FLC NewsLink

December 2007

## T2 INSIDE



## T2 EVENTS

**BioInformatics**
**Rockville, Md.**
**January 16, 2008**

•

**American Association for Advancement of Science (AAAS) Annual Meeting**
**Boston, Mass.**
**February 14-18, 2008**

•

**Clean-Tech Investor Summit**
**Indian Wells, Calif.**
**February 6-7, 2008**

•

**2008 AUTM Annual Meeting**
**San Diego, Calif.**
**February 28-March 1, 2008**

•

**WBT 2008**
**Arlington, Texas**
**March 26-27, 2008**

•

**FLC National Meeting**
**Portland, Ore.**
**May 5-8, 2008**

## T2 FACT

**Humans have been drinking beer for thousands of years. Historians theorize that humankind's fondness for beer was a factor in our evolution away from a society of nomadic hunters and gatherers into an agrarian society that would settle down to grow crops (and apparently drink). It wasn't until 1935 that the first canned beer, "Krueger Cream Ale," was produced.**

*- Mary Bellis, About.com*

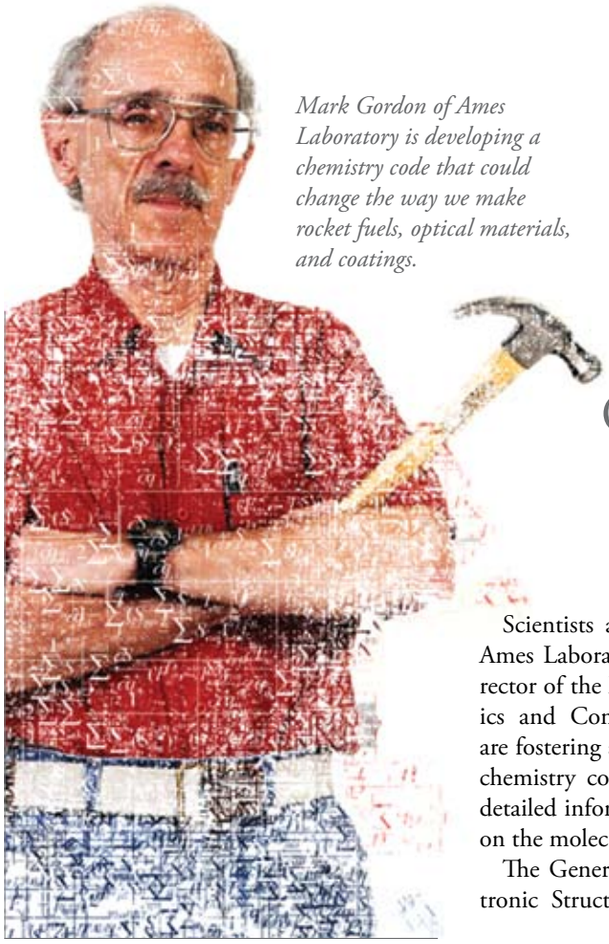
# Another Bayh-Dole Hearing

*by Gary Jones, FLC Washington, DC Representative*

Greetings from DC. The Bayh-Dole Act has come under congressional scrutiny for the second time in four months. On October 24, the Senate Judiciary Committee held a hearing on "The Role of Federally Funded University Research in the Patent System" to a packed room. There was an oversight hearing in the House on Bayh-Dole in July; see the August "DC on T2" column.

While this hearing was focused on a particular provision in the Act, it provided another opportunity for discussion on the Act in general. As all parties that participate in federally funded university research are aware, Bayh-Dole allows universities to take title to inventions developed on federal funding and to retain all licensing profits associated with that invention—with one exception. Under

*Bayh-Dole Hearing, page 5*



*Mark Gordon of Ames Laboratory is developing a chemistry code that could change the way we make rocket fuels, optical materials, and coatings.*

# Ames Laboratory Builds Computational Chemistry "Toolbox"

Scientists at the Department of Energy's Ames Laboratory, led by Mark Gordon, director of the laboratory's Applied Mathematics and Computational Sciences Program, are fostering and expanding a computational chemistry code that provides extensive and detailed information about how things work on the molecular scale.

