

T2 INSIDE

Effect of
Urbanization on
Colorado Water **2**

NASA's Rocket Test
Batters Shuttle,
Ares I **2**

NIAID
Fights Rabies
in Wildlife **6**

T2 EVENTS

FLC Southeast Regional Meeting
Jacksonville, Fla.
January 21-23, 2009

•
2009 AUTM Annual Meeting
Orlando, Fla.
February 2-14, 2009

•
FLC Northeast
Regional Meeting
Newport, R.I.
March 16-19, 2009

•
World's Best
Technology Showcase
Arlington, Texas
March 24-25, 2009

•
FLC National Meeting
Charlotte, N.C.
May 4-7, 2009

T2 FACT

The first U.S. patent for automobile seat belts was issued to Edward J. Claghorn of New York, N.Y. on February 10, 1885. Claghorn's patent was for a Safety-Belt for tourists, described in the patent as "designed to be applied to the person, and provided with hooks and other attachments for securing the person to a fixed object." Swedish inventor Nils Bohlin invented the three-point seat belt—not the first but the modern seatbelt—now a standard safety device in most cars. Nils Bohlin's lap-and-shoulder belt was introduced by Volvo in 1959.

- Mary Bellis, About.com

FLC NEWSLINK

The Newsletter of the Federal Laboratory Consortium for Technology Transfer



According to NHANES, one out of every six American children aged 2 years to 19 years—an estimated 16.3 million—is overweight. One of the communities at greatest risk is the African-American community. One out of five non-Hispanic Black children is considered overweight.

NIH AND NATIONAL COUNCIL OF NEGRO WOMEN COLLABORATE TO HELP CHILDREN MAINTAIN A HEALTHY WEIGHT

The National Institutes of Health (NIH) and the National Council of Negro Women (NCNW) have joined forces to train NCNW members how to present two NIH education programs that help children maintain a healthy weight.

One out of every six American children aged 2 to 19 years—an estimated 16.3 million—is overweight.

The most recent National Health and Nutrition Examination Survey (2003-2006),

or NHANES, also shows that an additional 15.6 percent are at risk of becoming overweight. One of the communities at greatest risk is the African-American community. According to NHANES, one of five non-Hispanic Black children is considered overweight, and one of three is at risk for overweight.

More than 30 NCNW cluster leaders—women who serve as the organization's regional leaders—came from across the

United States, including the Washington, D.C., metropolitan area, to participate in the training.

Participants were trained how to present two health education programs, as well as teach others to present the programs.

The programs emphasize improving food choices, increasing physical activity, and reducing screen time. Developed from NIH educational materials by the Eunice Kennedy

See Healthy Children, page 4



UC Berkeley graduate physics student Mickey Holcomb discusses the market potential for low-cost photovoltaic devices developed by LBNL's Samuel Mao and Robert Kosticki.

MBAs BRIDGE GAP BETWEEN CLEAN TECHNOLOGIES AND THE MARKETPLACE

The gap between the marketplace and Lawrence Berkeley National Laboratory's (LBNL) clean technologies has narrowed, thanks to a new program that drew more than 100 students, scientists, venture capitalists, and industry representatives from companies like AT&T and Pacific Gas & Electric Co., to the University of California (UC) Berkeley campus December 4.

They came to hear what eight teams of UC Berkeley graduate students had to say about the

See Tech to Marketplace, page 4

BNL RECEIVES PATENT FOR IMPROVED CANCER THERAPY, LOOKING FOR INDUSTRIAL PARTNERS

Four physicists at the Department of Energy's (DOE) Brookhaven National Laboratory (BNL) have been awarded U.S. Patent No. 7,432,516 B2 for the design of a "medical synchrotron" capable of delivering precision doses of proton radiation to cancerous tumors with minimal damage to surrounding healthy tissue. The new device would be more precise and less costly than existing proton-therapy

