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T² EVENTS

Clean Water Partnership Summit
Cincinnati, Ohio
September 5-6, 2007

International Space Congress &
International Space Exposition
Hyderabad, India
September 24-28, 2007

National Manufacturing Week
Chicago, Ill.
September 25-27, 2007

SSTI 11th Annual Conference
Baltimore, Md.
October 18-19, 2007

FLC Mid-Atlantic Region
Annual Meeting
St. Michaels, Md.
October 22-24, 2007

2007 Earth Sciences for Society
Denver, Colo.
October 28-31, 2007

T² FACT

In 1733, John Kay invented the flying shuttle, an improvement to looms that enabled weavers to weave faster. Kay's invention paved the way for mechanical power looms; however, the technology would have to wait another thirty years before a power loom was invented by Edmund Cartwright in 1787.

- Mary Bellis, *About.com*

FLC NEWS LINK

July 2007

DC ON T²

by Gary Jones, FLC Wash., DC Representative



Greetings from DC. Although I typically try to stay away from purely "agency-specific" topics in this column (preferring to highlight issues of a broader FLC interest), recent developments at the Department of Energy are noteworthy to many in the FLC community. In an internal DOE memorandum dated June 28, Secretary Bodman announced the appointment of Dr. Ray Orbach, Under Secretary for Science, as the Department's new Technology Transfer Coordinator.

The position was created by the Energy Policy Act of 2005 (P.L. 109-58, Title X, Section 1001(a), August 2005), which stated that "[T]he Secretary shall appoint a Technology Transfer Coordinator that will be the principal advisor to the Secretary on all matters relating to technology transfer and commercialization."

In addition, Section 1001 also directed the

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In addition to known allergens like mold, tobacco smoke, and dust mites, children's allergies may also be exacerbated by emissions from composite materials, the chemicals that make plastics flexible, and even paints.

BEHIND CLOSED DOORS: BEWARE THE AIR

by Allan Chen

Those factors in the home that cause or exacerbate asthma and allergies in children are not well understood, but scientists agree that they include allergens like dust mites, mold, and environmental tobacco smoke.

Mark Mendell, an epidemiologist in Lawrence

Berkeley National Laboratory's (LBNL) Environmental Energy Technologies Division, suggests another set of factors worth investigating: emissions from common indoor building and decorating products, such as composite wood materials that emit formaldehyde, flexible

plastics that emit "plasticizers," or even a fresh coat of paint. In a paper for the journal *Indoor Air*, Mendell conducted a review of epidemiologic studies published in scientific journals from 1989 through mid-2006, comprised of 21

See Toxin Detection, page 4

SANDIA INVENTION TO MAKE YOUR FLIGHT SAFER



Larry Schneider (left) and Mike Dinallo use the PASD diagnostic on a cockpit wiring bundle in a retired Boeing 737 at a Sandia FAA test center.

A Sandia National Laboratories (SNL) research team was the nation's only winner of the 2007 FLC Interagency Partnership Award for Excellence in

transferring federal technology to the commercial marketplace.

Larry Schneider, R. Kevin Howard, Steve Glover, and Michael Dinallo won from a pool of more than 250 research facilities for their team's work in creating PASD (Pulse Arrested Spark Discharge) — a commercially viable technique that sends a very brief high-voltage spark along the spaghetti-like wiring in airplane fuselages. The energetic but harmless spark jumps to ground or other wires when it crosses barely noticeable breaks in insulation, creating momentary short circuits whose locations can be traced and the damaged wiring repaired or replaced.

The technique was developed largely through a partnership with the Federal Aviation Administration (FAA). The technique, proven after years of testing and development at SNL, was transferred last year to the private sector.

SNL is a National Nuclear Security Administration laboratory.

DOE Secretary of Energy Samuel Bodman said, "PASD is the world's first wiring diagnostic tool that can detect and locate a broad range of aircraft defects, such as breached insulation, chafing, and small insulation cracks, and because of this detection will save lives."

