas emissions through increased energy efficiency. According to the EPA, environmental benefits of the more than 250 TVA-sponsored Energy Star homes in 2007 are equivalent to eliminating the emissions from about 123 vehicles, saving 741,000 pounds of coal, planting about 203 acres of trees, or eliminating more than 1.4 million pounds of carbon dioxide from the environment per year.

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TECH WATCH | LABORATORY TECHS READY FOR TRANSFER

NAVY LAB'S FUEL CELL

The Naval Research Laboratory has developed a microbial fuel cell (MFC) capable of harvesting energy in aerobic environments such as a water column or air/water interface.

The replacement of commonly used membranes with nanoporous membranes results in an MFC capable of generating $\sim 1\mu\text{W}$ that can be connected easily in series or parallel for additional power generation. These MFCs operate by passive nutrient diffusion and thus eliminate energy-draining pumps needed in other MFCs.

This technology is currently being developed for Navy use as a long-term, self-renewing power supply for environmental sensors. Applications include wastewater treatment, environmental sensors, persistent surveillance, bioremediation, and renewable electricity from biomass. NRL is seeking CRADA partners for continued refinement of this technology.

For further information, contact the Technology Transfer Office at the Naval Research Laboratory, techtran@utopia.nrl.navy.mil.

BIOMARKER FOR CARDIAC ISCHEMIA

Ischemic heart disease is a major cause of human cardiac morbidity and mortality, affecting over 14 million people in the United States alone. Current detection of cardiac ischemia relies upon identification of electrocardiographic anomalies and the release of cardiac markers from the damaged myocardial tissue. Unfortunately, patients with acute myocardial infarction are often insensitive to these tests during the early phases of intervention and, as a result, more markers for cardiac ischemic disease are needed. An NIH technology describes Cripto-1 as a biomarker for infarcted cardiac tissues. Cripto-1 is a member of the epidermal growth factor (EGF)-related proteins and is currently thought to play an important role in several cancers. The present invention shows that Cripto-1 is overexpressed in infarcted myocardial tissue, and not expressed or weakly expressed in non-infarct-related heart disease tissues and normal tissues. The technology could represent a new biomarker for the diagnosis of myocardial infarction, as well as a surrogate biomarker to monitor the healing process, including regenerative stem cell activity of the infarcted myocardial tissue.

Applications include a diagnostic tool for the detection of myocardial infarction and a method to monitor stem cell activity in damaged myocardial tissue.

More info: John D. Hewes, Ph.D., 301-435-3121, hewesj@mail.nih.gov

NIST DEVELOPS JUMPSTART SOFTWARE

The National Institute of Standards and Technology (NIST) has developed two demonstration software packages that show how Personal Identity Verification (PIV) cards can be used with Windows and Linux systems to perform logon, digital signing and verification, and other services.

The demonstration software, written in C++, will assist software developers, system integrators and computer security professionals as they develop products and solutions in response to Homeland Security Presidential Directive 12 and the FIPS 201-1 standard. Homeland Security Presidential Directive 12 calls for government employees and contractors to use secure identity credentials to access federal facilities and computers.

NIST worked with industry to develop the standards for the PIV cards that will be used for those purposes. Each card contains a unique number, two of the employee's biometric fingerprint templates, and cryptographic keys stored on an electronic chip embedded in the card's plastic body.

While each federal agency will implement the use of PIV cards on its own schedule, NIST computer scientists developed the software to demonstrate that PIV cards can work with common computer activities such as



system logon. This secure logon could eliminate the need for passwords for other applications and could provide access to secure databases to which the user is authorized.

"We wanted to provide IT professionals with a model of one way that PIV cards can be used to support authentication to federal information systems," explained Donna Dodson, deputy director of the NIST Computer Security Division.

The software is available at <http://csrc.nist.gov/groups/SNS/piv/download.html>.



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PIADC, from page 1



Kathy Apicelli

At the Plum Island Animal Disease Center, microbiologists Edan Tulman (left) and Claudio Afonso perform high-throughput capillary DNA sequencing, a technique that enables rapid determination of the complete genetic content of a viral pathogen.

livestock and economic losses throughout the world.

At PIADC, the Department of Homeland Security (DHS) and Department of Agriculture (USDA) work together on this crucial mission. In 2003, operational responsibility for PIADC transferred from the USDA to the DHS.