See BNL Cancer Therapy, page 5

FED LABS FLASH | NEWS FROM AROUND THE CONSORTIUM

THE EFFECTS OF CONVERTING AGRICULTURAL LAND TO URBAN LAND ON IRRIGATION WATER IN COLORADO

by John W. Mayo

The conversion of agricultural land to urban residential land is associated with rapid population growth in the Grand Valley of western Colorado. Information regarding the effects

percolation and estimated salt loading derived from irrigated agricultural lands in the Grand Valley in a 1985 to 2002 monitoring and evaluation study (M&E). The U.S. Geological Survey (USGS), in cooperation with the Colorado River Salinity Control Forum and the Mesa Conservation District, quantified the current (2005–2006) deep percolation and irrigation-water application characteristics of 1/4-acre residential lots and 5-acre estates, urban parks, and urban orchard grass fields in the Grand Valley,



of this land-use conversion on deep percolation, irrigation-water application, and associated salt loading to the Colorado River is needed to support water-resource planning and conservation efforts.

The Natural Resources Conservation Service (NRCS) assessed deep

and compared the results to NRCS M&E results from alfalfa-crop sites. In addition, seepage from three irrigation-water holding ponds was estimated. Salt loading was estimated for the urban study results and the NRCS M&E results by using standard salt-loading factors.

A daily soil-moisture balance calculation technique was used at all urban study irrigated sites. Deep percolation was defined as any water infiltrating below the top 12 inches of soil. Deep percolation occurred when the soil-moisture balance in the first 12 inches of soil exceeded the field capacity for the soil type at each site.

Results were reported separately for urban study bluegrass-only sites and for all-vegetation type (bluegrass, native plants, and orchard grass) sites. Deep percolation and irrigation-water application also were estimated for a complete irrigation season at three subdivisions by using mean site data from each subdivision. It was estimated that for the three subdivisions, 37 percent of the developed acreage was irrigated (the balance being impermeable surfaces).

Full report: <http://pubs.usgs.gov/sir/2008/5086/>

COVINGTON NAMED AEDC EXECUTIVE DIRECTOR

Michael Britt Covington is Arnold Engineering Development Center's (AEDC) new executive director. In this role, Covington will be responsible for assisting the center commander in overseeing the daily operations of Arnold.



Covington was previously the technical director for the 76th Maintenance Wing Tinker Air Force Base in Oklahoma. There he was responsible for technical leadership of the largest wing at the Oklahoma City Air Logistics Center.

He previously served as deputy director of the 77th Aeronautical Systems Group at Brooks City-Base, Texas, where he was responsible for a \$150-million budget and led a 300-person group providing advanced performance, survival and force protection capabilities to U.S. and allied air, ground and naval forces through development, production and sustainment of human-centered systems, including aircrew life support, egress, survival, chemical, biological, radiological and nuclear defense, aeromedical evacuation equipment, medical information, Air Force uniforms and aircraft mishap analysis.

Covington has a Bachelor of Science in aerospace engineering from Auburn University and a Master of Science in engineering management from Mercer University.

ROCKET MOTOR TEST HELPS NASA'S SHUTTLE AND ARES I

by Steve Roy

NASA's space shuttle program has successfully conducted a test firing of a space shuttle reusable solid rocket motor in Utah. The flight support motor, or FSM-15, burned for approximately 123 seconds, the same time each reusable solid rocket motor burns during an actual space shuttle launch.

The test evaluated possible performance changes as shuttle motors age. Space shuttle solid rocket motors are certified for flight for five years from their date of manufacture. The more than seven-year-old, four-segment motor tested Thursday is the oldest ever fired.

The test further substantiated the certification that was established by NASA at the beginning of the shuttle program. It also provided important information for continued launches of the shuttle and development of the Ares I rocket, a key component of NASA's

Constellation Program, which will launch the Orion crew exploration vehicle on missions to the moon. Ares I test objectives included performance data on a new nozzle design that would increase robustness, and measurement of environmental changes caused by motor pressure and sound. This valuable data will assist in the final design of the launch structure for Ares I rockets by engineers from NASA and ATK Launch Systems Group of Promontory, Utah—a unit of Alliant Techsystems Inc.—which manufactures space shuttle solid rocket motors.



“This test is an example of the aggressive testing program NASA pursues to assure flight safety,” said David Beaman, manager of the Reusable Solid Rocket Booster Project Office at NASA's Marshall Space Flight Center in Huntsville, Ala. “It also allows us to gather information on how motors with different ages perform.”