The General Atomic and Molecular Electronic Structure System, or GAMESS, in-

*Ames Chemistry, page 4*

# UA, Cleveland State Joining Forces to Get Ideas into Marketplace

*by Paula Schleis, Beacon Journal*

A variety of partnerships between area universities have blossomed in recent years as the academic centers have aggressively joined the effort to transform northeast Ohio's economy.

The latest is an agreement between the University of Akron (UA) and Cleveland State University (CSU) for sharing resources to get new technology out of the lab and into job-creating companies.

The collaboration could test the waters for a proposed joint research foundation — an organization that would be shared by many higher education institutions interested in helping companies get off the ground.

Under a recently signed agreement, the University of Akron Research Foundation (UARF) will handle technological, commercialization and intellectual property management services for CSU as needed. These services will include:

- Evaluating products and technologies for commercialization.
- Negotiating and administering contracts to transfer commercialization rights in intellectual property and technology.
- Identifying collaboration opportunities among universities and private companies.
- Supporting emerging enterprises.

Likewise, Akron will have access to CSU resources in which that school has expertise.

"While both Cleveland State and our university already manage these functions, a combined effort will allow us to leverage a much larger pool of university-industry partnerships," UA President Luis Proenza said.

CSU President Michael Schwartz added: "Our region has the opportunity to be on the leading edge of research collaboration and economic development."

Both executives invited other institutions to join them in this cooperative effort. UARF is a not-for-profit organization supporting the University of Akron. Unlike typical university

*Ideas to Marketplace, page 5*

# FedLabsFlash | Technology Transfer Notes

## Emergency Preparedness Blog

Associate Professor Jeffrey Herrmann of the Institute for Systems Research (ISR) has developed the Public Health Preparedness Modeling blog to support public health emergency preparedness planners and the researchers who are developing models for this community.

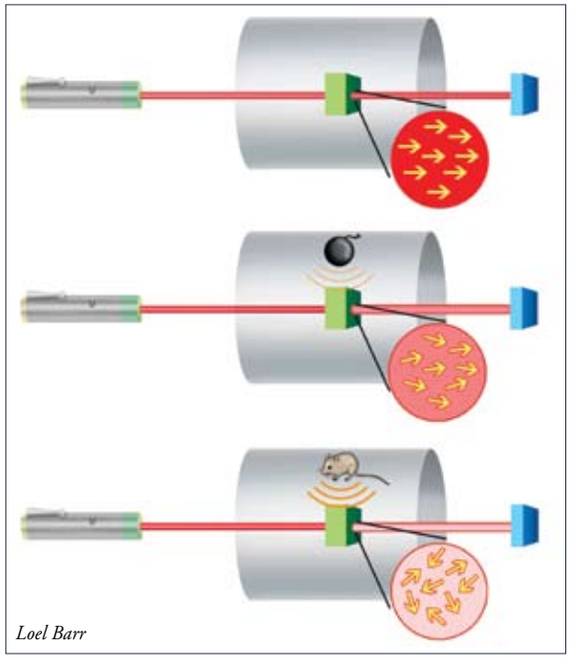
Herrmann has a background in operations research and industrial engineering. His public health planning research concentrates on models of mass dispensing and vaccination clinics, also known as "points of dispensing," or PODs.

His Clinic Planning Model Generator software creates a Microsoft Excel workbook for POD planning. Public health planners in 25 states have used the software to evaluate and improve their POD plans. This work is sponsored by the Montgomery County, Maryland, Advanced Practice Center for Public Health Emergency Preparedness and Response.

Herrmann hopes members of the public health planning community will find the blog a useful tool to build community and share information. He welcomes comments about emergency preparedness issues and particular models.

Blog address: *http://blog.umd.edu/phpm*

## Sensor Powerful Enough for Fetal Heart Monitoring



Loel Barr

*In NIST's new mini-magnetometer, light from a laser (small gray cylinder at left) passes through a small container (green cube) containing atoms in a gas. The cell and any sample being tested are placed inside a magnetic shield (large grey cylinder). When no sample is present the atoms' "spins" align themselves with the laser beam, and virtually all the light is transmitted through the cell to the detector (blue cube). In the presence of a sample emitting a magnetic field, such as a bomb or a mouse, the atoms become more disoriented as the field gets stronger, and less light arrives at the detector. By monitoring the signal at the detector, scientists can determine the strength of the magnetic field.*

A tiny sensor that can detect magnetic field changes as small as 70 femtoteslas—equivalent to the brain waves of a person daydreaming—has been demonstrated at the National Institute of Standards and Technology (NIST). The sensor could be battery-operated and could reduce the costs of noninvasive biomagnetic measurements such as fetal heart monitoring. The device also may have applications in Department of Homeland Security screening for explosives.

