

T2 INSIDE



Obama Picks
Chu for Energy
Secretary

2



PNNL Discovers
BioMarkers for
Diabetes

3



Molecules in
Motion

6

T2 EVENTS

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

Photovoltaics Summit 2009
San Francisco, Calif.
June 1-3, 2009

Bio International 2009
Atlanta, Ga.
May 18-21, 2009

T2 FACT

History changed on October 4, 1957, when the Soviet Union successfully launched Sputnik I. The world's first artificial satellite was about the size of a basketball, weighed only 183 pounds, and took about 98 minutes to orbit the Earth on its elliptical path. On January 31, 1958, the United States successfully launched Explorer I. This satellite carried a small scientific payload that eventually discovered the magnetic radiation belts around the Earth.

- Mary Bellis, *About.com*

FLC NEWS LINK

January/February 2009

The Newsletter of the Federal Laboratory Consortium for Technology Transfer



Duane Schneider demonstrates a microencapsulation process that results in a chemical being encapsulated in a polymer shell. Familiar uses for microencapsulation include scratch-and-sniff perfume ads in magazines, time-release medications, and carbonless copy paper. Duane is working with a local business to develop a microencapsulation process for a cosmetics product.

Randy Montoya

SANDIA'S MICROENCAPSULATION GIVES ENTREPRENEUR GLOW

Microencapsulation isn't a new technology, but it's always finding new applications. Familiar uses include the scratch-and-sniff perfume ads in magazines, certain time-release pharmaceuticals, and (perhaps mostly for an older generation) carbonless copy paper.

Now Sandia National Laboratories' resident microencapsulation expert, Duane Schneider, is working with an Albuquerque company to use microencapsulation technology in a novel self-warming hand and body lotion.

Microencapsulation, as its name suggests, is the creation of a tiny capsule (or, in practice, lots of tiny capsules), usually just microns in diameter, that contain a particular material. In practice, microencapsulation entails placing a spherical shell composed of a synthetic or natural polymer completely around another chemical. That shell delays or slows the release of the core material. When the polymer shell dissolves or is ruptured by pressure, the material it encapsulates

is released. In addition to the familiar uses previously noted, microcapsules have found uses in the pharmaceutical, agricultural, cosmetic, and food industries, and have been used to encapsulate oils, aqueous solutions, alcohols, and various solids.

Schneider didn't start out as the microencapsulation go-to guy at Sandia, but a need arose and he stepped forward to fill it, learning everything he could about the subject,

See Entrepreneur Glow, page 4

ARS RESEARCH SHOWS PLANT PIGMENT SUPPORTS BONE HEALTH

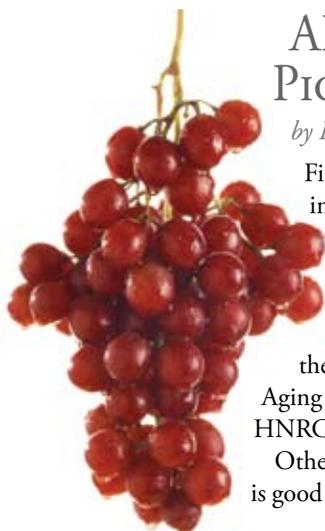
by Rosalie Marion Bliss

Findings from a new study suggest that natural pigments found in plants may help protect against bone loss in older men and women. Researchers funded by the Agricultural Research Service (ARS) reported the findings in a paper published online by *The American Journal of Clinical Nutrition*.

The study was led by epidemiologist Katherine Tucker of the Jean Mayer USDA Human Nutrition Research Center on Aging (HNRCA) at Tufts University in Boston, Mass. Tucker directs HNRCA's Dietary Assessment and Epidemiology Research Program.

Other studies have consistently shown that fruit and vegetable intake is good for bones. Biological antioxidants in fruits and vegetables, such

See Bone Health, page 5



NASA STUDY INVESTIGATES STRESS IN PILOTS

by Nancy Smith Kilkenny

Have you ever felt as if your brain was so full of information that you couldn't process another thing? Mental overload creates confusion and frustration, and for airline pilots, the consequences can be disastrous.