According to Schneider, "The final step was finding the right commercial partner. Astronics Advanced Electronics Systems

Safer Flights, page 5

FED LABS FLASH | TECHNOLOGY TRANSFER NOTES

CCAT AWARDS OMEGA \$49K

The Center for Commercialization of Advanced Technology (CCAT) in San Diego, California, announced recently that it had awarded Omega Sensors Inc., a \$49,000 product development award.

The company will use the funds for continued development of its micro-electro-mechanical systems (MEMS) accelerometer technology.

Accelerometers are used to determine acceleration (movement) in navigational vehicles such as helicopters, airplanes and unmanned military aircraft and can be used to measure vibration, velocity and other types of movement.

The San Diego-based Omega Sensors developed the MEMS accelerometer to provide a far less expensive and far more sensitive alternative to accelerometers currently on the market. "This unique

MEMS accelerometer has not only been proven to provide world-class accuracy, but it's been determined that Omega Sensors can sell their technology for a fraction of the cost of those accelerometers currently used by NASA in their space shuttles and global positioning systems," said Tom Sheffer, program director for CCAT San Diego.

Omega Sensors' technology can also effectively be used in the seismic imaging market to measure vibration on bridges and civil engineering projects, as well as oil and natural gas exploration. Funded by the Department of Defense (DOD), the CCAT program identifies, evaluates, funds and fast-tracks the development of technologies for use by the DOD and the Department of Homeland Security.

LOS ALAMOS LABORATORY TECHS CAPTURE R&D 100 AWARDS

by Todd Hanson

Los Alamos National Laboratory (LANL) researchers won two of *R&D* magazine's prestigious 2007 R&D 100 Awards. The award-winning projects this year include the Camera on a Chip and the Portable Acoustic Cytometer.

"I am impressed with and proud of the ingenuity of our R&D 100 award winners," said Laboratory Director Michael Anastasio. "The awards demonstrate the Laboratory's powerful role in developing innovative concepts and translating them into practical solutions." These latest winners bring LANL's total to 105 awards since the Laboratory began entering innovations in the competition in 1978.

Terry Wallace, principal associate director for science, technology and engineering, was pleased with the awards, but a bit surprised. "We had some excellent submissions this year that validate the fact that the Laboratory is on the cutting edge of technological development. I am surprised we didn't get more awards because of the very high quality of our entries."

Camera on a Chip

The Camera on a Chip is a 2-centimeter by 2-centimeter microelectronic device that combines an array of silicon photosensors and a metal-oxide-semiconductor (CMOS) chip with

See LANL Techs, page 8

LOCAL COMPANY GETS LANL ENVIRO REMEDIATION CONTRACT



Acquisition Services Management Division Leader Kevin Chalmers, left, and Keith Tucker of Accelerated Remediation Company sign the MDA-B cleanup contract at Chalmers' laboratory office.

Accelerated Remediation Company, a local small business with offices in Los Alamos, received a contract from LANL to begin remediation of an historic waste site known as Material Disposal Area B. (MDA-B). This area, located within Technical Area 21, was the first common

disposal area for radioactive waste generated at the Laboratory and received waste related to Laboratory operations from 1945 until 1948.

MDA-B is located in Los Alamos on DP Mesa, on the south side of DP Road across from numerous Los Ala-

mos businesses. In compliance with the New Mexico Environment Department Consent Order, MDA-B is scheduled for complete removal of historical contents. DP Mesa contains land that potentially could be transferred to Los Alamos County for economic development or other purposes.

Because of the county's interest and MDA-B's proximity to a planned commercial development, LANL's goal is to clean the former disposal site to residential standards.

Laboratory officials and Keith Tucker, Accelerated Remediation Company's program manager, signed the contract last week at Los Alamos.

The contract for \$36.4 million is the largest awarded to a minority-owned small business certified by the Small Business Administration since at least 1999.

"Cleanup of MDA-B represents a significant step forward by the Laboratory in continuing to meet our environmental stewardship commitments," said Sue Stiger, LANL's associate director for environmental programs.

FLC NEWSLINK

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Subscriptions: tgrayson@utrs.com
Article submissions: tgrayson@utrs.com

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FLC Management Support Office
950 North Kings Highway, Suite 208
Cherry Hill, NJ 08034
856-667-7727
856-667-8009 fax
www.federallabs.org

TECH WATCH | LABORATORY TECHS READY FOR TRANSFER

HORMONE REPLACEMENT

The utility of estrogenic substances in the practice of medicine is well documented. Estrogens may be used for the replacement of the natural hormone estradiol in hypogonadism, following the removal of the ovaries, or cessation of ovarian activity during menopause.