Described in the November issue of *Nature Photonics*, the prototype device is almost 1,000 times more sensitive than NIST's original chip-scale magnetometer demonstrated in 2004 and is based on a different operating principle.

Its performance puts it within reach of matching the current gold standard for magnetic sensors, so-called superconducting quantum interference devices, or SQUIDs.

These devices can sense changes in the 3- to 40-femtotesla range, but must be cooled to very low (cryogenic) temperatures, making them much larger, power-hungry, and more expensive.

"The small size and high performance of this sensor will open doors to applications that we could previously only dream about," project leader John Kitching said.

The new NIST mini-sensor could reduce the equipment size and costs associated with some noninvasive biomedical tests. The NIST group and collaborators have used a modified version of the original sensor to detect magnetic signals from a mouse heart. The new sensor is already powerful enough for fetal heart monitoring.

More info: *www.nist.gov/public_affairs/releases/magnetometer.html*

## USFS Scientists Awarded Nobel Peace Prize

The Nobel Committee recently announced the award of the Nobel Peace Prize for 2007 in equal parts to the Intergovernmental Panel on Climate Change (IPCC) and Al Gore, Jr.

Thirteen U.S. Forest Service researchers are IPCC authors and reviewers and share in this esteemed honor. These scientists specialize in diverse fields, including forest ecology, hydrology, soils and climate. Their work is part of studies covering 40 years of climate and air quality research on forested lands.

"The Forest Service is exceedingly proud of our internationally renowned scientists who are leaders in forest and climate research," stated Chief Gail Kimbell. "Our researchers contribute to the advancement of science and provide reliable and credible solutions to natural resource issues."

The Nobel Committee recognized "efforts to build up and disseminate greater knowledge about man-made climate change, and to lay the foundations for the measures that are needed to counteract such change."

Scientists recognized include:

- Dr. Ralph Alig
  Pacific Northwest Research Station
- Dr. Ronald Neilson
  Pacific Northwest Research Station
- Dr. David Peterson
  Pacific Northwest Research Station
- Dr. Richard Birdsey
  Northern Research Station
- Dr. Linda Heath
  Northern Research Station
- Dr. David Nowak
  Northern Research Station
- Dr. Kenneth Skog
  Forest Products Laboratory
- Dr. Wei Min Hao
  Rocky Mountain Research Station
- Dr. Linda Joyce
  Rocky Mountain Research Station
- Dr. Robert Musselman
  Rocky Mountain Research Station
- Dr. Michael Ryan
  Rocky Mountain Research Station
- Dr. Ariel Lugo
  International Institute for Tropical Forestry
- Dr. Allen M. Solomon
  Washington Office

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# Tech Watch | Laboratory Techs Ready for Transfer

## INL's System for Controlling Fluid Flow

Idaho National Laboratory (INL) researchers have developed a system, apparatus and method of controlling the flow of a fluid. In accordance with one embodiment of the present invention, a flow control device includes a valve having a flow path defined through and a valve seat in communication with the flow path with a valve stem disposed in the valve seat.

The valve stem and valve seat are cooperatively configured to cause mutual relative linear displacement thereof in response to rotation of the valve stem.

A gear member is coupled with the rotary stem and a linear positioning member includes a portion that complementarily engages the gear member.

Upon displacement of the linear positioning member along a first axis, the gear member and rotary valve stem are rotated about a second axis, and the valve stem and valve seat are mutually linearly displaced to alter the flow of fluid through the valve.

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

## Combating HIV

Despite recent developments in drug and compound design to combat the human immunodeficiency virus (HIV), there remains a need for a potent, nontoxic compound that is effective against wild type reverse transcriptase (RT), as well as RTs that have undergone mutations and thereby become refractory to commonly used anti-HIV compounds.