USDA activities at Plum Island are

carried out by scientists and veterinarians with the department's Agricultural Research Service (ARS) and the Animal and Plant Health Inspection Service (APHIS).

PIADC's Targeted Advanced Development (TAD) unit partners with USDA, academia, and industry scientists to deliver lead vaccine and

antiviral candidates to APHIS for licensure and inclusion in the USDA National Veterinary Vaccine Stockpile. Its Disease Threat and Assessment/Forensics (DTA&F) unit obtains epidemiologic information on the FMD virus and other high-priority foreign animal agents.

APHIS scientists operate the Foreign Animal Disease Diagnostic Laboratory, which tests samples collected from U.S. livestock with clinical signs suggestive of an exotic disease.

APHIS tests animal products and live animals being imported into the U.S. to prevent the accidental introduction of unwanted diseases. APHIS also maintains the North American Foot and Mouth Disease Vaccine Bank at PIADC, and trains state, federal, and academic veterinarians and veterinary pathologists to recognize foreign animal diseases.

ARS scientists at PIADC constantly seek new countermeasures against foreign animal diseases, including prevention, control and recovery strategies. ARS focuses on developing faster-acting, safe vaccines and antivirals to limit or stop transmission during outbreaks, and conducts research to better understand the animal-pathogen interaction. The principal diseases studied are FMD, classical swine fever, and vesicular stomatitis virus.

State-of-the-art biosafety practices and

procedures prevent disease organisms from escaping into the environment. Biologically isolated air-handling systems, extensive decontamination procedures, preventive maintenance and backup systems on the lab's biosafety systems, trained security professionals, surveillance systems, and rigorous employee standards ensure that Plum Island, located off the northeastern tip of New York's Long Island, and the lab itself remain secure. Not once in more than 50 years of operation has an animal pathogen escaped from the island.

Environmental protection and energy efficiency are important to PIADC's operations. Upgrades to the wastewater treatment plant, power plant, and cooling system improve environmental performance.

Employee training, an environmental management system, and regular audits make it every employee's responsibility to protect the environment at Plum Island. Plum Island was recently named an Important Bird Area by the New York Audubon Society. In a successful effort to attract different bird species, Plum Island placed osprey nests and bluebird boxes throughout the island and will add kestrel houses.

More info: http://www.dhs.gov/xres/labs/editorial_0901.shtm

Forest Resources, from page 1

for field technicians to age every tree on the 5.5 million acres that the DNR manages. And size isn't always a determining factor. The old-growth index developed for the eastside included a set of visual attributes, such as the shape of the tree crown and the thickness and size of bark plates on the trunks of ponderosa pine, larch, and Douglas fir. "We hope to get away from hard and fast rules in determining old growth," said Hemstrom. "There is too much variation in tree characteristics. It makes more sense to look at the whole tree, rather than simply its size."

Very aware of the strong feelings around old-growth management, the Forest Service, DNR, and their collaborator from the University of Washington hosted several workshops for stakeholders, including the superintendent of schools, members of the legislature, environmental groups, and the timber industry, to discuss the role of old growth

in the ecosystem and ways to manage it while also managing timber production.

"We hope that with this inclusive process, we might arrive at common ground and avoid a lot of the fighting that has happened in the past," said Hemstrom.

It turns out that on the drier eastside of the Cascade range, managing forest with old-growth characteristics and commercial timber is fairly compatible. "The large, old trees on the eastside are critical to conserve because they take so long to replace and are at risk from fire and drought stresses brought on by the younger trees crowding in below," said Hemstrom.

Managing the understory for timber may improve the health of the trees that remain by reducing the competition for water and nutrients.

DNR and Forest Service scientists are now preparing management options for the state's eastside old-growth forest.

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TECH TRANSFER SUMMER LEGISLATIVE UPDATE

by Gary Jones

FLC Washington, DC Representative



Greetings from D.C. As we head into the summer doldrums and toward the summer recess, party conventions, fall campaigns and elections, legislative activity is likely to slow down considerably. I thought I would take the time now to briefly highlight the status of a few salient pieces of legislation of interest to the FLC community that have seen some action in the past several months, including bills just introduced, passed and awaiting presidential signature, or removed from the calendar.