They are also widely employed as a component of oral contraceptives.

However, orally active synthetic estrogens are associated with a number of side effects, such as enhanced risk of endometrial carcinoma; induction of malignant carcinoma, especially in the cervix, breast, vagina and liver; promotion of gallbladder disease, thromboembolic and thrombotic diseases, myocardial infarction, hepatic adenoma, elevated blood pressure, and hypercalcemia; and reduced glucose tolerance.

Inventor Hyun K. Kim of the National Institutes of Health (NIH) announced a new family of novel, active estrogens that are nitrate esters of estradiol.

These nitrate esters possess enhanced estrogenic activity following oral administration and lack a 17-ethynyl alcohol, which has been implicated in many side effects attributed to other synthetic estrogens.

It is anticipated that these esters could be used in all instances where estrogen is prescribed as a treatment.

Licensing Status: Available for exclusive or nonexclusive licensing.

More info: Tara L. Kirby, Ph.D.; (301) 435-4426; tarak@mail.nih.gov

BAROBALL™ VALVE

Barometric pumping is a remediation technique that removes volatile contaminants from soil in the vadose zone, above the water table.

At Washington Savannah River Company (WSRC), scientists have developed a control valve that increases the efficiency of barometric pumping.

The BaroBall™ control valve allows natural soil gas to flow out of an underground well, while restricting airflow from the surface into the well. Air flowing into the well from the surface will dilute and possibly spread contaminants still present in the subsurface.

The U.S. Patent and Trademark Office has issued Patent No. 5,641,245 and 6,425,298 on the BaroBall valve.

WSRC invites interested companies with proven capabilities in this area of expertise to enter into a licensing agreement with WSRC to manufacture and market this device as a commercial product.

More info: John Olschon, License Executive
Savannah River National Laboratory, (803) 725-0848,
john.olschon@srnl.doe.gov

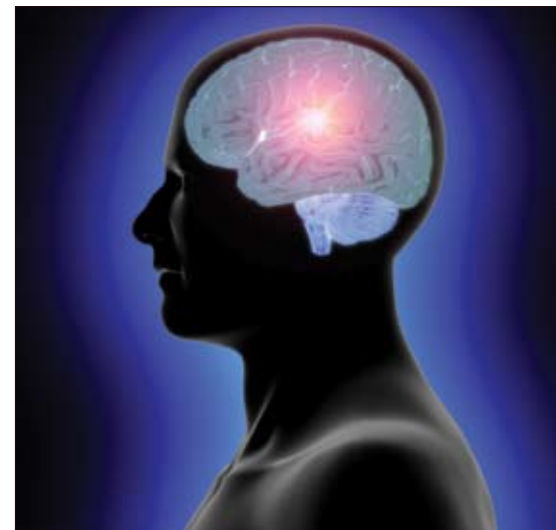
TRAINING PSYCHOPHYSIOLOGICAL SKILLS

An innovation from NASA's Langley Research Center (LRC) is a system of providing physiological self-regulation training for mental or physical optimizing purposes in sports or other complex skills, or for treating health problems, through the trainees'/users' psychophysiological signals.

The method provides for real-time modulation of task/environment interface that would allow a trainee to learn physiological self-regulation in order to modify the difficulty of the performance task and/or environment in which training is conducted.

Employing proven techniques in biofeedback and physiological self-regulation, in conjunction with the innovation described herein, would enable athletes to develop self-efficacious outcome responses that can be translated into the operational domain of athletic competition. The innovation presents the capability to extend current sports psychological practices of guided imagery, visualization and cognitive reinforcement learning by systematically providing demonstrable and knowledge feedback through the innovative use of closed-loop cybernetic feedback principles that provide immediate reinforcement of psychophysiological self-regulation.