There are two major classes of RT inhibitors. The first comprises nucleoside analogues. Nucleoside analogues can cause serious side effects and have resulted in the emergence of drug-resistant viral strains that contain mutations in their RT. The second major class of RT inhibitors comprises non-nucleoside RT inhibitors (NNRTIs) that do not act as DNA chain terminators and are highly specific for HIV-RT. Christopher Michejda, Marshall Morningstar, and Thomas Roth of the National Cancer Institute have developed a novel class of NNRTIs (substituted benzimidazoles) effective in the inhibition of HIV-RT wild type as well as against variant HIV strains resistant to many non-nucleoside inhibitors. These NNRTIs are highly specific for HIV-1 RT and do not inhibit normal cellular polymerases, resulting in lower cytotoxicity and fewer side effects than the nucleoside analogues, such as AZT. This novel class of compounds could significantly improve the treatment of HIV by increasing compliance with therapy.

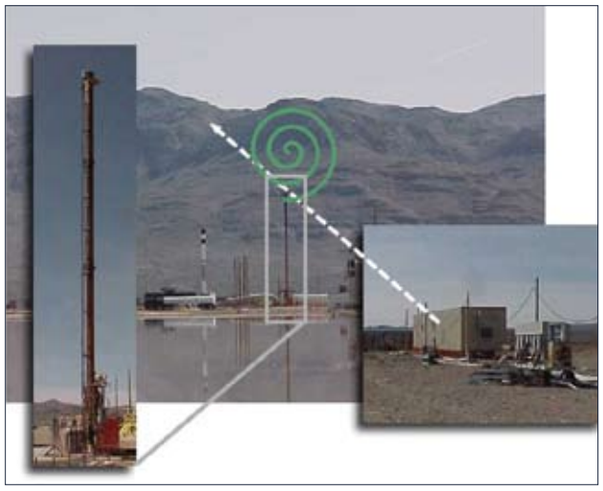
*More info*: Sally Hu, Ph.D., 301-435-5606, *hus@mail.nih.gov*

## Thwarting Terrorism, Enviro-Pollution

*by Jared Sagoff*

A new award-winning innovation developed at the Department of Energy's Argonne National Laboratory (ANL) can covertly detect chemical-plumes at great distances and may help thwart future chemical- or nuclear-based terrorist attacks. The technology has a number of other uses as well, from detecting environmental pollution to determining the extent of tissue damage in burn victims without physical contact.

Passive millimeter-wave spectroscopy (PmmWS) was pioneered by Sami Gopalsami, Sasan Bakhtiari, Paul Raptis and Thomas Elmer, all of ANL's Nuclear Engineering Division. The technology has the capacity to identify chemical plumes at ranges of up to a few kilometers and at concentrations as low as 100-1000 ppm. This new technology was recently recognized with one of the 2007 R&D 100 awards, colloquially known as the "Oscars of invention."



*Tests of the millimeter-wave spectroscope were conducted at the Nevada Test Site, shown here. Housed in a bunker (inset, right) several hundred meters from the test site (center), the spectrometer was able to distinguish the signal of gas plumes (represented by the green spiral) from the background mountains.*

The ANL team designed PmmWS primarily to monitor chemical signatures emitted by processing facilities suspected of unauthorized nuclear activity. Certain chemical fingerprints can identify factories involved in the enrichment and reprocessing of nuclear materials and their use in weapons production.

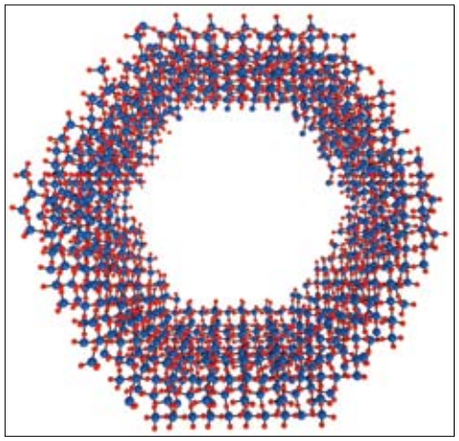
The researchers' ability to collect remote data passively, like using an infrared camera, as opposed to actively, like using radar, provides a significant improvement over other chemical detection equipment. "The main concern is that there should be nothing to intercept," said Gopalsami. "If you are my adversary, you can just put up some sort of receiver and see that I'm looking at you."