Researchers at NASA's Glenn Research Center in Cleveland are studying how advanced technology can be used to warn pilots when they are operating under dangerous levels of stress, fatigue and distraction. Biomedical engineer

See Pilot Stress, page 4

FED LABS FLASH | NEWS FROM AROUND THE CONSORTIUM

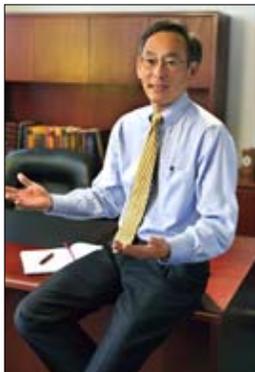
OBAMA PICKS BERKELEY NATIONAL LABORATORY DIRECTOR STEVE CHU FOR ENERGY SECRETARY

President Barack Obama has nominated Steve Chu, Director of the Lawrence Berkeley National Laboratory (LBNL), to be Secretary of Energy.

Chu, 60, is a Nobel laureate physicist and a Professor of Physics and Molecular and Cell Biology at the University of California (UC), Berkeley.

He is also one of the nation's foremost and outspoken advocates for scientific solutions to the twin problems of global warming and the need for carbon-neutral renewable sources of energy. He has called these problems "the greatest challenge facing science" and has rallied many of the world's top scientists to address it.

In speeches to organizations around the globe, Chu has delivered a consistent message. "Stronger storms, shrinking glaciers and winter snowpack, prolonged



droughts and rising sea levels are raising the specter of global food and water shortages. The ominous signs of climate change we see today are a warning of dire economic and social consequences for us all, but especially for the poor of the world," Chu said. "The path to finding solutions is to bring together the

finest, most passionate minds to work on the problem in a coordinated effort, and to give these researchers the resources commensurate with the challenge."

Since assuming the directorship of LBNL in August 2004, Chu has put his words into action by focusing the Laboratory's considerable scientific resources on energy security and global climate change, in particular the production of new fuels and electricity from sunlight through non-food plant materials and artificial photosynthesis.

At the same time he has reinforced

LBNL's historic leadership in energy-efficient technologies and climate science.

"Steve Chu came to our lab with a vision for how our community could have an impact on the greatest scientific and technological challenges of our times," said LBNL Deputy Director Paul Alivisatos. "Berkeley Lab has been transformed under his leadership so that we now have programs that bring together scientists from diverse disciplines to work on biofuels, soft X-ray science, solar energy, carbon management and battery technologies, just to mention a few."

Said UC Berkeley Chancellor Robert Birgeneau, who has known Chu for three decades since the two men worked at Bell Laboratories in the 1970s, "Steve Chu has been relentless about addressing the technical challenges of renewable energy in a deep way. We will now have an energy policy that can mean the U.S. will have a chance of obtaining energy self-sufficiency through new technology."

More info: <http://newscenter.lbl.gov/>

USDA ANNOUNCES \$477 MILLION IN FUNDING FOR SCHOOLS, ROADS

Secretary of Agriculture Ed Schafer today announced that the Forest Service is distributing more than \$477 million to 41 states and Puerto Rico for improvements to public schools, roads and stewardship projects.

This is the first year under the amended and reauthorized Secure Rural Schools and Community Self Determination Act (P.L. 110-343). Payments under the Act help fund schools and roads and create employment opportunities through projects that maintain current infrastructure and improve the health of watersheds and ecosystems in national forests.

Since 1908, 25 percent of Forest Service revenues, such as those from timber sales, mineral resources and grazing fees, have been returned to states in which national forest lands are located. In recent decades those revenues have declined significantly. The original Secure Rural Schools Act (P.L. 106-393) aimed at stabilizing the funding and transitioning to lower pay-

ments by providing assistance to affected rural counties. Under the original Act, more than \$2.5 billion was paid out over seven years. A recent report, "Sustaining Forests and Communities" which summarizes activities under the previous Act, can be viewed at www.fs.fed.us/srs. That Act expired in September of 2007; the reauthorized Act extends the program four more years.

The first of the reauthorized payments is shown in the Summary of 2008 Forest Service payments. Oregon will receive the highest payment of more than \$133 million; California will receive more than \$57 million; Idaho and Washington will receive more than \$37 million.

The Act also provides for an additional \$52 million this year to be used by local resource advisory committees to fund projects to maintain infrastructure, improve the health of watersheds and ecosystems, protect communities, and strengthen local economies. In past years, 55 committees in western states have been active in this program.

The Forest Service anticipates the formation of nearly 60 more committees under the newly reauthorized Act, many of them in the Lake States, eastern states and southeastern states where national forests are located.

The Forest Service manages 193 million acres of national forests and grasslands. For more information, visit www.fs.fed.us.