Like the video game biofeedback technology that received widespread favorable publicity for LRC and was licensed to Cyberlearning Corp. (www.smartbraingames.com), this human performance enhancement technology is based on the LRC biocybernetic flight deck adaptive automation research of the 1990s. It differs from the video game technology in that, with the present invention, the feedback



The innovation presents the capability to extend current sports psychological practices of guided imagery, visualization and cognitive reinforcement learning by systematically providing demonstrable and knowledge feedback through the innovative use of closed-loop cybernetic feedback principles.

of an operator's physiological activity is presented in the form of movement of actual physical objects that the person is manually interacting with while performing a task, rather than in the form of a task simulation or game on a computer screen.

More info: <http://technology.nasa.gov>

FLC Technology Locator

Personalized 1:1 Assistance!

Need assistance locating information on federal technologies, federal laboratory expertise, or collaboration possibilities?

*Contact the FLC Technology Locator,
Frank Koos, at 856-667-7727*

Toxin Detection, from page 1

studies mostly from outside the United States. These studies found associations between common indoor materials and an increased risk of asthma, pulmonary infections, and allergies in children.

The growing body of research identified specific risk factors, including organic chemicals like formaldehyde, benzene, and phthalate esters (the “plasticizers” that make some plastics flexible); indoor materials, including carpet, paint, flexible flooring, and other plastics; and various activities related to installing and cleaning these materials indoors.

Mendell is careful to note that “causal relationships have not been demonstrated” in these studies. However, his review of these studies, most of which were conducted in Europe, suggests that U.S. scientists should take a closer look at emissions from indoor materials for their possible effects on children’s health.

Asthma Prevalence Growing

According to the Centers for Disease Control (CDC), the prevalence of asthma in children in the United States increased from 3.6 percent in 1980 to 6.2 percent in 1996. This is an average increase of 4.3 percent per year, a relatively high growth rate that worries health experts. Asthma can be a severe, life-threatening illness; moreover, both allergies and asthma are expensive to individuals and to society. Current science suggests that risk factors for developing asthma include genetic predisposition; specific allergens such as dust mites, cockroaches, and pet dander; moisture and mold; and environmental tobacco smoke. There could be other risk factors, as yet unknown.

A complication for researchers seeking the causes of the asthma growth rate is that while a few risks have been clearly demonstrated, the case for others is weak. “Sufficient evidence of a causal relationship” is the CDC’s strongest level of evidence; “sufficient evidence of an association” and “limited evidence of an association” are weaker. The CDC also draws a distinction between factors that cause a condition, such as the development of asthma, and those that exacerbate an existing condition, for example by triggering asthma attacks.

In an authoritative report published in

2000, the Institute of Medicine, part of the National Academy of Sciences, concluded that there is sufficient evidence for a causal relationship between the development of asthma in susceptible children and exposure to a house dust-mite allergen. The report also concluded that there is sufficient evidence of an association between exposure to environmental tobacco smoke and development of asthma in younger children, a statement strong enough to suggest that parents should protect children from exposure to tobacco smoke. Except for environmental tobacco smoke, however, the CDC currently does not recognize the association of chemical agents encountered in the home with asthma.

“The most frequently identified risk factors related to indoor residential chemical emissions include formaldehyde or formaldehyde-emitting particleboards, plasticizers or plastic materials, and recent painting,” said Mendell.

Pressed wood products include particleboard, medium density fiberboard, interior plywood, and interior hardwood paneling. The urea-formaldehyde resin within them releases formaldehyde over time. So do other indoor sources, including tobacco smoke, varnishes, paints, and carpets. Moisture on building materials can also accelerate the release of airborne formaldehyde. Painting and freshly painted surfaces release various volatile organic compounds into indoor air.

Formaldehyde emissions and particleboard were associated with asthma, chronic bronchitis, and other respiratory symptoms. Phthalate plasticizers, or the presence of phthalate-containing surface materials such as polyvinyl chloride or vinyl, as well as painting and other room renovation, were also associated in various studies with asthma, allergy, and respiratory symptoms.

The studies that examined indoor material emissions differed widely in design and focus, said Mendell. Their methods varied from measuring actual chemical concentrations of indoor air or dust to simply observing the presence or absence of materials that emit organic chemicals. Thus, there is a need for more rigorously controlled research to eliminate possible

confounding factors; for example, other unmeasured factors could be the real explanation for the findings in some studies.

