



## T<sup>2</sup> F A C T

Alfred Ely Beach was an inventor and the editor and co-owner of "Scientific American." In the first issue of "Scientific American," it was announced that the magazine would help secure patents for U.S. inventors. Beach was awarded patents for an improvement he made to the typewriter (1857), for a cable traction railway system (1864), and for a pneumatic transit system (pneumatic tube) for mail and passengers (1865).

- Mary Bellis, *About.com*



## T<sup>2</sup> E V E N T S

AUTM Central Regional Meeting  
Minneapolis, Minn.  
July 23-25, 2006

Optics and Photonics  
San Diego, Calif.  
August 13-17, 2006

FLC Mid-Continent/Far West  
Regional Meeting  
Colorado Springs, Colo.  
August 29-31, 2006

NASVF 2006 Annual Conference  
Rochester, N.Y.  
September 20-22, 2006

FLC Midwest/Southeast  
Regional Meeting  
Nashville, Tenn.  
October 25-27, 2006

## MICROSOFT, NGA ANNOUNCE ALLIANCE

Microsoft Corp. and the National Geospatial-Intelligence Agency (NGA) announced the signing of a Letter of Understanding to advance the design and delivery of geospatial information applications to customers.

Headquartered in Bethesda, Md., the NGA is a Department of Defense combat support agency and a member of the national intelligence community whose mission is to provide timely, relevant and accurate geospatial intelligence (GEOINT) in support of U.S. national security.

The NGA will use the Microsoft® Virtual Earth™ platform to provide geospatial support for humanitarian, peace-keeping and national security efforts.

The Virtual Earth platform is an integrated set of powerful online mapping and search services that deliver imagery through easy-to-program application programming interfaces (APIs).

GEOINT is the exploitation and analysis of imagery and geospatial information to describe, assess and visually

*See Microsoft, NGA Alliance, page 4*



*Nobel Peace Prize winner Norman Borlaug believes Ug99 is the most serious threat to wheat and barley in 50 years. He is shown here consulting with Kenyan and CIMMYT leaders near wheat plots in Kenya.*

## SEARCHING FOR THREATS TO U.S. GRAINS

*by Don Comis, Agricultural Research Service*

Since the early part of the 20th century, the Agricultural Research Service's (ARS) Cereal Disease Laboratory (CDL) has stood as a sentry watching for emerging diseases of cereal crops—wheat, barley, and oats. The St. Paul, Minn., lab is on high alert now since an African strain of stem rust has emerged as an unprecedented-

international threat to wheat and barley.

Stem rust, caused by the fungus *Puccinia graminis* sp. *tritici*, has historically been one of the most destructive plant diseases. The new African strain, called Ug99 because it first surfaced in Uganda, has spread since 1999 to Kenya and Ethiopia. It will likely spread to major wheat-growing areas of

*See ARS Africa, page 4*

## DC ON T<sup>2</sup>: S&T PROPOSALS

*by Gary Jones, FLC Washington, DC Representative*



Greetings from DC. As I write this, Congress has been back from Memorial Day recess for a few weeks and is headed into the summer session – with a very contentious election right around the corner.

The number of legislative working days between now and the election is dwindling, with the number of new legislative proposals slowing as well. I thought this might be a good time to recap some of the proposals relevant to the S&T community that are currently under review on the Hill, broken out by categories.