"That was the number one requirement – you do not want to be transmitting any signal," Bakhtiari added.

This passive remote-sensing spectrometer represents the second R&D 100 award-winning invention in millimeter-wave technology for the Gopalsami-led team.

*More info*: Steve McGregor, 630-252-5580, or media@anl.gov

*Ames Chemistry, from page 1*



*A GAMESS tool developed at Ames Laboratory makes it possible to visualize GAMESS calculations. This image is of a mesoporous silica nanoparticle.*

cludes a hierarchy of quantum chemistry methods that helps solve problems relating to molecules. Using GAMESS, the Gordon group is making major contributions to the design of new rocket fuels for the Air Force and new optical materials, fuels and wear-resistant coatings for the Department of Defense.

GAMESS is a "legacy" code that was assembled in 1977 from existing quantum chemistry computer programs by the staff at the National Resource for Computations in Chemistry.

The project ended in 1981, but the Gordon group has continued to enhance the software suite over the years, developing new functionalities and parallelizing the code. The researchers have created sophisticated and complex methods for GAMESS to address intermediates, unusual chemical species that may have lifetimes of only picoseconds or femtoseconds, but may be very important in the overall chemical reaction.

In addition, GAMESS includes the novel graphics visualization programs, MacMolPlt and WinMolPlt, for Macintosh computers and PCs, respectively. The programs ease the task of interpreting the complicated calculations performed by GAMESS.

A unique feature of GAMESS is the effective fragment potential, or EFP, which is based on quantum mechanics but is not quantum mechanics. The EFP is a sophisticated model to predict how solvents affect chemical reactions and to predict the behavior of liquids. Treating a molecular system with EFPs makes it possible to complete an entire calculation in orders of magnitude less computer time than a fully quantum calculation. "GAMESS runs on every kind of computer platform and compiler you can imagine," said Gordon. "It just passed 20,000 registered user groups in over 100 countries. This translates into an estimated 100,000 to 150,000 individual users. They range from people in academics to industry to government labs." GAMESS is distributed at no cost to users by accessing www.msg.ameslab.gov and signing a license agreement.

*Ideas to Marketplace, from page 1*

organizations, research foundations are affiliated nonprofit groups that can hold equity in startup companies.

They can also enter into independent contracts and manage profits from technology licenses.

UARF's expertise in technology transfer opportunities was noted when a report for the National Science Foundation named it one of 10 exemplary institutions for "successfully advanced innovation partnerships through technology transfer despite their modest research expenditures, rural locations and other challenges."

The Ohio Board of Regents recently ranked UA first in the state for having the highest rate of return per research dollar leading to the commercialization of technologies. UA was followed by Ohio State and Case Western Reserve universities, both of which have large medical complexes.

Proenza noted that UARF has increased UA research funding almost $6 million in the past 4 years and helped create 21 companies. UARF Executive Director Ken Preston said the UA-CSU partnership is revolutionary. "Universities typically, in this region at least, have not shared on tech-transfer issues," he said.

Preston said discussions are underway on a shared research foundation that could include universities throughout northeast Ohio.

It could be that UARF would evolve into such an organization, or a new foundation would be formed and UARF could provide services to it, he said.

Universities "spin out as much technology as we can to the private sector . . . and that is viewed as the greatest source of job creation," Preston said.

But the greatest challenge for new businesses is cash, and universities are forbidden from investing in private enterprises.

Research foundations bridge that gap, and a nonprofit shared by many universities could open the doors to many new partnerships, he said.



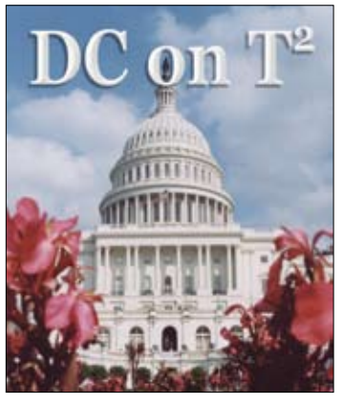
*Bayh-Dole Hearing, from page 1*

Bayh-Dole, universities that run government labs (i.e., government-owned, contractor-operated labs, or GOCOs) are required to return a portion of those licensing proceeds to the government when those proceeds exceed 5 percent of the lab's budget. This provision, and more specifically whether the 5 percent mark is appropriate, was the primary topic of the hearing.