“Future studies will have to carefully measure formaldehyde and other chemicals indoors,” said Mendell. “They will need to determine whether it’s a specific chemical such as formaldehyde that causes the association, or some other emission that is always associated with the presence of that chemical. Formaldehyde emissions, for example, are known to come from particleboard, but this material also emits other chemicals.”

One chemical compound, or several working together, could be the cause of health conditions. Still, when all the studies are taken together, and considering both their strengths and weaknesses, “it is hard to imagine what else could explain these findings that is not related to indoor chemical emissions,” Mendell said.

Mendell has been studying the associations between health and indoor environmental factors throughout his career. As an epidemiologist with the CDC’s National Institute for Occupational Safety and Health, he studied the indoor factors

associated with “sick building syndrome,” a set of respiratory and other symptoms among workers in office buildings. Detailed by the CDC to LBNL in 2000, he continued to work on those issues and ultimately joined the staff of LBNL’s Indoor Environment Department.

“I believe that studying health impacts of the indoor environment is one of the most important directions for building science,” he said. Most employed people work indoors and indeed spend most of their lives indoors, yet the health effects of the indoor environment are not well understood. LBNL’s Indoor Environment Department is one of the few research groups in the U.S. currently doing research in this field.

It was while considering literature relating indoor environments and respiratory health effects in children that Mendell noticed the large number of papers from outside the United States that seemed to implicate emissions from building materials. After carefully reviewing the available evidence, he said, “These studies justify conducting further research in this area, especially where the evidence is strongest — as with formaldehyde at levels commonly found in homes.”



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recognized PASD's capabilities and then brought to bear their significant expertise to field a system within months. PASD's first use in a National Transportation Safety Board accident investigation yielded exceptional results. ArcSafe® (the commercial name for PASD and other test technology) is just now being marketed, but its future looks bright."

The award recognized SNL's work with a federal agency to transfer technology to the marketplace that helps prevent catastrophic airplane in-flight failures resulting from short circuits in electrical wiring.

SNL also had three winners in the more populated, but still selective, Award for Excellence in Technology Transfer category.

Craig Smith and Ernest Friedman-Hill were winners for "Jess® — the Rule Engine for the Java™ — Platform." The program is a tool for building intelligent software that can be repeatedly applied as an expert system to difficult or ill-defined systems when rote computation won't do. It has been applied to problems in technology, insurance, and financial services, as well as in academic artificial intelligence research, and has been licensed to hundreds of academic institutions.

Nathan Golden, Tom Anderson, Bill Camp

(ret.), Art Hale, and Mark Allen won for Novint's 3-D haptic technology software that adds an interactive virtual touch capability to human-computer interactions. Among the uses are medical applications, remote vehicle or robotic control, military applications, and video games. Users are said to feel realistic weight, shape, texture, dimension, dynamics, and force effects.

An improved solar design won an award for David King, Paul Smith, James Gee, Mark Allen, and Jeffrey Nelson.

The breakthrough photovoltaic cell design and fabrication process for Albuquerque-based Advent Solar, Inc., moves current-carrying electrical circuits from the front surface of the cell, where they unavoidably

block sunlight, to the back surface, where the backside wiring carries the current away. The advance — which uses a laser to drill holes through the silicon substrate and form conductive channels from front to rear surfaces — is said to lower costs by eliminating the front-to-back assembly. And the design is aesthetically pleasing, a quality not often mentioned in connection with SNL advances.

More info: www.sandia.gov

DC on T², from page 1

Secretary to: 1) establish a Technology Transfer Working Group, consisting of members of the national labs and single-purpose research facilities to coordinate activities across the Department, exchange information internally, and develop and disseminate information to the public and potential partners relevant to technology transfer; 2) create an Energy Technology Commercialization Fund to be used to promote energy technologies for commercial purposes (The Energy Policy Act of 2005 [EPACT] identifies the sourcing formula for the fund); and 3) develop a technology transfer execution plan, to be updated annually.