A space shuttle launch requires the power of two reusable solid rocket booster motors to lift the 4.5-million-pound shuttle vehicle. Each solid rocket booster burns for approximately 123 seconds and generates an average thrust of 2.6 million pounds.

In this latest test, the motor generated 3.3 million pounds maximum thrust for two minutes.

More Info: www.nasa.gov/shuttle

FLC NEWSLINK

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TECH WATCH | LABORATORY TECHS READY FOR TRANSFER

LIVERMORE DIAMOND COATINGS

Lawrence Livermore National Laboratory (LLNL) researchers have been able to create amorphous diamond coatings and free-standing films with significantly reduced intrinsic stress while allowing manipulation of the hardness, toughness, adhesion, and wear resistance.

Amorphous diamond, or hydrogen-free diamond-like carbon (DLC), is a form of carbon that can be characterized as extremely hard, chemically inert, optically transparent, low friction and a semiconductor.

Hydrogenated DLCs are used in a number of coating and thin film applications for optical windows, medical devices, tools, car parts, and magnetic storage. Amorphous diamond is harder than hydrogenated DLCs and therefore provides more protection for coated products; but current coatings are not thicker than a few micrometers because deposition methods cannot overcome the high intrinsic stress of the material and adhesion problems of thick layers.

LLNL has reduced this technology to practice and used the process for real-world applications.

More info: Randall Elder, 925-422-9914, elder3@llnl.gov

NIST IMPROVES ACCURACY IN IMMERSION



Scientists at the National Institute of Standards and Technology (NIST) have developed software that improves the accuracy of tracking devices in its immersive, or virtual, research environment by at

least 700 percent. The software can be used by scientists in other immersive environments with slight modifications for their individual laboratories. This advance is a step forward in transforming immersive technology that has traditionally been a qualitative tool into a scientific instrument with which precision measurements can be made.

Immersive environments such as NIST's are typically made up of two or more 8 foot by 8 foot walls onto which images ranging from larger-than-life bodies or actual-size buildings can be displayed on the walls and the floors. The images are three-dimensional. Researchers wear 3-D glasses and hold a wand, each of whose location is tracked. Using these devices, the researcher can walk around and interact with the virtual world.

More info: Evelyn Brown, evelyn.brown@nist.gov, 301-975-5661

NAVY LAB PATENTS PORTABLE, EASY-TO-USE OXYGEN-LINE CLEANING UNIT

The Oxygen Line-Cleaning Unit, developed and patented by the Naval Air Warfare Center Aircraft Division, Patuxent River (NAWCADPAX), was showcased at the annual World's Best Technologies, held in Arlington, Texas, March 26-27, 2008. This portable, inexpensive, and easy-to-use apparatus and method for cleaning aircraft oxygen conduits also can be used

for marine and medical applications where there is a need to convey oxygen or hydraulic fluids. Additionally, the new process allows the user to meet EPA requirements by eliminating the use of the Class I ozone depleting substance CFC-113 "freon" solvent.

Standards of the Department of Defense, NASA, National Fire Protection Agency, American Society for Testing Materials, and the Society of Automotive Engineers specify that rigorous removal of organic and particulate contamination from oxygen and oxygen-enriched handling equipment is absolutely necessary to prevent a fire hazard. There is also a toxicity hazard stemming from toxic residue remaining in life support equipment. The U.S. Navy's oxygen line-cleaning technology keeps conduits free of contamination or



foreign substance buildup that results from normal use, malfunction, or poor/improper maintenance. Unlike many conduit cleaners currently available, the Navy's oxygen line-cleaning technology does not use chemicals that contain cleaning agents incompatible with oxygen systems.

The Navy is actively seeking a partner in industry or academia to work with its scientists to prototype an oxygen line-cleaning unit, with the ultimate goal being mass manufacture and distribution within the United States.

Applications from American manufacturers for license to practice the invention are also welcome.

More Info: Paul Fritz, 301-342-5586



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Tech to Marketplace, from page 1

commercial viability of a handful of Berkeley Lab innovations that reduce adverse environmental impacts and promote sustainability.