*See DC on T<sup>2</sup>, page 5*

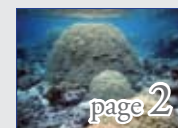


## T<sup>2</sup> INSIDE



page 2

Serving  
America



page 2

Climate  
& Coral



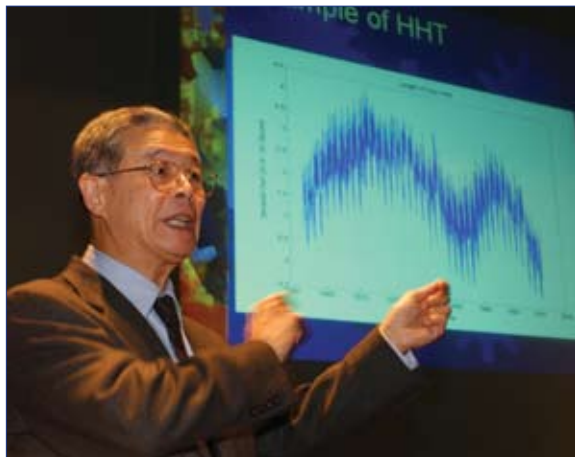
page 6

Better,  
Cleaner Engines

Tech Classifieds, Page 7

# FED LABS FLASH | TECHNOLOGY TRANSFER NOTES

## NASA SCIENTIST FINALIST FOR SERVICE TO AMERICA MEDALS



*Huang explains the Hilbert-Huang Transform technology.*

When you win NASA's Invention of the Year award, chances are you're working on pretty complex issues that anyone without a Ph.D. might have difficulty understanding.

That is certainly the case with Dr. Norden Huang, chief scientist for oceanography at NASA's Goddard Space Flight Center. But while the details of Dr. Huang's work may be difficult to comprehend, anyone who sees the practical applications of his work can grasp its importance. That is why the Partnership for Public Service has selected Dr. Huang as a finalist for its Service to America Medals. The awards pay tribute to America's dedicated federal workforce, highlighting those who have made significant contributions to our country.

Honorees are chosen based on their commitment and innovation, and the impact of their work on addressing the needs of the nation. Dr. Huang's pioneering research led to the development of the Hilbert-Huang Transform (HHT) technology, a revolutionary, adaptive set of signal-analysis algorithms. Unlike precursor technologies, HHT provides an effective method for analyzing non-linear and nonstationary signals (such as those occurring in natural phenomena) while improving the accuracy of linear and stationary signal analysis. In winning the 2003 NASA Government Invention of the Year award, HHT was cited as "one of the most important discoveries in the field of applied mathematics in NASA history."

"It is an honor to be selected as a finalist for this award," said Dr. Huang. "It's been an pleasure and a privilege to work with so many great people—both inside and outside NASA—over the years."

## USGS, GLOBAL CHANGE, AND CORAL REEFS

Scientists and reef managers are concerned about coral reef systems being affected by global change and need to understand the processes that control their resilience.



*Ofu lagoon's underwater landscape is heavily populated by massive Porites colonies.*

Researchers from the U.S. Geological Survey, the University of Hawaii, the Florida Institute of Technology, the Wildlife Conservation Society, and the National Park Service are studying the National Park of American Samoa to determine the internal and external factors that increase the ability of a wide variety of corals to resist environmental stress.

The shallow lagoon there contains species of Acropora and Pocillopora, corals ordinarily prone to bleaching (expelling their symbionts) at high temperatures.

External factors include changes in water temperature, ultraviolet radiation, dissolved oxygen, and water motion.

Internal factors being investigated include genetic diversity of algal symbionts and the associated microbial communities.

## FDA APPROVES CANCER VACCINE

Nearly two decades ago, researchers at the National Cancer Institute (NCI), part of the National Institutes of Health, and other institutions began searching for the underlying causes of cervical cancer. That scientific quest led to the recent approval by the Food and Drug Administration of the vaccine Gardasil™, which protects against infection from the two types of human papillomavirus (HPV) that cause the majority of cervical cancers worldwide.

Population studies helped to establish the link between HPV infections and the disease, revealing that while most HPV infections clear and do not lead to cancer, virtually all cases of cervical cancer were caused by HPV infection. NCI scientists Douglas Lowy, M.D., and John Schiller, Ph.D., pioneers in HPV research, then examined ways to boost the body's immune response to

prevent the cancer-causing infection. This work led to development of the technology on which the HPV vaccine is based.

"Genetic engineering—technology involving the manipulation of genetic material—was used to create this vaccine, which is made up of non-infectious virus-like particles (VLPs)," explained Lowy, chief of the Laboratory of Cellular Oncology in NCI's Center for Cancer Research (CCR). "These hollow spheres, formed by a single protein from the virus (L1 protein), trigger an antibody response that is capable of protecting the body against infection by the targeted virus types."

"Gardasil is similar to other immunizations that guard against viral infection," said Schiller, deputy chief of the Laboratory of Cellular Oncology at CCR. "By preventing infection with two of the HPV types that can cause cervical cancer, this vaccine, if given prior to exposure to these sexually transmitted viruses, can protect women from ultimately developing cervical cancer."