In naming Dr. Orbach, the Secretary has identified a single point of responsibility for technology transfer policy within the Department, directing him to "perform the duties of the Coordinator ..." as outlined in the EPACT (including establishing the Technology Transfer Working Group and preparing the Technology Transfer Execution Plan). Dr. Orbach is now responsible for "overseeing and for advising the Secretary on all technology transfer and commercialization activities performed by the DOE National Laboratories, single purpose research facilities, and other DOE facilities authorized to conduct technology transfer."

In addition to meeting the specific directives of the EPACT, the Secretary went further by simultaneously establishing a Technology Transfer Policy Board to as-

sist Dr. Orbach in developing an "enduring framework for continuity and uniformity of technology transfer" within the DOE complex. The Policy Board, unlike the Working Group (which will consist of lab personnel), will be comprised of career DOE employees from the Office of Science (2), Nuclear Security (2), General Counsel (2), Policy and International Affairs (1), Office Management (1), and four others designated by the Under Secretary for Science (with possible members identified by the Principal Secretarial Officers).

The primary functions of the Technology Transfer Policy Board will be to:

- 1) Consider the development of a Secretarial policy statement concerning the purpose and goals of the Department's technology transfer mission.
- 2) Develop the technology transfer execution plan and annual update.
- 3) Oversee the activities of the Technology Transfer Working Group.
- 4) Oversee and develop proposed policies governing the use of overhead funds to conduct technology transfer activities at a DOE lab or research facility.
- 5) Conduct oversight activities of each technology transfer ombudsman.
- 6) Oversee and encourage efforts to engage private sector entities, including venture capital companies.
- 7) Develop an annual technology transfer report.

8) Provide recommendations to the Coordinator for appointing a DOE representative to the FLC and the Interagency Working Group for Technology Transfer.

The immediate task of the Coordinator and the Policy Board, as stated in the press release, is to "undertake a comprehensive review of the Department's technology transfer activities with the goal of deploying energy technologies to the marketplace at an accelerated rate."

Filling the Technology Transfer Coordinator position is a positive step for the DOE. Although it's too soon to tell how this new development will have an impact on technology transfer activities within the DOE lab environment, or what, if any, changes to current DOE tech transfer policy the newly created Policy Board may wish to implement, our DOE member labs will certainly want to follow this closely — and presumably be involved at every available opportunity (e.g., participation in the Working Group, etc.) to work toward continued successful technology transfer at the DOE labs.

The EPACT can be found under the public law section on Thomas (www.thomas.gov). The DOE internal memorandum (http://www.doe.gov/media/Technology_Transfer_Memo.pdf) and press release (<http://www.doe.gov/news/5191.htm>) are available on the DOE's website.

Gary can be reached at gkjones@flcdc.cnchost.com.

OSU'S CATLOS REAPS REWARDS OF RESEARCH



Elizabeth Catlos received the Geological Society of America's "Top Young Scientist" award in October 2006, and two months later was selected by the Smithsonian Institute for a special publication on notable young people available late September 2007. Her most recent award from the University of Texas at Austin—the Harrington Fellowship—will allow her to focus solely on the research in western Turkey she began while at OSU.

by Jana Smith

It's been an amazing year for Elizabeth Catlos, assistant geology professor, at Oklahoma State University (OSU). She received the Geological Society of America's Top Young Scientist Award in October 2006, and two months later was selected by the Smithsonian Institute for a special publication on notable young people that will be available late September 2007. Her most recent award from the University of Texas (UT) at Austin—the Harrington Fellowship—will allow her to focus solely on the research in western Turkey she began while at OSU.

As a Harrington Fellow, Catlos will take a leave of absence from OSU for the 2007-2008 academic year to participate in the program at UT Austin. She says it is a great opportunity to collaborate with other scientists while pursuing her career and research interests. Only five faculty fellows are awarded each year.

The fellowship includes a stipend that will cover her salary and medical benefits. She was also awarded a research stipend and funds to support a seminar series and a student.

OSU graduate student Courteney Baker will work with Catlos at UT while pursuing her graduate degree.