The students, who study law, business, public policy and engineering, spent the last ten weeks asking the kinds of questions not often found in scientific analyses: What are the roadblocks to implementation? Does it have revenue potential? Is it likely to be backed by venture capitalists?

Some students even hit the pavement and rounded up potential investors who may be interested in backing the technologies.

Their work is at the heart of a recently launched program called Cleantech to Market, or C2M for short, which is a partnership between LBNL's Technology Transfer and Intellectual Property Management Department and the Berkeley Energy and Resources Collaborative, an organization founded by MBA students at UC Berkeley's Haas School of Business.

"The student teams can drill more deeply into these technologies than we in Tech Transfer have the resources to do, given that we market 40 to 50 technologies a year," said Robin Johnston, a licensing analyst in the Technology Transfer and Intellectual Property Management Department who helped launch the program. "The program is also creating for the Lab what universities with business schools take for granted: entrepreneurial alumni who look to their alma maters for resources such as people, ideas and, in this case, technology."

The student-led market research, which started this semester as a pilot program, seeks to provide greater exposure for promising LBNL technologies, foster connections with the entrepreneurial and venture-capital community, and spur the adoption of innovative business practices

and policies that promote energy efficiency.

In the program's first batch of projects, eight teams totaling 40 students were matched with a who's who of LBNL clean energy technologies: advanced biofuels,



Blake Holland, who is pursuing joint degrees in law and business, introduces the audience to the energy-saving advantages of electrochromic windows as fellow team member and MBA student Ari Frankel looks on.

a novel solar chemical storage invention, a fabrication method for photovoltaic devices, an innovative electrolyte for batteries, and a low-cost water purification system. Other teams pored over strategies for implementing smart facades for efficient buildings, low roll resistant tires, and intellectual property and business models for developing countries.

The students' work culminated in market analyses, financial models, and recommendations that were presented at the Dec. 4 event.

The reports were prepared with help from the LBNL scientists who developed the technologies, as well as outside experts such as venture capitalists, business attorneys, and industry reps.

For some LBNL scientists, a market analysis and economic feasibility study wasn't the only benefit of the cross-disciplinary collaboration.

"A significant value of the team for me was in rounding up venture capital groups who were likely to be interested in the technology," said Elton Cairns, a scientist in the Environmental Energy Technologies Division, who developed a high conductivity electrolyte for lithium-ion batteries suitable for electronics and automotive applications.

More info: www.epa.gov/nheerl/

Healthy Children, from page 1

Shriver National Institute of Child Health and Human Development (NICHD), the programs have been tailored to meet the needs of the NCNW cluster leaders.

"The NIH and NCNW are working together to make sure that children get the information they need to avoid overweight and its attendant risks," said Yvonne T. Maddox, Ph.D., deputy director of NICHD. "The NICHD has developed science-based health education programs tailored to meet NCNW's needs, and NCNW members will deliver these programs to families who can benefit from them."

The Energize Our NCNW Families: Parent Program provides parents and caregivers with practical, research-based information to help their families maintain a healthy weight, while Media-Smart Youth: The Essentials teaches young people ages 11 to 13 years how to analyze and understand media messages about nutrition and physical activity so that they can make healthy choices for themselves.

"One in five African-American children is overweight. This has long-term health implications for these children," said Dorothy Height, Ph.D., chair and president emerita of the NCNW. "Now is the time to act. Today's training enables our

members to go back to their communities and not only deliver these programs, but train others to deliver them to parents and young people to put them on the path to better health."

These programs are adapted from curricula offered in the NIH's We Can! (Ways to Enhance Children's Activity and Nutrition) education program. We Can! is a highly adaptable, science-based program for families and communities to help children maintain a healthy weight. More than 900 community sites across the U.S., and in nine other countries, are providing We Can! activities in their communities.

Founded in 1935, the NCNW mission is to lead, develop, and advocate for women of African descent as they support their families and communities.

NCNW fulfills this purpose through research, advocacy, and national and community-based services and programs on issues of health, education, and economic empowerment in the United States and Africa.

The NICHD sponsors research on development, before and after birth; maternal, child, and family health; reproductive biology and population issues; and medical rehabilitation.