CDC REPORTS ON PUBLIC HEALTH IN ERA OF DECLINING FUNDING

The Center for Disease Control's (CDC) Coordinating Office for Terrorism Preparedness and Emergency Response recently released its inaugural report on CDC's terrorism preparedness and emergency response activities.

The report describes CDC's role in preparing the nation for public health emergencies, its significant preparedness accomplishments, the diversity of challenges that remain, and priorities for ongoing and future work in a climate of decreasing resources.

"Building a strong platform for public health preparedness and response is not an easy endeavor," said Dr. Richard E. Besser, Director of CDC's Coordinating Office for Terrorism Preparedness and Emergency Response. "Much work remains to be done to improve our internal and external response capabilities, and to reduce our vulnerabilities to all types of public health threats."

The report, *Public Health Preparedness: Strengthening CDC's Emergency Response*, outlines CDC's future preparedness priorities.

The report can be accessed at <http://emergency.cdc.gov/publications/jan09phprep>.

FLC NEWSLINK

FLC NewsLink is published 11 times a year by the Federal Laboratory Consortium for Technology Transfer and the FLC Communications Committee.

FLC Communications Co-Chairs:

Al Jordan & Sara Miller

Layout & Design: Tom Grayson

Copy Editor: Denise Bickmore

Staff Contributor: Lauren Pafumi

Subscriptions: tgrayson@utrs.com

Article submissions: tgrayson@utrs.com

Opinions or views expressed in FLC NewsLink are those of the contributors and do not necessarily reflect those of the FLC, its officers, or its representatives.

FLC Headquarters

1001 Connecticut Ave., NW, Suite 735
Washington, DC 20036
202-296-7201

FLC NewsLink

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

NIH CANCER TREATMENT

Detecting cancer prior to metastasis greatly increases the efficacy of treatment and the chances of patient survival.

Although numerous biomarkers have been reported to identify aggressive tumor types and predict prognosis, each biomarker is specific for a particular type of cancer, and no universal marker that can predict metastasis in a number of cancers has been identified. In addition, due to a lack of reliability, several markers are typically required to determine the prognosis and course of therapy.

National Institutes of Health (NIH) inventors, led by Y. Peng Loh, discovered a novel CPE splice variant designated CPE-ΔN and found that its expression levels increase according to the presence of cancer and metastasis wherein this variant is upregulated in tumors and further increased in metastatic cancer.

This data has been demonstrated both in vitro and in vivo experiments and in liver, breast, prostate, colon, and head and neck cancers. Metastatic liver cells treated with CPE-ΔN siRNA reversed the cells from being metastatic and arrested cells from further metastasis. Thus, this novel CPE isoform is a biomarker for predicting metastasis, and its inhibitors have an enormous potential to increase patient survival.

Applications

- Prognosis of multiple types of cancer and determination of the likelihood of metastasis
- Prevention and treatment of cancer with CPE inhibitors
- Determining the stage of cancer development.

The technology is currently in the pre-clinical stage of development. Available for exclusive or nonexclusive licensing.

More info: Jennifer Wong, 301-435-4633, wongje@mail.nih.gov

IDAHO LAB'S METHOD OF PRODUCING HYDROGEN

The United States uses nine million tons of hydrogen annually. There are several drivers for high cost hydrogen, including the cost of production as well as compression and/or liquefaction required to increase the density of hydrogen to the point that it can be economically transported.

Idaho National Laboratory (INL) researchers have developed a method and apparatus to generate pressurized hydrogen using water and a variety of carbon-rich compounds.

The purpose of the invention is to provide hydrogen in a format that is usable and affordable for virtually any application.

More info: David R. Anderson, 208-526-0837

PNNL RESEARCHERS DISCOVER CANDIDATE BIOMARKERS FOR TYPE 1 DIABETES

Researchers at Pacific Northwest National Laboratory (PNNL) have discovered a new method for potentially predicting the onset of type 1 diabetes with more consistency. Until now, the best method for predicting who will develop this disease has been through the identification of three specific autoantibodies produced by the human body against the pancreas, the organ that produces insulin.

As an alternative to that method, researchers have identified a specific set of proteins, together or as individuals, that may provide the same early precursor information. With more development, scientists believe that these proteins may hold the key to earlier detection of type 1 onset and therefore earlier intervention, as well as lead to improved therapies to aid physicians and patients in the management of high blood-glucose levels.