Chair Patrick Leahy (D-Vt) highlighted the work of Ames Laboratory, a Department of Energy facility operated by Iowa State University, stating that "[T]hrough its ingenuity and successful commercialization, … last year exceeded the 5 percent royalty mark and, as a result, repaid the taxpayers nearly $1 million, becoming the first such facility to do so." Ames Lab is currently the only facility to have reached the 5 percent cap.

Elizabeth Hoffman, Executive Vice President and Provost, Iowa State University, spoke on behalf of Ames Lab – and possibly for other university GOCOs affected by this provision in the future when she said, "[I] am here to propose a limited, technical fix that would eliminate a restriction that we believe has an unintended, inequitable, negative impact on small [GOCOs]; namely, the current limit imposed on retaining royalties resulting from technology transfer activities." She suggested that the royalty limitation "be increased to 15 percent of the annual budget for GOCO contractors with annual budgets of less than $40 million." She also reminded the committee that by law the monies retained by the lab under these provisions are to be used for research and educational purposes. Returning them to the government makes them unavailable for that purpose.

Other witnesses included Arti Rai, Professor, Duke Law School; Dr. Charles Louis, Vice Chancellor for Research, University of California, Riverside; and Robert Weissman, Director, Essential Action, a nonprofit advocacy group. While noting the primary topic of the hearing, they took the opportunity to address other issues as well.




Professor Rai stated that while "there is little reason to believe we need a major overhaul of the current system of technology transfer," some "tweaks" to the system might be worth studying. She specifically pointed to two provisions, the "exceptional circumstances" provision and the "march-in rights" provision. Currently, federal agencies are required to prove "exceptional circumstances" before declaring that patenting is the wrong approach to commercialization; she questioned whether such a high bar is necessary. Regarding the provisions that allow compulsory licensing in the event a patentee is not commercializing appropriately (i.e., "march-in rights"); while acknowledging they have never been used, she still cautioned against any attempts to weaken them.

Dr. Louis testified strongly in favor of Bayh-Dole, suggesting that the policies and objectives of the Act are as applicable today as when it was passed, e.g., using patent law to promote the utilization of inventions arising from federally funded research and collaboration between commercial concerns and nonprofits, including universities. Further, he stated that there are sufficient safeguard provisions (such as the march-in rights provisions) to protect against abuse. He said that from the University of California's perspective, "any efforts that would undermine the effectiveness and proven success of the Bayh-Dole Act would not be in the public's interest." Mr. Weissman's testimony was in direct opposition to the other witnesses' perspectives—he was very critical of the Act and its consequences, particularly in the area of pharmaceutical research and pricing. As he stated in written testimony, although federal agencies have "embraced the Bayh-Dole mission of licensing federally funded inventions to private corporations, our experience shows that the government has abrogated its duty to ensure that pharmaceuticals incorporating federally funded inventions are reasonably priced." He went on to urge the use of march-in rights by federal agencies.

While it's unclear at the moment exactly where this focus on Bayh-Dole (and technology transfer) may be headed, folks in DC make a living out of trying to read between the lines on comments from the Hill. As Chairman Leahy said in his opening statement, this hearing "gives the Committee a long-overdue opportunity to begin an examination of the success, as well as any shortcomings, of the tech transfer provisions of Bayh-Dole in general." It appears there may be more to come. See Chairman Leahy's opening statement and all witness testimony on the Senate Judiciary Committee website, http://judiciary.senate.gov/hearing.cfm?id=2998.

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

# Brookhaven Develops New DNA-Based Nano Assembly Technique

*(From left) Dmytro Nykypanchuk and Mathew Maye load a sample into an atomic force microscope, while Daniel van der Lelie and Oleg Gang review data at Brookhaven Lab's Center for Functional Nanomaterials.*

Scientists at the Department of Energy's Brookhaven National Laboratory (BNL) have developed a new method for controlling the self-assembly of nanometer- and micrometer-sized particles.

The method, based on designed DNA shells that coat a particle's surface, can be used to manipulate the structure—and therefore the properties and potential uses—of numerous materials that may be of interest to industry. For example, such fine-tuning of materials at the molecular level promises applications in efficient energy conversion, cell-targeted systems for drug delivery, and bio-molecular sensing for environmental monitoring and medical applications.