More info: www.nichd.nih.gov



SOLD! NASA LAB PARTICIPATES IN LIVE IP AUCTION

by Gary Jones, FLC Washington, DC Representative



Greetings from D.C.

NASA Goddard Space Flight Center (GSFC) (and FLC member) recently became the first federal lab to auction off the rights to an exclusive license of government-owned intellectual property (IP) at a live public auction.

The auction took place in Chicago in late October. GSFC presented three lots of bundled IP assets for “sale,” with one attracting bidders during the auction—and a strong indication that the remaining two bundles would transact after the auction.

The live IP auction, conducted by Ocean Tomo Auctions, was created “to introduce the marketplace to a forum for facilitating the open and public exchange of intellectual property ... bring a sense of urgency and closure to IP transactions, create a center for IP liquidity, and effectuate transparency” for that particular market. The live auction is one of several tools recently developed by Ocean Tomo for this purpose.

The first Ocean Tomo IP auction occurred in 2006 and, as with subsequent auctions, the sellers in the transaction ranged from large technology corporations to small firms to individual entrepreneurs holding IP rights. GSFC became the first federal lab to participate in, or more pointedly, their IP became the first government-owned IP to be offered at public auction.

NASA’s participation was unique in other ways as well. While other lots were indeed offered for actual sale to the highest bidder, what NASA was “selling” was slightly different. It was selling the rights to an exclusive license for the technology in question. No ownership interest in the NASA technology was up for sale. The technologies were initially licensed to Ocean Tomo, and when a successful bid occurred at auction (as happened in Chicago), the exclusive license transfers from Ocean Tomo to the successful bidder. This occurs via a novation process, where a new license agreement (now between Ocean Tomo and the bidder) substitutes for and cancels the original license agreement (between NASA and Ocean Tomo).

The three bundled lots of IP offered by NASA included 1) signal processing technologies, 2) global positioning technologies, and 3) proximity-sensing technologies. The signal processing bundle “sold” for \$55,000 plus an ongoing royalty stream.

Given the circumstances surrounding commercialization of government-owned IP, there were certainly challenges to finding the right model for bringing NASA technologies to market via the live auction process. These details are better left to the professionals at NASA to address (see contact information below). Suffice it to say they met those challenges and the results are encouraging. As Nona Cheeks, chief of GSFC’s Office of Innovative Partnerships, noted, “We are delighted that exclusive rights to our patents were sold at auction. Not only does this sale maximize the value of the award winning [signal processing] technology by transferring it to a commercialization partner, it also benefits the U.S. taxpayers and the domestic economy.”

Currently, there are plans for GSFC and possibly other NASA labs to continue their relationship with Ocean Tomo by participating in the upcoming spring auction in San Francisco.

The live IP auction is simply another potential tool—albeit new and not without some challenges—that may be of use to the tech transfer professionals working to move technology out of the lab and into the marketplace. NASA has been the pioneer—its experience may be instructive to others interested in this approach.

Read more about the live auction process on the Ocean Tomo website (www.oceantomo.com) or contact GSFC’s tech transfer office at <http://techtransfer.gsfc.nasa.gov/>.

Gary can be reached at gkjones@federallabs.org.

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BNL Cancer Therapy, from page 1

systems, potentially increasing the availability and benefits of this treatment for cancer patients worldwide. The Brookhaven scientists are now seeking industrial partners to license and commercialize the technology.

“In the realm of cancer treatment, proton therapy is considered ‘surgery without a knife’ because proton beams can deliver cell-killing energy with extreme precision, unlike conventional x-ray radiation therapy,” said BNL physicist Stephen Peggs, one of the lead scientists on the project. While working at DOE’s Fermi National Accelerator Laboratory, Peggs witnessed the completion of the nation’s first hospital-based proton-therapy synchrotron, installed at California’s Loma Linda University Medical Center in 1990.

“Almost as soon as the Loma Linda synchrotron went out the door, we started thinking about ways to build a better machine,” Peggs said. The current design—developed and refined as Peggs and other physicists worked on large-scale accelerators for physics experiments, including the Relativistic Heavy Ion Collider (RHIC) at BNL—is the culmination of that effort.