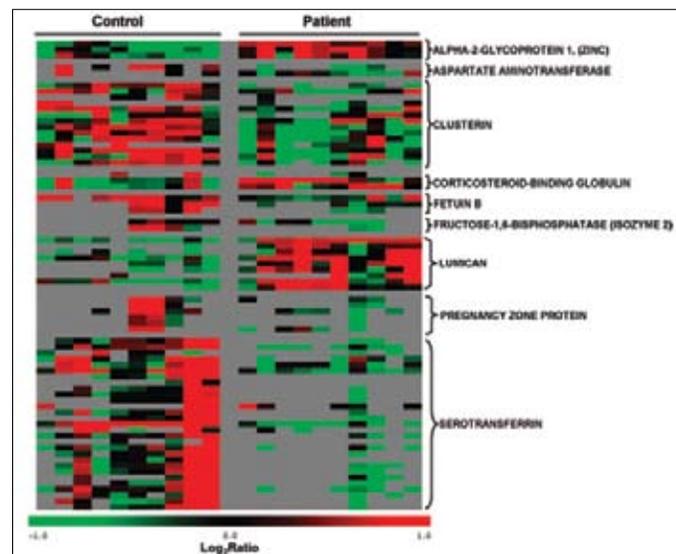
Advantages

- Potential for dramatic improvement in the consistency of onset determinations
- Information could provide drug therapy companies

with insight for better treatments

Patent(s) Pending, available for licensing in all fields.

More Info: Lisa Teske, 509-372-6850, 509-375-2631, Lisa.teske@pnl.gov



This heat map represents constituent peptide abundances for the indicated proteins. Areas shown in red indicate peptides detected in higher abundance, which correspond to candidate biomarkers of type 1 diabetes.



Entrepreneur Glow, from page 1

which can be as much an art as a science. Microencapsulation work is but one aspect of Schneider's job in the Organic Materials Department — he also supports a variety of nuclear weapon, alternative energy, and nanoscience programs as a chemical technologist. Over the years he's developed microencapsulation solutions for a number of critical national security-related projects. For example, his microencapsulation work has found its way into Sandia technology designed to detect explosive materials.

Sandia researchers aren't the only ones who've come knocking on Schneider's door. Not long ago, Kevin Mallory, owner and president of Formulab, an Albuquerque-based contract manufacturer of personal care products, had an innovative idea for a potentially patentable topical lotion. This lotion requires that two ingredients remain separated until time of use. Mallory, a chemist himself, knew the underlying chemistry for this product was sound.

The challenge was: How do you keep the components separated until time of use?

There were options: You could bottle the ingredients separately, the way epoxy glues are packaged. A more desirable solution, Mallory thought, would be to use a microencapsulation technique that would allow both active components of the lotion to live together in the same bottle. One or both key ingredients would be encapsulated; only when gently rubbed — as when applying a lotion — would the encapsulating polymer rupture, releasing the active ingredients inside and allowing the components to combine.

Mallory was convinced he had a winning idea but didn't have the microencapsulation expertise to prove out the concept himself. That's when he turned to Sandia and its Small Business Assistance (NMSBA) program.

The folks in the program linked up Mallory with Schneider and Schneider's boss, Mike Kelly. The three talked about



One frequently used microencapsulation process involves stirring an aqueous core and an organic solvent containing a dissolved polymer shell material into an emulsion.

Mallory's idea and what he'd like to accomplish. Schneider and Mike agreed that Sandia could help, and Mallory and Schneider began working together.

As Schneider moved ahead on the project, he invited Mallory to come and observe the work in the Center for Integrated Nanotechnologies (CINT) facility on Eubank Boulevard, just outside the Eubank Gate.

Mallory says his interaction with Sandia was invaluable. "This was like a crash course in microencapsulation; it really accelerated our learning curve. It helped us a tremendous amount," he said.

Mallory characterizes the Sandia relationship as "absolutely fantastic" and, speaking of the NMSBA program said, "I've been thinking about how lucky I am to live in a community where this kind of help is available."

Ultimately, the project ended on a positive note.

"We were able to show that we could microencapsulate the materials," Schneider said, adding that a follow-on agreement with Formulab may involve looking at some alternative materials.

More info: www.sandia.gov

Pilot Stress, from page 1

and lead researcher Angela Harrivel and research associate Terri McKay are testing the effectiveness of functional near infrared spectroscopy, also known as fNIRS. This emerging technology offers a noninvasive, safe, portable and inexpensive method for monitoring brain activity.

It uses infrared light to penetrate skin, brain and fluids to examine blood flow in the cortex and check the concentration of oxygen in the blood indicating neural activity.