In her research, Catlos applies geochemical techniques to address basic questions about how the Earth's crust reacts to dynamic processes. Her research is centered around three major themes in diverse field areas: (1) deciphering the reason for large-scale crustal extension in western Turkey; (2) understanding the evolution of the Himalayas; and (3) developing the tectonic history of India's southern granulite terrain. The Harrington Fellowship provides Catlos access to specialized equipment and faculty within the Jackson School of

Geosciences needed to advance the research.

In the summers of 2005 and 2006, Catlos conducted field work in the Menderes Massif and collected over 200 rock specimens. Work in the UT Electron Microbeam Laboratory and the High Resolution CT Scanning Facility will help Catlos better understand the geochemical and petrological history of these specimens.

She will then organize a symposium on the "Geology of the Aegean" and invite speakers from a variety of fields concerned with understanding the basic geology of the Aegean, as well as the area's geological-archeological history and natural hazards.

The Aegean has been a locus for devastating natural disasters, including recent earthquakes as well as enormous historical volcanic eruptions. The symposium would appeal to a large segment of UT faculty and students interested in the importance of this particular area in understanding the Earth's history. Catlos also has international partners and U.S. collaborators in

place to organize a workshop and field excursion to western Turkey. The trip could lead to a UT research program in the Aegean and increased contacts with Turkish scientists.

Catlos envisions the Harrington Fellowship as a vehicle for developing new ideas and obtaining new data for work supported by the National Science Foundation to answer a basic research question with real-world application. "It's an opportunity that I couldn't turn down," said Catlos. "I may not have an opportunity like this again."

She recently presented her research in Vienna with a colleague and has plans to present at other international conferences. She will attend a conference at Cambridge this summer and will return to western Turkey to continue her research.

"I'm an adventurer," said Catlos. "I always wanted to be like Indiana Jones. And I have been able to do that."

Oklahoma State University—an active 100M+ research university located in Stillwater, Oklahoma—is home to more than 500 researchers working in the fields of biotechnology, energy, nanotechnology, sensors and more to develop innovative solutions for application and commercialization in the global marketplace.

For more information about OSU's research programs, visit www.vpr.okstate.edu/researchcentral.

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PREVENTING E.COLI

National Institutes of Health researchers have invented a conjugate vaccine to prevent infection by *E. coli* 0157:H7, particularly in young children under 5 years of age.

E. coli 0157:H7 is an emerging human pathogen that causes a spectrum of illnesses with high morbidity and mortality, ranging from diarrhea to hemorrhagic colitis and hemolytic-uremic syndrome (HUS). Infection with *E. coli* 0157:H7 occurs as a result of consumption of water, vegetables, fruits or meat contaminated by feces from infected animals, such as cattle.

The most recent large outbreak in the U.S. was from contaminated bag spinach. The conjugate is composed of the O-specific polysaccharide isolated from *E. coli* 0157, or other Shiga-toxin producing bacteria, conjugated to carrier proteins, such as nontoxic *P. aeruginosa* exotoxin A or Shiga toxin 1.

More info: Peter A. Soukas, 301-435-4646, soukasp@mail.nih.gov

LANL SENSORS

Los Alamos National Laboratory (LANL) scientists are looking for industry partners to develop and commercialize sulfur-resistant, high-temperature, solid-state gas sensors using patented chemically modified terbium-yttrium-zirconium oxide (Tb-YSZ) ceramic coatings. LANL gas sensors can be used to monitor the presence and concentration of O₂, CO, NO_x, and hydrocarbon with superior selectivity in most environments, especially in corrosive and high temperature settings.

More Info: Michael Erickson, 505-667-8087, michaele@lanl.gov

MICRO/NANO MACHINES

Lawrence Berkeley National Laboratory (LBNL) is seeking a qualified partner(s) to work in a collaborative effort to further develop, test, and commercialize improved micro and nano machining technologies to manufacture medical cardiac stents used to shore up weak blood vessels leading to the heart.

LBNL's technology offers the potential to lower stent production costs, improve quality, and provide safer operation.

More info: Ka-Ngo Leung, KNLeung@lbl.gov, 510-486-7918

STRONGER PLASTIC, RUBBER

Agricultural Research Service (ARS) scientist Lei Jong has discovered a method using defatted soy products to improve the strength of rubber products. Defatted soy products do not contain soybean oil. All of the steps and the equipment for ARS's method are the same as current commercial practices.