“Our new design has improvements in beam-focusing technology to make the smallest possible beam size—that is, the sharpest possible ‘knife,’” said Peggs. Because smaller beams deliver radiation with increased precision, this improvement could have a significant impact by shortening the duration of treatment, increasing its effectiveness, or both. The new design also promises to be less costly and more reliable, which should increase its availability.

How it works

The idea behind radiation therapy is to deliver a lethal dose of radiation to cancerous cells. In conventional x-ray radiation therapy, many healthy surrounding cells are also exposed to the radiation because x-ray beams deposit their energy as they travel through tissue. In fact, most of the dose of x-rays is deposited near the surface of the body. Though cancerous cells tend to be more susceptible to the damaging effects of radiation (or less able to repair it), the collateral damage to healthy tissues limits the dose physicians can use to destroy the tumor.

Proton therapy offers an advance over conventional x-rays because proton beams deposit most of their energy where the beam stops. The original proton therapy synchrotrons were designed to deliver cell-killing doses of radiation to tumors in three dimensions by aiming proton beams from multiple directions to stop at the depth of the tumor tissue. That precision targeting allows doctors to deliver higher doses to the tumor cells while sparing healthy surrounding tissue.

But accelerators are often costly to build and difficult to maintain, explaining why the design principles for hospital-based accelerators must be radically modified, and why relatively few hospitals have them. The new accelerator design developed by the BNL team offers two main advantages: “rapid cycling” and “strong focusing.”

Rapid cycling allows proton beams to be injected and

BNL Cancer Therapy, page 8

NIAID, MERIAL DEVELOP ORAL VACCINE TO COMBAT RABIES IN WILDLIFE



More than 90 percent of all cases reported annually to the Centers for Disease Control and Prevention (CDC) now occur in wildlife, and the species most frequently infected are skunks, raccoons, foxes, and bats.

Merial, a world-leading animal health company producing pharmaceutical products and vaccines for livestock, pets, and wildlife, has developed an innovative oral rabies vaccine (Raboral V-RG®) targeting wildlife.

The underlying technology for Raboral V-RG® was developed at the National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health, and acquired by Merial through a nonexclusive license.

Rabies is a preventable viral disease of mammals transmitted most often through bites from infected animals. More than 90 percent of all cases reported annually to the Centers for Disease Control and Prevention (CDC) now occur in wildlife, and the species most frequently infected are skunks, raccoons, foxes, and bats.

The rabies virus attacks the central nervous system, leading to paralysis and ultimately death. While human rabies

deaths are rare in the United States, the estimated public health costs associated with disease detection, prevention, and control exceed \$300 million each year.

Dr. Bernard Moss and colleagues at NIAID developed the poxvirus technology used in Raboral V-RG®. This method allows the high-level expression of an inserted gene. Poxviruses are excellent candidates for immunizing vectors because of their large genome size, possession of their own transcriptional regulatory sequences, broad host cell range, and lack of infectivity of isolated viral DNA. Recombinant DNA technology has made it possible to express genes of one organism within another.

However, many of the commonly used viral vectors such as adenovirus, retrovirus, and papillomavirus have limitations that reduce their effectiveness as vaccine vectors. Generally, these viruses have a narrow host range and are unable to accommodate large amounts of DNA. Pox-

viruses, although difficult to recombine in vitro, do not have these limitations.

Raboral V-RG® is a safe and highly specialized recombinant poxvirus vaccine. The vaccine has only one rabies virus gene, so the risk of causing rabies is eliminated.

Raboral V-RG® is encased in solid fishmeal baits that are eaten by raccoons and coyotes in the wild. Each year, approximately 12 million doses of Raboral V-RG®, incorporated in bait units, are distributed by airplane, helicopter, or by hand to reach the target animals. Immunity is achieved approximately 10 to 14 days after the vaccine is ingested.

Rabies causes extreme suffering and pain in infected animals, and the symptoms include fever, headache, hallucinations, and confusion.

Death usually occurs within days of the onset of symptoms. Raboral V-RG® helps spare pets, livestock, and wildlife this fate.