"We ultimately want to use the technology to help pilots be more aware of their cognitive abilities during flight," said Harrivel. "No matter how much training they have, pilots could suffer from a lack of situational awareness when there is simply too much going on."

Pushing the limits

The scientists have fitted a kickboxing helmet with fNIRS optical sensors. In the study, Glenn volunteers don the helmet and sit in a moving cockpit simulator to give them a sensation of flying. The test subjects are presented with a variety of distractions and stress-inducing conditions as they use a joystick and flight instruments to stay "airborne" in virtual mode.

"Flying involves a lot of multitasking,

which can push the limits of human performance. During the simulation we purposely increase difficulty to add stress and confusion to see how they react and measure brain activity during overload," Harrivel explained.

Harrivel will redesign the headgear to make it more practical for everyday use if the research proves fNIRS to be a reliable technology for monitoring pilot cognition.

Harrivel says the research also could reveal ways to simplify the delivery of information in the cockpits of commercial aircraft. Flight computers could be designed to detect dangerously high levels of distraction or stress and supply only the most critical data to the pilots until the situation is under control. The goal is to help pilots make better decisions to ensure the safety of their passengers.

One of the test subjects is Glenn employee Jim Withrow, himself a licensed pilot. "The ability to maintain situational awareness is critical, both in high stress areas and in periods when pilot demands are very low," Withrow said. "This research is reaching out to ensure that pilots get and keep their head in the game."

Most of the test subjects are not licensed

See Pilot Stress, page 5

2009 FLC National Meeting, July 4-7, 2009
CHARLOTTE
 NORTH CAROLINA

It Takes a Team

- FLC Awards
- Technology Transfer Training
- Successful Spinoffs
- Patents
- Licensing
- Technology Transfer Tools
- CRADAs
- Technology Transfer Expert Panels
- Technology Transfer Best Practices

www.federallabs.org/meeting

HOUSE SCIENCE AND TECHNOLOGY COMMITTEE SETS AGENDA

by Gary Jones, FLC Washington, DC Representative



Greetings from D.C. My last column highlighted what we know at the moment about the direction that the new Administration will be taking on matters of science, technology and innovation.

Of course, equally important is the legislative agenda that the new Congress (111th) will be tackling on the same general issues. While there are multiple committees with S&T responsibilities, the House Science and Technology Committee has perhaps the most comprehensive oversight responsibility for science matters, and serves as a good indicator of what topics should get attention on Capitol Hill for the coming term.

Chair Bart Gordon, D-TN, recently issued his agenda for the 111th Congress, and it is broad-reaching in scope. He notes that the Committee “plans to work on issues including energy technology development, climate and weather monitoring, math and science education programs, nanotechnology, the space program, aviation research, and technical standards for industries from energy to health care to telecommunications,” and that they will also work with the Administration to implement “other critical science and technology priorities.”

Some of these priorities (see the full agenda for a more complete list) include:

- Maintaining our competitiveness—e.g., by fully funding the America COMPETES Act; reauthorizing the National Nanotechnology Initiative; restructuring national information technology R&D; addressing standards and evaluation techniques in biologic pharmaceuticals; and developing standards for health information technology (health IT) systems.

- Developing clean technologies—e.g., by implementing the Advanced Research Projects Agency for Energy (ARPA-E) at DOE to undertake high-risk, high-reward energy technology development; and focusing oversight attention on other alternative energy programs.

- Creating Jobs of the Future—e.g., by making federal STEM education programs better coordinated and more effective; promoting diversity in the STEM workforce; and directing investments in technologies to create “green jobs” that boost economic growth.

- Protecting our natural resources—e.g., by addressing the need for technologies to monitor compliance with greenhouse gas emission limits; directing more effective coordination of federal research on water supply, quality, and conservation; and conducting a review of weather and ocean research at NOAA.

- Exploring space—e.g., by working on a multi-year authorization for NASA that balances its missions and other research and student support programs; exploring the expansion of international space collaboration; and addressing the challenges facing the commercial space industry.

- Building new types of infrastructure—e.g., by focusing surface transportation R&D on intelligent transportation systems, more advanced materials and technologies to increase energy efficiency and reduce congestion; and ensuring adequate progress on the NextGen air traffic control program.

- Protecting people from natural and man-made threats—e.g., by refocusing federal disaster mitigation research related to fire, wind and earthquakes; ensuring that the Department of Homeland Security aligns its research priorities with the most critical threats and needs; and focusing research on technologies to improve border security.