The novel method, for which a patent application has been filed, was developed by BNL researchers Mathew M. Maye, Dmytro Nykypanchuk, Daniel van der Lelie, and Oleg Gang and is described in the September 12 online edition of *Small*, a leading nanoscience and nanotechnology journal.

"Our method is unique because we attached two types of DNA with different functions to particles' surfaces," said Gang, who leads the research team. "The first type—complementary single strands of DNA—forms a double helix. The second type is noncomplementary, neutral DNA, which provides a repulsive force. In contrast to previous studies in which only complementary DNA strands are attached to the particles, the addition of the repulsive force allows for regulating the size of particle clusters and the speed of their self-assembly with more precision."

"When two noncomplementary DNA strands are brought together in a fixed volume that is typically occupied by one DNA strand, they compete for space," said Maye. "Thus, the DNA acts as a molecular spring, and this results in the repulsive force among particles, which we can regulate. This force allows us to more easily manipulate particles into different formations."

The researchers performed the experiments on gold nanoparticles —measuring billionths of a meter —and polystyrene (a type of plastic) microparticles measuring millionths of a meter. These particles served as models for the possibility of using the technique with other small particles. The scientists synthesized DNA to chemically react with the particles. They controlled the assembly process by keeping the total amount of DNA constant, while varying the relative fraction of complementary and noncomplementary DNA.

This technique allowed for regulating the assembly over a very broad range, from forming clusters consisting of millions of particles to almost keeping individual particles separate in a non-aggregating form.

"It is like adjusting molecular springs," said Nykypanchuk. "If there are too many springs, particles will 'bounce' from each other, and if there are too few springs, particles will likely stick to each other."

The method was tested separately on the nano- and micro-sized particles, and was equally successful in providing greater control than using only complementary DNA in assembling both types of particles into large or small groupings.

To determine the structure of the assembled particles and to learn how to modify them for particular uses, the researchers used transmission electron microscopy to visualize the clusters, as well as x-ray scattering at the National Synchrotron Light Source to study particles in solution, the DNA's natural environment.

The Office of Basic Energy Sciences within the Department of Energy's Office of Science funded this research.



# FLC Profiles Laboratories

Information on over 250 federal laboratories and research centers is at your fingertips via the FLC website, www.federallabs.org/laboratories.

These online, publicly accessible profiles catalog a host of information to assist members of industry and government with technology transfer and commercialization.

The profiles include contact information; a listing of relevant laboratory websites; and the laboratory's mission, history, vision, facilities, technology transfer mechanisms, accomplishments, and areas of expertise.


In addition, the database is searchable by agency, state, FLC region, and area of expertise.

In order to keep this database current, the FLC encourages each member laboratory to review its current profile to ensure that it is accurate and complete. The FLC is also looking to add laboratories to this list to ensure that it is comprehensive and fully promotes the value and utility of the federal laboratory system.

To provide this information, please contact Lauren Pafumi of the FLC Management Support Office at 856-667-7727.

# Lab Classifieds | *Available Technologies, Facilities, and Partners*

## Fighting Obesity

A catalytic subunit of the DNA-dependent protein kinase complex (DNA-PKcs) has been shown to be important in DNA repair and VDJ recombination in lymphocytes. The inventors have discovered that DNA-PKcs also plays novel, important roles in energy regulation and neurological function. The inventors observed that mature DNA-PKcs-deficient mice have a lower proportion of fat, resist obesity, and have significantly greater physical endurance than wild-type control mice, particularly with increasing age. The inventors also observed that DNA-PKcs-deficient mice have better memory and less anxiety. The invention discloses methods of inhibiting DNA-PKcs activity to decrease adiposity, improve physical endurance, and increase insulin sensitivity and the number of mitochondria.

*More info*: Jay Chung, chungj@nhlbi.nih.gov

## Meat Quality

Agricultural Research Service (ARS) scientists in Nebraska have developed novel genetic markers to identify cattle with superior potential for producing tender meat.

Meat tenderness is the major determinant of consumer satisfaction with beef, and consistent meat tenderness is a top goal for U.S. beef producers.