Patent Reform. As everyone involved in technology transfer is aware, there has been a concerted effort over the past several years to pass comprehensive patent reform legislation.

The latest effort progressed to the point this spring where the House version (H.R. 1908; passed last fall) was awaiting passage of the Senate version (S. 1145) to go to conference for a final bill to present to the President.

The main sticking point in both bills is the issue of how to apportion damage awards for patent infringement. Although somewhat oversimplified, the general battle line for this issue falls between the high tech and the life sciences sectors, each of which has strong and opposing views on how this particular provision should be crafted.

The end result, after two years of legislative proposals, debate (and intense lobbying from all sides), and passage of the House version? The Senate removed its version from their calendar in mid-May. As reported by I/P Watch, the bill “will not be added again until Senator Patrick Leahy (D-VT), chairman of the Judiciary Committee, signals Senate Majority Leader Harry Reid (D-NV) that an agreement has been reached on the language.” A Senate aide was quoted in the same article as saying, “We haven’t been able to reach that final agreement ... We’re not ready for patent reform at this time ... [but] patent reform is not off the table.”

The Small Business Innovation Research Program. This program sunsets this year. In April, the House passed the Science and Technology Innovation Act of 2008 (H.R. 5819), its version of SBIR reauthorization.

The bill reauthorizes the SBIR and STTR programs through 2010; increases Phase I awards from \$100,000 to \$300,000 and Phase II awards from \$750,000 to \$2.2 million; allows cross-agency

awards and applications to apply directly for Phase II funding; and allows small businesses backed by venture capital to apply for awards (defining eligibility requirements), among numerous other provisions. The House bill now awaits action in the Senate before a final bill/law can be passed.

As reported in the SBIR Insider, preliminary indications suggest that the Senate is “less than enthusiastic” about the House version, particularly the expanded opportunities for venture capital-backed entities, and passage of the bill as currently written is unlikely. If a final bill is not passed into law by October, we may be looking at a continuing resolution for the current program.

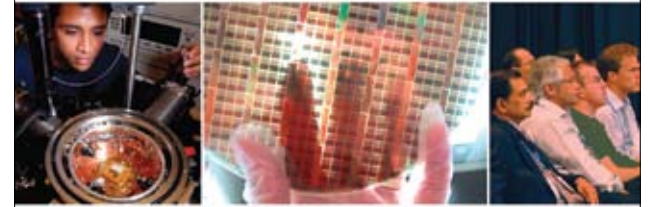
DOE Advanced Energy Technology Transfer Centers. A large multi-program bill (S. 2739; P.L. 110-229 when signed, which may occur before this goes to press) passed by both the House and Senate and awaiting the President’s signature, has language directing the Department of Energy to “make grants to nonprofit institutions, State and local governments, cooperative extension services, or institutions of higher education (or consortia thereof), to establish a geographically dispersed network of Advanced Energy Technology Transfer Centers...” (amending the Energy Policy Act of 2005). The grants are for five years and can be used for a variety of activities, as spelled out in the bill.

National Innovation Foundation. In early June, Senators Collins (R-ME) and Clinton (D-NY) introduced the National Innovation and Job Creation Act of 2008 (S. 3078), which calls for a National Innovation Council within the Executive Office of the President to “coordinate Federal innovation policy and provide financial assistance for State and local innovation initiatives.”

The legislation, as currently constructed, would effectively transfer “functions, personnel, assets and liabilities” of several existing programs to the Council. Programs that would be moved from the National Institute of Standards and Technology include the Manufacturing Extension Partnership program, Technology Innovation Program and the Office of Technology Partnerships. Programs to be moved from the National Science Foundation include Partnerships for Innovation, the Industry-University Cooperative Research Center program and the Engineering Research Center program; and from the Department of Labor, the Workforce Innovation in Regional Economic Development program. The act also identifies five new grant programs to be administered by the Council to support state-directed technology-based economic development efforts.

Gary can be reached at gkjones@federallabs.org.

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The Gas Guardian, a new safety welding cart licensed from the Air Force and now available from Spika Welding & Manufacturing.

by Chandra Morris, Comm. Dir., TechLink

A dramatic improvement in safety welding cart design patented by the U.S. Air Force Vandenberg Air Force Base Training Device Design and Engineering Center (TDDEC) to increase the safety and well being of airmen is now available commercially through Spika Welding & Manufacturing Inc., Moccasin, Montana.