## FLC NEWSLINK

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# TECH WATCH | LABORATORY TECHS READY FOR TRANSFER

## NO COLLIMATION

Scientists at the Department of Energy, National Nuclear Security Administration's Special Technologies Laboratory, operated by Bechtel Nevada, have developed a fiber-array-coupled wide-field Michelson interferometer for use in multichannel VISAR.

This optical and mechanical design leads to significant improvements in optical efficiency and interchannel isolation.

The device differs from previous designs in that the light from the fibers is not collimated in the interferometer, but instead is imaged to discrete locations at the cavity mirrors, which are curved and serve as field elements.

This approach makes possible the use of more precise fiber arrays with increased space between the fibers for greater isolation.

It also allows diversion of a subset of the beams inside the cavity to a different delay path, thereby providing simultaneous, differing delays with only a small amount of additional hardware and optics.

A patent application has been filed with the U.S. Patent and Trademark Office for the VISAR Interferometer with field elements.

*More info:* B.J. Willeford, Jr., [ips@nv.doe.gov](mailto:ips@nv.doe.gov), 702-295-0256, [www.bechtelnevada.com/techtrans/index.html](http://www.bechtelnevada.com/techtrans/index.html)

## MAXIMIZING POWER DELIVERED BY A PHOTOVOLTAIC ARRAY

A method and apparatus for maximizing the electric power output of a photovoltaic array connected to a battery, where the voltage across the photovoltaic array is adjusted through a range of voltages to find the voltage across the photovoltaic array that maximizes the electric power generated by the photovoltaic array and then is held constant for a period of time, has been developed by Roger Taylor and Eduard Muljadi of the National Renewable Energy Laboratory (NREL). After the period of time has elapsed, the electric voltage across the photovoltaic array is again adjusted through a range of voltages and the process is repeated. The electric energy and the electric power generated by the photovoltaic array is delivered to the battery, which stores the electric energy and the electric power for later delivery to a load.

NREL is looking for an organization to develop and commercialize this innovative technology.

*More info:* Richard Bolin, 303-275-3028 for licensing, CRADA, and Work for Others opportunities.

## GREETING VEHICLE/FUEL SYSTEM ANALYSIS

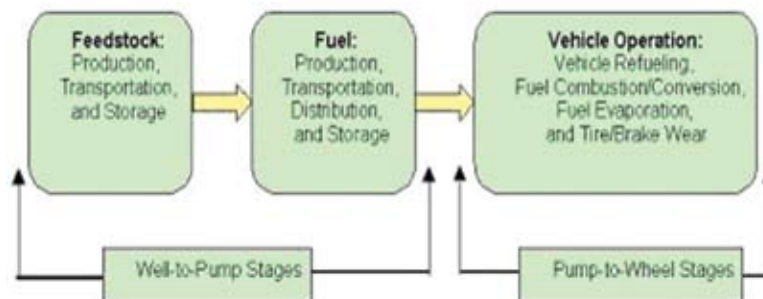
Government, industry, and academic researchers are developing advanced vehicle technologies and transportation fuels to help reduce the nation's dependence on oil, lower greenhouse gas emissions and urban air pollutants, and boost energy efficiency. To assist these efforts, Argonne National Laboratory's (ANL) Dr. Michael Wang has created a transportation analysis

tool that allows users to accurately evaluate the energy and environmental benefits of such technologies and fuels.

The GREET (Greenhouse gases, Regulated Emissions, and Energy use in Transportation) software model addresses the need for truly comparative full fuel cycle (or well-to-wheel) analyses. Developed in a user-friendly Microsoft® Excel platform with a graphical user interface, the model is available to the public free of charge at [www.transportation.anl.gov/software/GREET/index.html](http://www.transportation.anl.gov/software/GREET/index.html).

The Society of Automotive Engineers maintains that GREET has become a "gold standard" for well-to-wheel analyses of vehicle/fuel systems.

Users who can benefit from GREET include government



agencies, the auto industry, the energy industry, research institutes, universities, and public interest groups. Already, more than 2,000 GREET users in both the public and private sectors are registered throughout North America, Europe, and Asia.