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EARLY DIAGNOSIS OF DIABETES

Researchers at Pacific Northwest National Laboratory (PNNL) have applied advanced proteomics methods to identify potential new biomarkers of pre-diabetes and type 2 diabetes mellitus, both of which are characterized by high blood glucose and are associated with obesity. The new biomarkers may result in a more accurate test for both disorders.

The current gold standard for diagnosing pre-diabetes and type 2 diabetes is the oral glucose tolerance test (OGTT), which is used to determine patients' blood glucose levels before and after glucose intake. However, the OGTT is inconvenient, requires fasting, and is not highly reproducible. With more development, scientists believe that the biomarkers identified in this work may hold the key to earlier detection of pre-diabetes and type 2 diabetes. Advantages include improved accuracy in diagnosing pre-diabetes and type 2 diabetes.

More info: ron.thomas@pnl.gov

FAA CRADA OP

The FAA's William J. Hughes Technical Center is interested in entering into a Cooperative Research and Development Agreement (CRADA) with small business organizations to enhance, manufacture, and market a technology entitled SUN keyboard system translator (SunKeyST).

SunKeyST allows virtually any keyboard or pointing device to transparently interface to a SUN Microsystems workstation without the need for additional hardware or software support.

More info: Deborah Germak, 609-485-9862, deborah.germak@faa.gov

CESIUM EXTRACTION

Idaho National Laboratory (INL) has developed a method for co-extraction of cesium and strontium from acidic solutions using a mixture of commercially available crown ether and calixarene extractants that exhibit high radiation and chemical stability. This is an efficient solvent extraction process for the simultaneous removal of cesium and strontium from dissolved spent nuclear fuel and acidic nuclear waste streams. Combined use of these two extractants in one process represents a novel approach to partitioning these elements. Simultaneous solvent extraction of these radioactive elements is desirable for waste management concerns because the process provides purified cesium and strontium in a form easily concentrated or solidified, high levels of decontamination, high removal factors and a simplified chemical scheme.

More info: Gary W. Smith, 208-526-3780

NAVY CGI

The Naval Air Warfare Center Training Systems Division (NAWCTSD) has partnered with the National Institute of Justice in developing a computer-generated imagery (CGI) based use of force training simulator. The final objective of this project is the development of a prototype use of force training system that can be commercialized and marketed to law enforcement agencies at a reasonable cost. System scenarios provide a high level of interaction between the trainee and the simulator through the incorporation of speech recognition and CGI-based scenario content.

More info: Sunny Simmonds, 407-380-4699

BUG OFF

Agricultural Research Service (ARS) scientists Charles Cantrell, Jerome Klun, and Stephen Duke have isolated a natural compound, callicarpenal, from the American beautyberry that has been shown to repel mosquitoes, ticks, and fire ants. Callicarpenal, an all-natural insect repellent, is an alternative to commercially available synthetic repellents and is more effective than currently available natural repellents on the market. Callicarpenal is as effective as DEET and more effective than picaridin (Bayrepel) in the bioassays used against mosquitoes, and is also as effective as DEET and picaridin against the deer tick. It could be a good alternative to synthetic repellents such as DEET and picaridin, and could be marketed as an all-natural repellent. Using aerosols or creams, it could be applied topically.

The compound would have to be registered with the EPA.

In addition, inexpensive methods for developing this compound are needed.

More info: June Blalock, 301-504-5989, license@ars.usda.gov

LEARNING BY DOING

New instructional approaches and tools are offsetting the demand on information workers. The most profound of these new learning technologies use databases and software to enable adaptive "learning by doing." With these technologies, the learner is presented a logical sequence of problems or simulations where they are first instructed, then coached, and then allowed to practice solo. To reduce the time and cost associated with creating these processes, Idaho National Laboratory has created a tool called SimGen.

More info: Charity Follett, 208-526-9353

NETL COAL TECH

Researchers at the Department of Energy's National Energy Technology Laboratory (NETL) have developed a unique software module that can couple with computational fluid dynamics (CFD) codes to model the complex chemical reactions that occur between coal particles and flowing gases during the coal gasification process. The carbonaceous chemistry for continuum modeling (C3M) module provides unprecedented insight into the chemical kinetics and thermodynamics of a coal gasification unit, which could be invaluable to commercial plants attempting to design and optimize such technology.