As with the Administration’s science and technology policy agenda, there is nothing completely new and surprising here, but a few items are worth highlighting for their potential direct impact on technology transfer. Under the goal of maintaining competitiveness, the agenda states the committee’s intent to “work to develop updated policies for encouraging federally supported research at labs and universities to be brought into the marketplace”; while under the goal of developing clean technologies, they will review DOE Office of Science programs with an eye to “strengthen[ing] the linkages between basic energy research, applied energy research, and technology transfer ...”

As always, the link between oversight, authorizing legislation and, as applicable, appropriations can be direct...or not. We will continue to monitor and report on where both the Administration and Congress take science and technology policy over the coming months and how it may affect our community.

The House committee’s science and technology agenda can be found at <http://www.ostina.org/content/view/3779/1124/>.

Gary can be reached at gkjones@federallabs.org.

Bone Health, from page 1

as carotenoids, protect cells and tissues from damage caused by naturally occurring oxygen free radicals in the body. Such plant nutrients may help protect the skeleton by reducing oxidative stress, thereby inhibiting bone breakdown or resorption.

The researchers examined potential effects on bone mineral density of overall and individual intake of several carotenoid compounds, including alpha-carotene, beta-carotene, beta-cryptoxanthin, lycopene and lutein+zeaxanthin.

For the observational study, the researchers tracked changes in bone mineral density at two areas of the hip and lumbar spine of male and female volunteers, aged 75 years on average, participating in the Framingham Osteoporosis Study. Among these volunteers, 213 men and 390 women were measured at the beginning of the study and then four years later.

Over the course of the four years, carotenoids were associated with some level of protection against losses in bone mineral density at the hip in men and at the lumbar spine in women. No significant associations were observed at the other bone sites.

The results suggest there is a protective effect of carotenoids, particularly of lycopene, against bone loss in older adults. The researchers concluded that carotenoids may explain, in part, the previously observed protective effects of fruit and vegetable consumption on bone mineral density.

To look up the levels of individual carotenoids in selected foods, go to “Reports by Single Nutrients,” provided by the ARS Nutrient Data Laboratory at www.ars.usda.gov/Main/docs.htm?docid=15869.

Pilot Stress, from page 4

pilots. Researchers enlisted both licensed and unlicensed pilots to participate in order to ensure a mix of participants—those who were enthusiastic about the tests because of their flight experience, and those who had little or no flight experience but could demonstrate performance improvement over time.

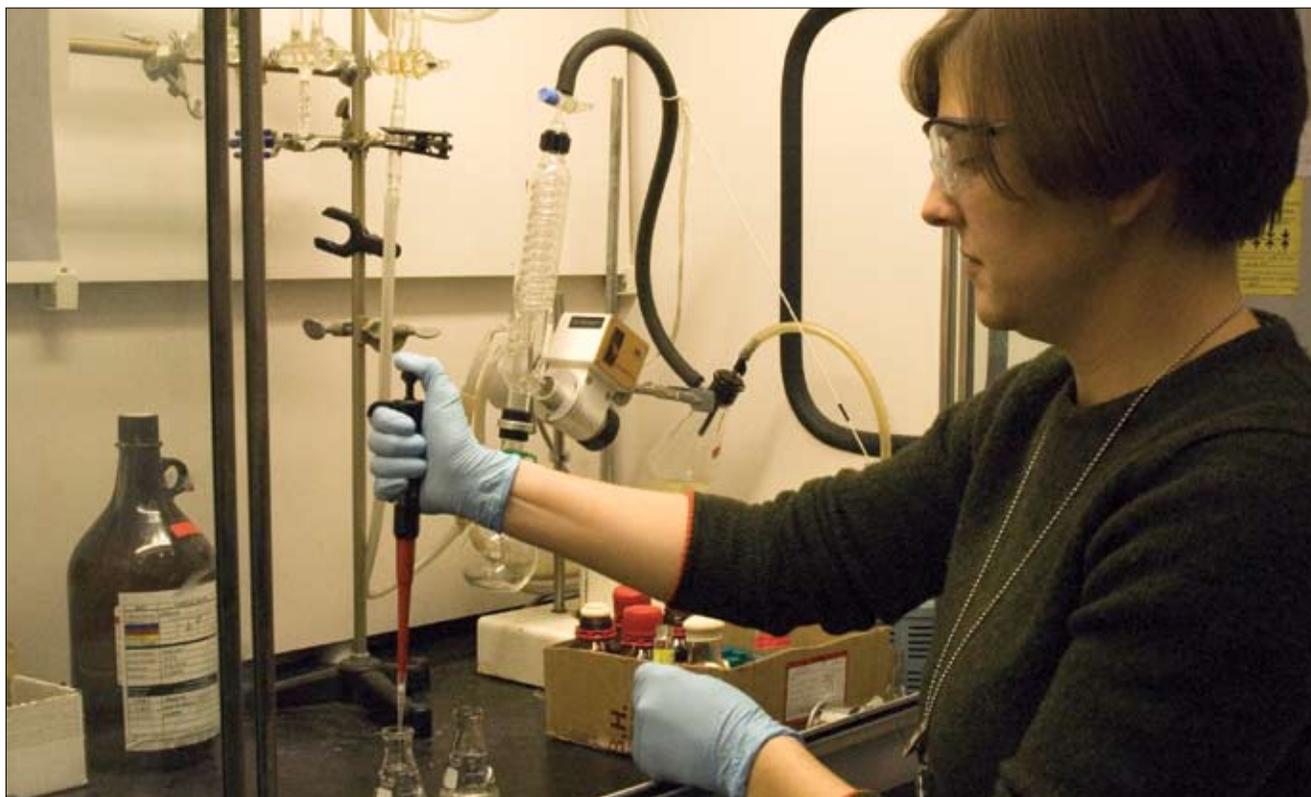
The study is overseen by NASA’s Integrated Intelligent Flight Deck Project, which is managed and funded by the Aviation Safety Program of NASA’s Aeronautics Research Mission Directorate in Washington.