To date, ANL has used GREET to evaluate various engine and fuel systems for the Department of Energy, other government agencies, and industry.

Other organizations have used GREET to evaluate advanced vehicle technologies and new transportation fuels.

*More info:* Dr. Michael Wang, 630-252-2819, [mqwang@anl.gov](mailto:mqwang@anl.gov).



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CEUs Available to Attendees .....

Partnership Opportunities for Labs .....

Patenting Strategies .....

IP Management .....

Effective Deal Making .....

Regional Awards Luncheon .....

Marketing Tech Transfer .....

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[www.southeastflc.org](http://www.southeastflc.org)

Microsoft, NGA Alliance, from page 1

depict physical features and geographically referenced activities on the Earth.

"NGA is collaborating with Microsoft to accelerate the introduction of commercial virtual solutions into the GEO-INT arena," said retired Air Force Lt. Gen. James R. Clapper Jr., director of the NGA. "This relationship will enable NGA to cooperate in the development of Microsoft's mapping software and to explore commercial software solutions."

"Microsoft is honored to work with the world's foremost mapping organization — we have much to learn from them," said Craig Mundie, chief technical officer of advanced strategies and policy at Microsoft. "We believe the combination of our experience delivering Web services with NGA's unparalleled knowledge of the geospatial domain will significantly advance the creation of a truly virtual Earth."

While Microsoft has been developing the Virtual Earth platform, NGA has been prototyping its own geodetically based and geospatially attributed knowledge base. By continuing to explore visualization concepts and develop user-requested imagery-related services, NGA and Microsoft will collaborate to provide enhanced geospatial services to their respective customers.

Currently, the two organizations believe they will both benefit from collaboratively implementing the latest technology and software applications and

identifying best practices for the Virtual Earth and NGA global knowledge base.

The NGA recently used the Microsoft Virtual Earth platform to develop a mapping site for Hurricane Katrina relief efforts in the Gulf Coast region. Using the Virtual Earth platform, the NGA was able to disseminate satellite imagery belonging to commercial imagery vendors, enabling first responders and agencies to view the affected areas.

Virtual Earth APIs enable many technologies to run together seamlessly, providing powerful horizontal integration to the platform. The NGA will continue to collaborate with industry to create additional crisis response sites in preparation for future disasters around the world.

With the Virtual Earth platform, public and private sector organizations can create an immersive online mapping and search experience that enables customers to easily discover, search, explore, share and visualize location data and locally relevant information.

The Virtual Earth platform encompasses the next evolution of the MapPoint® Web Service offering with innovative new capabilities. Developers have the flexibility to tap into one of the two Virtual Earth APIs: MapPoint Web Service API using SOAP XML, for communicating with customer applications; and Virtual Earth Map Control, which enables users to make requests via JavaScript to an asynchronous JavaScript and XML (AJAX) map object.

ARS Africa, from page 1



Ug99 stem rust on wheat in Njoro, Kenya.

to the United States and other major wheat-growing areas as well.

If it does, CDL would almost certainly be the first to sound the alarm through its online bulletins to farmers, crop advisors, and other interested individuals.

Nobel Peace Prize winner Norman E. Borlaug, founder of the Green Revolu-

tion, which was responsible for outstanding yield increases in wheat and other major crops in the mid-1900s, believes that this new mutant strain of stem rust is the most serious threat to wheat and barley crops in 50 years.

Wheat bred for stem rust resistance was a major reason for the Green Revolution's successes.

Borlaug is alarmed because the massive crop losses once caused by stem rust epidemics could happen again. Most of the high-yielding, rust-resistant dwarf wheat varieties he helped breed for developing countries and North America have no resistance to the new strain. In fact, most of the world's wheat is vulnerable.