The new design was developed in response to serious concerns about the safety of welders and others using traditional style welding carts at Vandenberg AFB. The new carts feature a stable four-wheel platform, enclosed regulators, a hose reel, a fire barrier separating the gas bottles, and a strong latching mechanism—all significant improvements.

Traditional carts are known to be dangerous. Their wobbly structures use a loose-fitting chain to secure two pressurized bottles containing highly flammable gases. The Air Force inventors regarded this as a workplace liability and sensed an opportunity to improve both worker safety and productivity.

The design improvements that resulted have proven to reduce the

AIR FORCE PATENTS STABLE NEW WELDING CART IMPROVING SAFETY IN THE WORKPLACE

risk to employees at TDDEC. The new cart was rated as a “Best Practice” by the 2004 Air Force Space Command Inspector General Operational Readiness Inspection team. It also was submitted and accepted into the Air Force Innovative Development through Employee Awareness (IDEA) program for notable improvement, where it has been approved as mandatory and recommended for wide use at the Space Command level. It has been sent up to the Air Force level at the Pentagon for further evaluation.

The Air Force applied for a patent for the new safety-conscious system, and TechLink, a Department of Defense partnership intermediary, brought the Air Force together with Spika Welding and Manufacturing Inc., a manufacturer in central Montana already producing numerous products for the military. In the fall of 2007, Spika received a license from the Air Force to manufacture the system and, after some final modifications to the initial design, began production of what they have dubbed the “Gas Guardian.”

“We are excited about adding the Gas Guardian welding cart to our product line,” said Tom Spika, president of Spika Welding & Manufacturing Inc. “In visiting with numerous safety officers and maintenance personnel in the Army, National Guard, Air Force, Coast Guard – they all see the merit of this system, and are anxious to replace their outdated systems. While the daily use of the oxy systems is fairly minimal, practically every facility has one and needs it on occasion. The hazards that the Gas Guardian can minimize far outweigh the cost. When one considers the potential damage and

injuries associated with the old-style carts, it’s obvious it is not worth the risk. One sheared-off valve can do a million dollars worth of damage, or worse, take a life.”

When TechLink became aware that the technology was available for licensing to industry, it looked for an ideal candidate and contacted Spika Welding and Manufacturing, Inc. Tom Spika agreed that the welding cart would be a beneficial addition to his company’s products. TechLink assisted Spika Welding with its license application and commercialization plan and facilitated license negotiations with the Air Force. The licensing of this technology to Spika Welding and its subsequently successful manufacture and availability to military and commercial markets is an example of how government technology transfer can be highly effective even through small companies in rural communities.

The Gas Guardian comes complete with an industrial quality American-made cutting/welding kit, regulators, hose and self-recoiling hose reel, and high pressure supply lines that attach to the customer-supplied cylinders.

The finish is powdercoated safety yellow, and the unit ships completely assembled. It is OSHA-compliant and available on the GSA. The system can also be purchased directly through Spika Welding at www.spikawelding.com or by phoning 406-423-5678.



www.federallabs.org

Iraq Water System, from page 1
stability and security of their country depends on the availability of freshwater for agriculture and for municipal and industrial uses,” said Sandia researcher Howard Passell. “We are grateful to have the opportunity to help.”

The project, funded by the Department of State’s Iraq Transition Assistance Office, included three five-day workshops over the past year. It culminated in early June with a meeting in Istanbul of all project participants and a pressure-packed demonstration of the model by the Iraqi engineers to three of their directors from the Iraq Ministry of Water Resources (MoWR). The participants included the Sandia team of Passell, Jesse Roach, and Marissa Reno; four engineers from the MoWR; a State Department contractor from the U.S. embassy in Baghdad; and a water program manager from UNESCO. Sandia contractor Geoff Klise and researcher Vince Tidwell also helped on the project over the course of the year in Albuquerque.

Roach says the best part of the project was watching the Iraqi engineers and modelers become engaged in the modeling process, a growing engagement that became apparent as the project unfolded. Roach was the lead modeler in the project.