However, ARS's method uses defatted soy flour (DSF) in place of carbon black, which is used in automobile tires and other products to increase their mechanical strength.

This invention can be used in various industries such as rubber, plastic, and coatings to significantly improve the strength and biodegradability of a variety of polymer products.

The advantage of using this technology versus other conventional fillers is that defatted soy products give a higher reinforcement effect in rubbers at a comparative or lower cost.

More info: Lei Jong, 309-681-6240, jongl@ncaur.usda.gov

BUG REPELLANT

Agricultural Research Service (ARS) scientists 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 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. Callicarpenal is potentially a safer and perhaps more effective insect repellent. The market potential is huge because 38 percent of Americans use a DEET-based product every year.

More info: Tara T. Weaver-Missick, twm@ars.usda.gov

SECURE NETWORKS

Michael Bennett and Gregory Bell of Lawrence Berkeley National Laboratory (LBNL) have invented an inexpensive apparatus that enables secure and auditable tapping of a computer network. The self-contained LBNL secure network tap will enable corporations, universities, research institutes, and government agencies to maintain optimal security while meeting increasingly strict privacy requirements. The LBNL invention includes encrypted log files and optional means for encrypting and storing tapped traffic.

More info: 510-486-6467, TTD@lbl.gov

MANAGING ADHD

Attention Deficit Hyperactivity Disorder (ADHD), the most common behavioral disorder in childhood, is estimated to affect three to five percent of people in the United States, both children and adults.

National Institutes of Health inventors Maximillian Muenke, Mauricio Arcos-Burgos, and F. Xavier Castellanos have identified haplotypes of latrophilin 3 (LPHN3) that increase the susceptibility for development of ADHD. LPHN3 is a G-protein coupled receptor that is specifically expressed in the brain's mesolimbic system, which is associated with ADHD.

Applications: Identifying individuals with enhanced susceptibility for ADHD; using LPHN3 haplotype information to design individualized treatments.

Licensing Contact: Tara Kirby, Ph.D.; 301-435-4426; tarak@mail.nih.gov

BIOMARKERS FOR CVD

The National Heart, Lung, and Blood Institute (NHLBI) seeks partners in a biomarker consortium to promote research on novel serum/plasma/urine biomarkers of cardiovascular disease (CVD) and related risk factors, including atherosclerosis, obesity, insulin resistance, hypertension, and metabolic syndrome. An immediate consequence of this project will be the development of new diagnostic tests to identify individuals at high risk for CVD and its risk factors at a time when intervention is most feasible.

More info: Lili Portilla, PortillL@nhlbi.nih.gov

LANL Techs, from page 1

control-and-processing circuits. The camera has a light-detection efficiency of more than 90 percent in visible light wavelengths (450 to 650 nanometers), a minimum exposure time of 50 nanoseconds, and a 300-nanosecond recovery time.

It also is designed for use in making radiographic movies of ultrafast phenomena employing protons (instead of x-rays) as the illumination source and for producing high-speed movies of fast processes over a wide range of visible or nearly visible wavelengths. The Camera on a Chip was developed by LANL researchers Kris Kwiatkowski and Christopher L. Morris, in conjunction with researchers from Teledyne Imaging Sensors.

Portable Acoustic Cytometer

The Portable Acoustic Cytometer will bring the diagnostic power of high-performance flow cytometry to more researchers and healthcare providers around the world.

The instrument uses acoustic

waves instead of a complex fluid-handling system to focus cells into a tight, concentrated stream for analysis by a laser beam.

As the world's first portable and affordable flow cytometer, the instrument also eliminates the need for large volumes of purified water, a scarce resource in parts of the world.

The device can be used for any of the analyses currently being done with conventional flow cytometers, but with higher throughput and greater sensitivity. The Portable Acoustic Cytometer was developed by Steven Graves, Robert Habbersett, John C. Martin, Mark Naivar, and Gregory Goddard, in conjunction with researchers from Acoustic Cytometry Systems, who included two former LANL researchers, Greg Kaduchak and Michael Ward.

Technology Transfer Training DVD Set

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