More info: [www.ars.usda.gov/is/pr/2006/060606.htm](http://www.ars.usda.gov/is/pr/2006/060606.htm)

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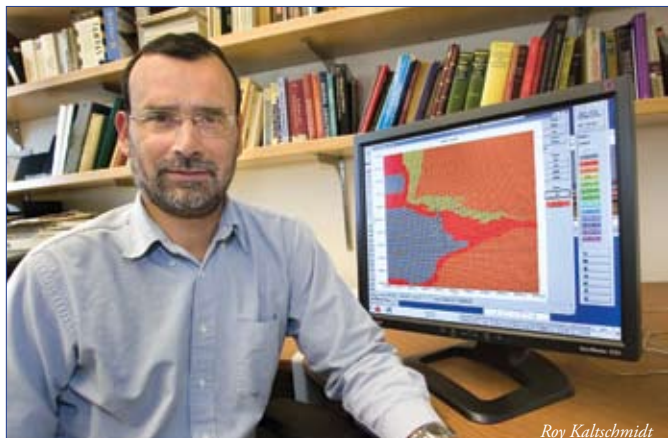
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# TECHNOLOGY TRANSFER SUCCESS HUNTS FOR HYDROCARBONS

by Dan Krotz, Lawrence Berkeley National Laboratory



Greg Newman with his software for modeling hydrocarbon reservoirs.

What does it take to shepherd an idea from the drawing board to the marketplace? Patience, hard work, and a little luck, according to Greg Newman of the Earth Sciences Division of Lawrence Berkeley National Laboratory (LBNL).

He recently won a 2005 FLC Award for Excellence in Technology Transfer for developing software that is used in electromagnetic modeling of offshore hydrocarbon reservoirs.

The software has been licensed to several oil and gas exploration companies such as Shell, ConocoPhillips, and a Norwegian company that uses the software to search for underwater hydrocarbon deposits. Over the past two years, these licenses and associated research funds

from the oil and gas industry have brought in nearly \$1 million in revenue to LBNL.

“These companies have used the software to locate reservoirs that otherwise would be difficult to detect with existing technology.

It has also been used to determine that some promising sites detected by other methods were in fact not hydrocarbon reservoirs,” said Newman.

Newman has been developing large-scale electromagnetic and imaging software for 20 years, mainly at Sandia National Laboratories (SNL).

In 2004, Newman joined LBNL. The lab’s Technology Transfer Department entered into an arrangement with SNL to allow LBNL to license the codes Newman developed at SNL, as well as allow Newman to continue

*See LBNL Success, page 8*

*DC on T<sup>2</sup>, from page 1*

While there are few bills directly focused on technology transfer, there are many bills under consideration that may impact the S&T community and, by extension, technology transfer efforts. Below is a brief list of select legislative proposals that fit this criterion. This is not an attempt to analyze any specific proposal, rather to identify several of the more salient bills that may be of growing interest to our constituents. For a detailed expression of the bills, see <<http://thomas.loc.gov>> and search using the bill number (e.g., S. 2802).

### *Technological Competitiveness*

As reported almost continuously throughout the current congressional session, the issue of technological competitiveness has been one of the primary drivers for S&T-related bills.

A selection of the more prominent bills includes: 1) American Competitiveness and Innovation Act (S.2802), 2) Research for Competitiveness Act (H.R.5357), 3) Early Career Research Act (H.R.5356), 4) Innovation and Competitiveness Act (H.R.4845), 5) Protecting America’s Competitive Edge Acts (PACE) - Energy (S.2197), 6) Sowing the Seeds through Science and Engineering Research Act (H.R.4596), and 7) National Innovation Act (S.2109).

The provisions of these bills often overlap, and the final result of any ‘competi-

tiveness legislation’ will incorporate some aspects of many of these bills. In general, they all emanate in one form or another from studies presented last year by the National Academies ([www.nap.edu/catalog/11463.html](http://www.nap.edu/catalog/11463.html)) and the Council on Competitiveness ([www.compete.org](http://www.compete.org)). While they differ in detail, in general, the bills focus on funding increases for basic research, supporting high-risk potential high-payoff early stage research, improving R&D infrastructure and innovation-related institutions, as well as establishing various awards promoting cutting-edge R&D.

### *S&T Education*

Commensurate with the focus on technological competitiveness is the emphasis on improving our S&T educational skills and abilities – a foundation component of any competitiveness discussion. Some of the bills introduced under this general category include: 1) Science Accountability Act (H.R.5442), 2) SEEK Math and Science Act (S.2423), 3) 10,000 Teachers, 10 Million Minds Science and Math Scholarship Act (H.R.4434), 4) National Science Education Incentive Act (H.R.450), 5) PACE-Education (S.2198), and 6) Higher Education Science and Technology Competitiveness Act (H.R.226).