ARS researchers identified three single nucleotide polymorphisms (SNP) in a particular gene, which can be used in animal breeding programs to identify superior animals with respect to meat tenderness.

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

## Better Batteries

Marca Doeff, Robert Kostecki, and colleagues at Lawrence Berkeley National Laboratory (LBNL) have developed improved carbon coatings for LiFePO4 materials used in lithium ion batteries. The researchers have produced very thin carbon coatings (<10 nm) on non-conductive LiFePO4 particles, increasing the electronic conductivity of the composite as much as six orders of magnitude compared to the native material. Applications include carbon coatings for electrode materials for applications such as power tools and hybrid vehicles.

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

## Brookhaven Tech Measures Aerosol

Research in the Atmospheric Sciences Division at Brookhaven National Laboratory (BNL) has resulted in the development of a new analytical instrument capable of measuring aerosol size distribution with high time and size resolution. Aerosols refer to particles, including solids, liquids and mixtures of such suspended in a gas, such as the atmosphere.

The aerosol mobility size (AMS) spectrometer eloquently addresses the need to increase measurement speed by integrating the classification, detection and counting of aerosol particles.

Using the AMS spectrometer, aerosol particle size data can be produced in about 1 second, an improvement by a factor of 50 over current technologies such as scanning mobility particle sizers, which must scan data of individual sizes of aerosols over a range of voltages. Further, the AMS spectrometer improves upon optical particle counters, which use light scattering and have a lower signal-to-noise ratio than the AMS spectrometer.

*More info*: www.bnl.gov

## Improving Images

NASA Goddard Space Flight Center invites companies to license a new technology proven to enhance the image quality of compressed grayscale or color JPEG images and MPEG video clips commonly used on websites, online applications, and streaming media. The Estimated Spectrum Adaptive Postfilter (ESAP) algorithm helps to improve the objective and subjective quality of these images, as well as enhance their perceptual visual quality as compared to baseline JPEG images. Goddard's ESAP algorithm is an image-adaptive postfiltering method designed to minimize the discrete cosine transform (DCT) blocking distortion caused by compressing JPEG images. The ESAP algorithm method improves both the measurable and the subjective quality of the images.

The algorithm can be commercially developed to enable enhanced video and image quality that is superior to previous techniques and the default JPEG or MPEG compression parameters.

*More info*: ESAP@gsfc.nasa.gov

## ANL's NanoLube

Federally mandated reductions in the amount of sulfur allowed in diesel fuels and lubricating oils will significantly reduce particulate emissions from diesel-fueled vehicles. However, removing the sulfur reduces the lubricating capacity of diesel fuel and lubricating oils, which can accelerate wear in fuel system components and engines.

To address these issues, Argonne National Laboratory (ANL) has developed boron-based additives to improve the lubricity of fuels and lubricants.

*More info*: Stephen Lake, 630-252-5685, slake@anl.gov

## Treating Disease

John Ortaldo and Robert Wiltrout of the National Cancer Institute have discovered that C12 beta-D-galactosyl ceramide may be used to deplete or inactivate NKT cell populations. These findings suggest methods for using C12 beta-D-galactosyl ceramide to treat conditions that would benefit from depletion of NKT cells, such as certain autoimmune diseases (e.g., lupus, multiple sclerosis) and AIDS.

Deficiencies in NKT cells are associated with at least some types of autoimmune disease, including type 1 diabetes and autoimmune gastritis in mice.

In contrast, NKT cells augment autoantibody secretion and lupus development in lupus-prone mouse models, and therefore lupus patients may benefit from the depletion of NKT cells.

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

## Navy Coating

The Naval Research Laboratory (NRL) has developed a new self-decontaminating coating for use in filters, protective clothing, and disposable wipes that is capable of actively destroying pesticides and related chemical agents on contact. The coating comprises a thin, layered, composite film containing enzymes, which degrade chemical toxins.

It is readily applied to substrates such as beads, fabrics, or paper by inexpensive methods such as dip coating, spin coating or spraying. The materials offer platforms for homeland defense, agricultural, and related applications.

*More info:* www.nrl.navy.mil

# ON THE INNOVATION TRAIL

The 2008 FLC National Meeting  Portland, Oregon  May-5-8, 2008

www.federallabs.org/meeting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