“Our approach was to build the computer model in a collaborative fashion with the Iraqis,” he said. “We could have built it for them and then handed it over, but we wanted them to have ownership — to understand how the model went together and how it works. At the end of the third workshop, our Iraqi colleagues presented the model to three high-level Iraqi Ministry of Water officials. They presented it entirely in Arabic, explained how it worked, and answered questions about everything from input data to the scenario runs they were demonstrating. It was a powerful moment in a very successful capacity-building project.”

The model was built in a commercially available system dynamics (SD) modeling platform called Studio Expert, produced by Powersim, Inc. It features short run times, user-friendly interfaces, and real-time graphical output. The Sandia Geohydrology Department staff have used

Iraq Water System, page 8

LAB CLASSIFIEDS | AVAILABLE TECHNOLOGIES, FACILITIES, AND PARTNERS

OAK RIDGE'S CRYOBLASTING

Oak Ridge National Laboratory has developed a cryoblasting process using a centrifugal accelerator for accelerating frozen pellets of argon or carbon dioxide toward a target area.

The system utilizes an accelerator throw wheel designed to induce, during operation, the creation of a low-friction gas bearing within internal passages of the wheel, which would otherwise retard acceleration of the pellets as they move through the passages.

A system and method for producing large quantities of frozen pellets from a liquid material, such as liquid argon or carbon dioxide, for use in a cryoblasting process utilizes a chamber into which the liquid material is introduced in the form of a jet that disintegrates into droplets.

Applications include paint stripping, cleaning of radioactive surface contamination, and solvent reduction in cleaning/stripping processes.

More info: Mark Reeves, 865-576-2577, reevesme@ornl.gov

ELECTROACTIVE POLYMER BRAIDS

An electroactive polymer (EAP) is a plastic-like material that changes shape when voltage is applied to it. It can serve as an actuator or sensor and has myriad other applications such as conductors, batteries and transducers. It can handle large amounts of deformation, have many properties similar to biological tissues, and have great potential in the field of robotics.

The Space and Naval Warfare Systems Center-San Diego (SSC San Diego) has woven together single strands of EAPs. These braids are made up of EAP tiles connected by actuators. By controlling the actuators, the EAP braid can perform a wide range of motions, including contracting, elongating, expanding outward or inward, twisting, bending and curving. Braided EAPs also enable scalability for large and small devices alike and can be used in unconventional settings such as at depth in the ocean.

More info: Stephen Lieberman, 619-553-2778, or stephen.lieberman@navy.mil

INFLUENZA, PANDEMIC VACCINES

Development of effective vaccines against influenza, especially pandemic or avian, is a subject of intense current research efforts. The NIH is pleased to offer the subject technology, a system to quantitate virus neutralization and entry. This system utilizes pseudotyped lentiviral vectors that mimic properties of the influenza virus. Experimental use of this system has shown an increase in sensitivity more than ten times that achieved with HAI assays. This standardized system can allow influenza vaccine candidates to be evaluated and compared, which can be a critical step in identifying the best product forward. Applications include quick, high-throughput, sensitive and quantitative measure of neutralizing antibodies for vaccine development and identification of therapeutic monoclonal antibodies.

More info: Susan Ano, Ph.D.; 301-435-5515; anos@mail.nih.gov.

GUAYULE PLANT FOR LATEX

Agricultural Research Service (ARS) scientists have developed a new technique for transforming guayule plants into a latex substitute. This technique allows more efficient transformation than earlier methods, allowing more rapid guayule improvement that should add value to guayule. Guayule produces a latex rubber that is valuable because it is an alternative to conventional rubber. Guayule latex also possesses hypoallergenic properties, which may have significant medical implications.

With this new technique, agronomically important genes can be more effectively transformed into guayule lines and ultimately boost the latex yield of guayule plants. This new technique is no more expensive than other techniques currently being used. This invention should lead to large-scale production runs for guayule transformation.

More info: Tara T. Weaver-Missick, tara.weavermissick@ars.usda.gov, 301-504-6965

HIV VACCINATION

A National Institutes of Health technology pertains to conjugate polypeptide compositions that are designed to elicit antibody response against HIV. The peptides are conjugates of one gp41 capable of forming a stable coiled-coil structure and another gp41 capable of forming an alpha-helical structure. These structural elements of gp41 were identified as important for playing a role in HIV-1 cell entry. Compositions that elicit neutralizing antibodies against HIV have been elusive to date, but the subject technology may be important in realizing that goal.