In general, these bills provide initiatives to improve the teaching credentials

of science and math teachers and to encourage students to consider science and engineering disciplines at the university level.

### *Intellectual Property*

Certainly the S&T community has a keen interest in intellectual property and any potential amendments to current law. Over the past year, numerous bills have been introduced that focus on IP issues. Two of the more salient proposals include the Patents Depend on Quality Act (H.R.5096), which follows a significant attempt at patent reform via the Patent Reform Act (H.R.2795). H.R.2795, introduced in summer 2005, proposes significant changes to the current patent system, including changing to a ‘first to file’ as opposed to a ‘first to invent’ system. The Intellectual Property Organization ([www.ipo.org](http://www.ipo.org)) has a useful comparison of the various provisions of both bills.

### *Miscellaneous*

Other proposed bills of interest include: 1) Federal Research Public Access Act of 2006 (S.2695), requiring federal agencies to “develop public access policies relating to research conducted by employees of that agency or from funds administered by that agency,” 2) (H.R.4684), which “amends the Small Business Act to provide for an increase in the amount of awards under the first

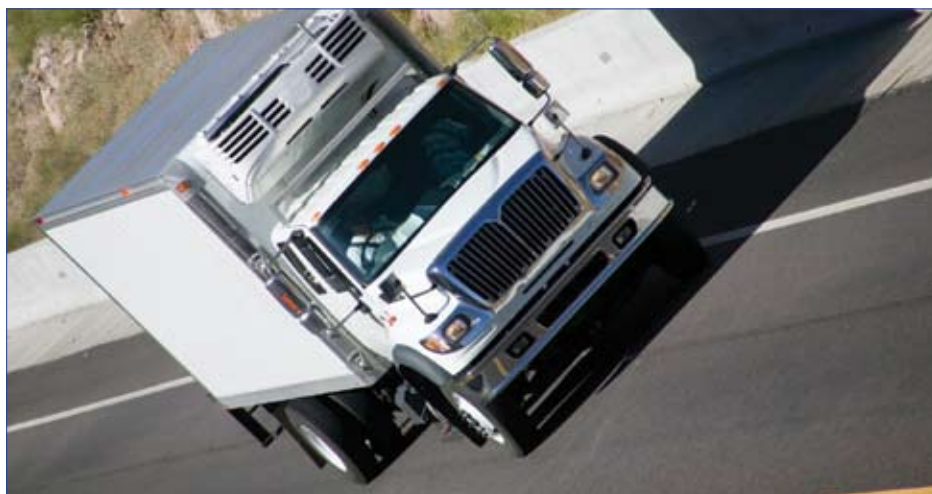
and second phases of the Small Business Innovation Research [SBIR] program,” 3) PACE-Tax (S.2199), which increases and makes permanent the R&D tax credit, 4) Science Park Administration Act (S.1581), facilitating “the development of science parks,” and 5) Foreign Science and Technology Assessment Act (S.1211), establishing “an Office of Foreign Science and Technology Assessment to enable the United States to effectively analyze trends in foreign science and technology....”

Given the time constraints noted, the prospects of passing significant comprehensive competitiveness legislation may be diminishing for the current session. The same may be said for significant patent reform. These may not move until after the election.

Finally, one other area of interest to the S&T community is immigration reform. The House version of the proposed bill would increase the number of H1-B visas (used for scientists and engineers) from 65,000 to 115,000 per year, while the Senate version currently does not address this issue. It is interesting to note that the U.S. Citizenship and Immigration Services began accepting H1-B visas on April 1 and met the annual limit on May 26—for all of FY 2007.

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# EPA, BORGWARNER PARTNER TO REDUCE FUEL CONSUMPTION



*The EPA and BorgWarner are examining the commercial viability of newly advanced turbochargers, air management, and electronic sensors for use with clean diesel and high-efficiency gasoline engines.*

Cleaner engines mean cleaner air thanks to a partnership to develop advanced automotive components for cleaner, more

fuel-efficient engines and vehicles.