More info: Diane Newlon, roberta.newlon@netl.doe.gov

EXTRACTING DNA

The Naval Research Laboratory (NRL) has successfully developed a magnetic microbead support that enables the capture of genomic targets in a single step. The microbead is functionalized with a phosphorous branched dendrimer linker that covalently binds DNA capture probes, allowing hybridization of the target directly onto the bead. The targets can then be recovered through heat denaturation in small elution volumes for direct analysis. The robust bond between capture probe and microbead permits regeneration of the probe even after repeated cycles at high temperatures (up to 100°C) and salt conditions (3-5 M NaCl), providing a reusable universal platform for sequence-capture or background subtraction. NRL is seeking patent licensees or CRADA partners.

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

SPAWAR ENHANCES ROBOTIC RADIO RELAY COMMUNICATIONS

Robots are increasingly used for operations conducted in life-threatening and hazardous situations, such as in mining, law enforcement, and explosive disposal environments.

Space and Naval Warfare Systems Center Pacific (SPAWAR Pacific) has developed a robotic relay radio system to extend the communications link between the user and the robot, allowing the robot to travel further distances and into previously unreachable areas.

Eight years and \$1.5 million in development have been contributed to this technology, and a second-generation system with increased functionality is currently in development.

Additionally, SPAWAR Pacific's Technology Transfer Office announced this technology's availability for licensing in the *Federal Register* and is accepting and evaluating license applications and commercialization plans from nine companies and one government agency.

"I have never seen this much interest in any other technology that we have marketed. We have had to create new procedures and strategies for tracking and managing the interest in this technology,"



Deployer module mounted on iRobot packbot

said Dr. Stephen Lieberman, Head of Technology Transfer at SPAWAR Pacific.

SPAWAR Pacific's Unmanned Systems Branch won the 2008 Office of the Secretary of Defense Office of Technology Transition and DOD TechMatch Hot Technologies Contest for its Robotic Radio Communication System.

The reward was the creation of a marketing video about the technology funded by DOD TechMatch and created by Peter Doyle, an award-winning producer who has produced segments on *Nova*, *48 Hours*, *Biography*, and the *CBS Evening News*.

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BNL Cancer Therapy, from page 5

extracted from the synchrotron in just one turn around the circular particle accelerator. Unlike the earlier machines, which required multiple turns, this eliminates the need for sensitive feedback systems to control the beam currents.

"This makes the machine more robust and reliable to operate. It's more of a turn-key operation," Peggs said. "Turn it on and it consistently starts up like a transformer, rather than booting up like a PC."

Strong focusing refers to the ability to shape the proton beam and keep it focused to pinpoint dimensions. In contrast to the Loma Linda machine, where beams measure up to a centimeter across, the new design can achieve beams as narrow as one millimeter.

Pinpoint accuracy reduces collateral damage and allows physicians more flexibility in the doses they use. Higher doses could yield more effective therapy, possibly in fewer treatments.

Compact beam size has other benefits as well: smaller components (beam pipes, magnets, etc.) for the whole device. That makes everything lighter and less expensive, Peggs said. Smaller size will also eliminate the need for water-cooling most magnets; air-cooling will be sufficient. That adds up to even more cost savings.

"Our biggest challenge now is to find

partners in an industrial consortium to help us build one of these new machines," said Peggs. "It's part of our mission as a national laboratory to put together teams and serve national needs in terms of technology transfer. We would help to build the first specialized, high-tech items, but most of an accelerator is made from conventional technology, and that can be done by industry. So we are looking for a consortium to see this move into the commercial sector — and hospitals across the country," he said.

In addition to Peggs, Michael Brennan, Joseph Tuozzolo, and Alexander Zaltsman, all in BNL's Collider-Accelerator Department, collaborated on the project. Their ideas and designs stem directly from their experience working on particle accelerators for physics experiments.

"It's the fact that we do the science for accelerators like RHIC that allows us to do this for medical applications," Peggs said.

The physicists' work at RHIC and on the development of the improved medical synchrotron is supported by the DOE's Office of Science (Office of Nuclear Physics).

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