Federal Laboratories and State & Local Governments
Partners for Technology Transfer Success

Order Your Copy Today! 856-667-7727

NEW TOOL GIVES RESEARCHERS A GLIMPSE OF BIOMOLECULES IN MOTION



NIST researcher Ted Heilweil, National Research Council postdoctoral fellow Catherine Cooksey (pictured), and NIST Summer Undergraduate Research Fellow Ben Greer from Carnegie Mellon University have demonstrated the feasibility of a new technique for studying biomolecules using terahertz radiation. Because terahertz waves are almost completely absorbed by water, the team was able to reduce the amount of water to the bare minimum while still providing a realistic sample environment by using hollow, nanosized droplets called micelles as tiny test tubes.

The ability of biomolecules to flex and bend is important for the performance of many functions within living cells. However, researchers interested in how biomolecules such as amino acids and proteins function have long had to make inferences from a series of X-ray-like “still pictures” of pure crystalline samples.

Now, using a new technique based on terahertz (THz) spectroscopy, scientists at the National Institute of Standards and Technology (NIST) have recently taken the first step toward revealing the hidden machinations of biomolecules in water.

With wavelengths that range from 1 millimeter to 25 micrometers, THz radiation falls between the infrared and microwave spectral regions.

Researchers can determine how molecules are moving by passing THz radiation through a sample and measuring which wavelengths are absorbed. Unfortunately, room temperature water, the

medium in which biological molecules typically are studied, absorbs nearly all of the THz radiation, limiting the utility of THz spectroscopy for probing biomolecular function.

To avoid the water problem, the NIST team needed to find a way to provide a simple but realistic environment for the biomolecules that contained the least amount of water possible.

NIST researcher Ted Heilweil, National Research Council postdoctoral fellow Catherine Cooksey, and NIST Summer Undergraduate Research Fellow Ben Greer from Carnegie Mellon University found their solution in the form of nanoscale droplets made of soap-like molecules called micelles.

Using the micelles as tiny test tubes, the team filled the hollow molecules with a small sample of water and the amino acid L-proline, a protein building block. Measurements validated their hypothesis that

the micelles would provide an aqueous environment that allows the amino acid to flex and bend while limiting the absorption of the THz radiation by water.

The THz measurements on this simple biomolecule compared well with expectations from other studies, further validating the technique.

According to Heilweil, this study is an important first step toward using THz radiation for studying biomolecules. More ambitious measurements on larger molecules such as small peptides, proteins, and DNA fragments will be more challenging, but he says it may be possible in the near future.

“If we can get larger molecules in [the micelles], we can get a much better idea of how living molecules function,” Heilweil said. “This will let us see the basic, most fundamental building blocks of life as they move, which is very exciting.”