The Environmental Protection Agency (EPA) and BorgWarner have signed a

Cooperative Research and Development Agreement (CRADA) to develop advanced air management technologies that will enable the automotive and trucking industries to utilize EPA's clean diesel combustion (CDC) and high-efficiency gasoline combustion technologies.

The partners will examine the commercial viability of newly advanced turbochargers, air management, and electronic sensors for use with clean diesel and high efficiency gasoline engines.

Commercialization of these technologies will result in lower emissions and reduced fuel consumption, which in turn saves Americans money at the pump, improves environmental protection, and lessens dependence on foreign oil.

Diesel-powered passenger vehicles have significantly better fuel economy than their gasoline-powered counterparts. Through the partnership, BorgWarner will build and evaluate unique turbochargers that will maintain fuel economy in clean diesel combustion systems. The company also will develop air management and combustion sensor technologies.

Partnering with BorgWarner allows this "made in the USA" technology to also support manufacturing jobs in the U.S. through its turbocharger manufacturing and engineering facilities in Asheville, N.C.

The EPA-BorgWarner partnership was established through a CRADA under the EPA FTTA Program.

For additional information on this technology, visit [www.epa.gov/otaq/technology](http://www.epa.gov/otaq/technology).

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# LAB CLASSIFIEDS | AVAILABLE TECHNOLOGIES, FACILITIES, AND PARTNERS

## LANL FUEL CELL STACK

Los Alamos National Laboratory (LANL) scientists have created a novel and efficient direct methanol fuel cell (DMFC) stack. This new stack has a circular footprint, within which are a cathode and anode manifold, tie-bolt penetrations, and tie-bolts.

Each fuel cell uses two graphite-based plates. One plate includes a cathode active area that is defined by serpentine channels connecting the inlet and outlet cathode manifold. The other plate includes an anode active area defined by serpentine channels connecting the inlet and outlet of the anode manifold, where the serpentine channels of the anode are orthogonal to the serpentine channels of the cathode.

### Application(s)

- Portable electronics
- Electric scooters
- Battery chargers
- Wearable power packs.

*More info:* Laura Barber, 505-667-9266, ljbb@lanl.gov

## INL's NOVEL GAS METER

Mass flow meters are the most prevalent method used to accurately measure flow rate. However, mass flow meters must be calibrated separately for each gas or gas mixture in order to be useful.

Idaho National Laboratory has developed a novel gas flow meter that measures the flow rate of mixed gases, pure gases, and gas systems. The device has been tested to give accurate values for flow rates as low as 5 mL/min.

This is especially useful in situations where the composition of the flowing gas changes over time.

*More info:* Jason Stolworthy, 208-526-5976

## BERKELEY'S FLEXIBONE

Carolyn Bertozzi and colleagues at Lawrence Berkeley National Laboratory (LBNL) have developed a rapid and inexpensive method to incorporate high mineral content into a polymer scaffold to create lightweight composite materials with a wide range of applications.

The technique can be used to incorporate ceramics, metals, or semiconductors into hydrogels.

These Flexibone composites will be useful in a variety of biological and nonbiological applications that require a flexible polymer as well as the ability to tune strength and electronic, magnetic, conducting, and insulating properties.

Applications include bone implants, dental implants, bio-cements, and flexible composites with magnetic and electrical properties.

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

## FDA's FLU VACCINE

The Food and Drug Administration (FDA) and the National Institutes of Health announce that a single vector DNA vaccine against influenza is available for licensing.

The single vector expresses both hemagglutinin (HA) and matrix (M) proteins, generating both humoral and cellular immune responses.

The vaccine candidate completely protected mice against homologous virus challenge and significantly improved survival against heterologous virus challenge. A robust and reliable vaccine supply is widely recognized as critical for seasonal or pandemic influenza preparedness. The advantages offered by this vaccine make it an excellent candidate for further development.

The FDA is seeking statements of capability or interest from parties interested in collaborative research to further develop, evaluate, or commercialize this technology.

*More info:* Zhiping Ye, 301-435-5197, or Beatrice Droke, 301-827-7008

## SRL's RADROPE™

Researchers at Savannah River National Laboratory (SRL) have developed a lightweight, portable system that rapidly detects the presence of nuclear materials in sealed containers without using harmful x-rays.