More info: Susan Ano, Ph.D.; 301-435-5515; anos@mail.nih.gov

FOOD & BEVERAGE

The Naval Research Laboratory has developed a tool – chip-based CE – with demonstrated capabilities for food and beverage analysis. Conventional chemistry is used in a highly miniaturized, “lab-on-a-chip” environment to detect sodium monofluoroacetate (a rodent poison) and various poisonous alkaloids, such as nicotine, strychnine, and aconitine, in beverages.

Additionally, this tool is being advanced for Navy use in the detection of explosives and other biological toxins in a liquid environment.

More info: techtran@utopia.nrl.navy.mil

THERMAL RECTIFIER

Alex Zettl, Arun Majumdar and colleagues at Lawrence Berkeley National Laboratory (LBNL) have invented the first solid-state thermal rectifier.

The LBNL nanoscale solid-state device is to thermal systems what the diode is to electronics. Controlling the direction of heat flow could lead to radical improvements in thermal management across a range of products.

Applications include thermal management for microelectronic devices, solar cells and solar energy management systems, refrigerators, hybrid biological/inorganic systems, and nanoscale calorimeters.

More info: TTD@lbl.gov

CARDIO CRADA

The Department of Health and Human Services (HHS) seeks a CRADA and/or license(s) with a pharmaceutical or biotechnology company to develop and commercialize amphipathic helical peptides potentially useful for the treatment and prevention of cardiovascular disease. The CRADA would have an expected duration of one to five years. The goals of the CRADA include the rapid publication of research results and timely commercialization of products, methods of treatment or prevention that may result from the research.

More info: Dr. Denise Crooks, crooksd@nhlbi.nih.gov

Iraq Water System, from page 6

the SD platform for years in collaborative, multi-stakeholder settings as a way of helping collaborators understand the complexities of their resource systems, identify data and information gaps, and evaluate competing resource management strategies—often in group settings, Passell said.

Over the years the Sandia water modeling group has blended this technical/social approach—bridging science and policy—to help decision makers with water, energy, and food resource management problems in New Mexico, the U.S., and internationally.

They have used the approach in one form or another and have engaged scientists and engineers from more than a dozen countries, including Turkey, Syria, Iraq, Libya, Jordan, Japan, and four central Asian republics.

The first two workshops in the Iraq project took place in Amman, Jordan, in November 2007 and February 2008. The initial workshops focused on helping the Iraqis learn to use the software and think about how the different systems associated with their resource issues were

interdependent and interconnected.

By the time of the second workshop, the Sandians — with data and other information from the Iraqis — built a first draft of the model. The Iraqis used their growing skills to also build part of that version of the model.

One of the critical drivers in the model was the flow of water from the headwaters of the Tigris and Euphrates rivers in Turkey to Iraq. The transboundary nature of this water resource adds a critical wrinkle in Iraqi efforts at water management.

“Surface water in Iraq is affected by infrastructure development and water operations in upstream countries,” said Reno, who built the transboundary module in the model. “Historically, Turkey and Syria were not major water users, but now both countries have developed the capacity to store and use more, and that is a major concern to Iraq.”

Just as Iraq is at risk as the downstream user in the Tigris-Euphrates system, so are the Mesopotamian marshes at risk as the downstream user in Iraq. Labeled by some as the original Eden and populated still by the ancient Marsh Arab culture, the

southern marshes once covered about 8,000 square kilometers.

They are a crucial freshwater wetland ecosystem in the Arabian Gulf region. Water uses upstream have gradually reduced the area of the marshes.

Saddam Hussein partially drained them in the 1990s when his enemies hid there, and they are threatened by increasing upstream water use in the future. Now they cover about 5,000 square kilometers.

“The marshes, which are culturally, historically, and economically rich and diverse, have started to dry out — partly by accident and partly by design,” said Geoff Klise, the team member who built



U.S. Army Corps of Engineers.

Marsh Arabs poling a traditional mashoof in the marshes of southern Iraq. The Marsh Arabs, or Ma'dan, dwell in the marshlands of the Tigris-Euphrates system in the south and east of Iraq and along the Iranian border. A Sandia team has been working with Iraqi scientists to develop a model of the nation's surface water systems.

the marsh module. “We modeled how they might be restored, looking at flows, reservoir operations, and changes to agriculture, to see how these might affect marshes downstream.”

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