**FLC 2009
Calendar**

Order Yours Today!
856-667-7727

Technology Transfer Training DVD Set

This 11-DVD set contains 14 technology transfer video courses delivered by subject matter experts.



Fundamentals Training - \$50.00
Intermediate Training - \$50.00
Advanced Training - \$50.00
Complete Boxed Set - \$140.00

Order Yours Today!
856-667-7727

LAB CLASSIFIEDS | AVAILABLE TECHNOLOGIES, FACILITIES, AND PARTNERS

TRACKING DEVICES

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. 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

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

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. LLNL has used the process for real-world applications.

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

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

O₂ LINE CLEANING

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. The oxygen technology keeps conduits free of contamination or foreign substance buildup that results from normal use, malfunction, or poor/improper maintenance. The Navy is seeking a partner in industry or academia to work with its scientists to prototype an oxygen line-cleaning unit.

More Info: Paul Fritz, 301-342-5586

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

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

CRANE ENGAGEs IN COOPERATIVE TECHNOLOGY TRANSFER

Naval Surface Warfare Center, Crane Division (NSWC Crane) has partnered with Growth Alliance for a Greater Evansville (GAGE) to build better relations between the government and the private sector. The Partnership Intermediary Agreement (PIA) is a technology transfer agreement that will enable southern Indiana businesses to benefit from NSWC Crane's science and technology expertise, as well as allow utilization of facilities and equipment.

"We have world class facilities and equipment that can be made available to help a company commercialize their products," said Capt. Charles LaSota, NSWC Crane commanding officer, during the technology transfer ceremony in Evansville, Indiana, on September 3, 2008. "This partnership is the starting point to make known the access that is available for businesses and universities of the Evansville, Indiana region to Crane."

LaSota explained to the audience that NSWC Crane has 1,800 scientists, engineers, and technicians who are working on solving technical problems for the nation's warfighters. Through this agreement, NSWC Crane will make more than 70 patents available to businesses, and provide research assistance and access

to personnel and resources.

John Dement, NSWC Crane Tech Engagement Officer, explained that for NSWC Crane to continue to be successful, the installation looks for opportunities to partner with local



Technology transfer ceremony announcing Partnership Intermediary Agreement between NSWC Crane Division and GAGE, September 3, 2008. Left to right: Joe Wallace, President and Chief Executive Officer, GAGE; Captain Charles LaSota, Commanding Officer of NSWC Crane; Jonathan Weinzapfel, mayor of Evansville, Indiana.

companies and universities with a vested interest in technology. NSWC Crane studied and examined existing partnerships and other partnership models to conclude that it could make a positive impact in the region by allowing utilization of Crane resources. That is where GAGE came in.

"We look very enthusiastically to this

partnership with GAGE to help you help us do our mission of supporting the warfighter," said Dement. "We do this by making available our collective resources so that companies and universities in conjunction with their technology development can make our products perform better and be more cost effective."

"This partnership has the potential to be the starting point for an unprecedented economic transformation in this region," said Joe Wallace, GAGE president and chief executive officer. "There are so many different applications where the same science can be utilized."

The PIA with GAGE will provide an opportunity for local businesses in 28 counties and 3 states to develop technology and create new jobs.

In the Evansville area, GAGE will serve as the manager for NSWC Crane's patent portfolio and work to create additional cooperative research and testing agreements with businesses utilizing NSWC Crane's patents and resources.

GAGE will also connect businesses with specific patents and technology to find ways to apply military research for non-military use. By NSWC Crane's providing access to advanced technology and skilled personnel, the goal is to increase the possibility that companies can develop new products to grow their businesses.

"It's quite amazing to think that local businesses will be able to harness this technology and market it for practical purposes, opening up the possibilities for significant job creation and wealth creation in southwestern Indiana," said Jonathan Weinzapfel, mayor of Evansville, Indiana. He added that in a few years someone is going to look back at this moment and see that "this was a genesis of an idea that created new business and hundreds of jobs and untold wealth here...that's the success story we want to see happen in the future."

"We all benefit when we work together and leverage our collective resources," said Dement. "That's what this partnership with GAGE is all about."

NSWC Crane's focus is to support the warfighter by leveraging its technical capabilities to provide innovative, leading-edge technical solutions for the rapidly changing combat environment.

PRRST STD
U.S. POSTAGE
PAID
PERMIT #117
SOUTHEASTERN PA
19399

January/February
2009

FLC
NEWSLINK

Published by the Federal Laboratory Consortium for Technology Transfer
The Only Government-wide Forum for Technology Transfer