The RadRope system can be used in a straight line, a curved line, or at an angle, and the length of the system can be easily customized for a variety of different uses.

*More info:* Dale K. Haas, Savannah River National Laboratory, Westinghouse Savannah River Company, 803-725-4185, dale.haas@srnl.doe.gov

## NIH T-CELL

Renal cell carcinoma (RCC) is the most common renal tumor, with approximately 30,000 cases per year in the U.S. The survival rate for this cancer is very low—only 10% of patients survive because this carcinoma is resistant to most chemotherapies.

A T-cell receptor that was cloned from a human immune cell by researchers at the National Institutes of Health (NIH) has the ability to recognize a number of human kidney tumors. The cells were able to kill kidney cancer cells in patients and, when introduced into other human immune cells, these cells also acquired the ability to kill kidney cancer cells.

*More info:* Michelle A. Booden, Ph.D., 301-451-7337, boodenm@mail.nih.gov

## LBNL'S ERGONOMIC ARM

The Berkeley Ergonomic Arm of Lawrence Berkeley National Laboratory (LBNL) is a practical ergonomic intervention and support system to improve productivity and reduce workplace ergonomic-related injuries.

The Berkeley Ergonomic Arm dynamically enhances musculoskeletal support and comfort during sitting tasks at the computer or standing at a benchtop or manufacturing station. The aim is to reduce the likelihood of cumulative trauma injuries to the upper extremities.

This is a ground-floor opportunity with enormous upside market growth potential. LBNL is seeking a qualified partner(s) to work in a Phase III collaborative effort to refine and commercialize the new Berkeley Ergonomic Arm.

*More info:* Chris Kniel, Technology Transfer Department, crkniel@lbl.gov, 510-486-5566

## ARS ENERGY

Agricultural Research Service (ARS) scientists have designed a device that can be used for recovering ethanol or other water-soluble organic products resulting from the fermentation process. ARS's invention (a spiral-wound supported liquid membrane module) is a low-energy chemical separation device that combines the processes of extraction and pervaporation in a single piece of equipment, an advantage over existing devices. This technology allows for continuous removal of ethanol from a fermentor, which can increase both fermentor productivity and product yield, thereby reducing production costs.

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*LBNL Success, from page 5*  
developing the codes.

His software deciphers the signals captured from electromagnetic imaging of offshore hydrocarbon reservoirs, which are pockets of oil, gas, brine, or water located under the seabed. In this process, a ship-towed transmitter sends electromagnetic signals into the sea floor.

Some of the fluids within a hydrocarbon reservoir, such as oil, are insulators, so they resist the signals. Other fluids are conductive, such as water and brine.

Detectors located on the sea floor gather the electromagnetic signals after they've traveled through a reservoir, giving geophysicists an indication of what it holds.

"But it is very difficult to interpret what these signals mean just by looking at the raw signals, so we developed a processing package that takes the signals and produces three-dimensional maps of the substrata," said Newman.

The technology is meant to augment — not replace — current imaging techniques such as seismic imaging. It will allow scientists to tease out ever more subtle signatures of hydrocarbons from geologically challenging sites.

Newman traces the software's success to a few mile-

stones. In the early 1990s, he received Office of Science (Basic Energy Sciences) funding and Laboratory Directed Research and Development funding for separate projects to aid the transition of his modeling and imaging codes from serial computers to high performance, distributed computing platforms.

More funding came in 1999, when he got a call from ExxonMobil representatives who were interested in using the software to produce very detailed images of offshore sites.

Newman and colleagues, such as fellow Earth Sciences Division staff scientist.

Mike Hoversten and postdoctoral fellow Michael Commer, are currently working to increase the code's scale so it can map large basins that measure 2500 square kilometers. Ultimately, it is one more valuable tool in the push to secure reliable sources of energy.

"This technology will help buy us time as we seek renewable energy alternatives," said Newman. "One must be dedicated to seeing that the technology being transferred is going to be a success. Be proactive and work with the lab's technology transfer people. They are a there to help your technology succeed, but you must take the lead."



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