FLC NEWSLINK

August 2006

T² INSIDE

T² EVENTS

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

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

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

•

Partners in Environmental Technology Technical Symposium
Washington, D.C.
November 28-30, 2006

•

FLC National Meeting
Arlington, Texas
May 15-18, 2007

T² FACT

Invented in 1871, the first "ordinary" bicycle was invented by British engineer James Starley. Known as the Penny Farthing, it was the first really efficient bicycle, consisting of a small rear wheel and large front wheel pivoting on a simple tubular frame with tires of rubber.

- Mary Bellis, About.com

Argonne Tests Valves for Diesel, Gas Engines

Advanced ceramics are the leading candidates for high-temperature engine applications — offering improved engine performance and reduced emissions. One type of ceramic, silicon nitrides, is being evaluated for use in valve train materials for diesel and natural gas engines.

Because they operate in high-stress, high-temperature, corrosive environments, these materials must be highly durable and reliable. Accurate and efficient surface and subsurface characterization methods are essential to identify damage caused by machining and to ensure the reliability of the valves.

A group of researchers at Argonne National Laboratory (ANL), led by J.G. Sun, have been investigating nondestructive evaluation (NDE) methods to detect surface and subsurface defects caused by abrasive machining processes. Such defects — which include microstructural discontinuities such as spalls, cracks, and voids — are typically within 200 µm of the material's surface and can significantly degrade the fracture strength and fatigue resistance of silicon-nitride ceramics. Because these ceramics are partially translucent in light, a laser-scattering method based on the detection of optical scat-

See Argonne Engine Valves, page 8

Sandia's TufFoam™ Churns Up Waves of Industry Interest

by Nancy Garcia, LANL

When surfboard material manufacturer Clark Foam closed shop last year, the nation's $200-million surfboard manufacturing market appeared headed for a wipeout.

Hearing the news, Sandia National Laboratories' (SNL) LeRoy Whinnery, who describes himself as "a warm-water surfer" (as opposed to his wife, whom he says "will surf anywhere"), believed he just might have a solution — a foam initially developed to protect sensitive equipment from harsh mechanical environments, known as TufFoam™.

Originally created for the National Nuclear Security Administration to protect sensitive electronic and mechanical structures from harsh environments, LANL's foam may be ideally suited for surfboard blanks, car bumpers, and airplane wings.

Now two licensees are evaluating the SNL-developed foam for this use, and scores of inquiries are being explored about this field and other uses, including insulation and structural core applications.

The material is a water-blown, close-cell, rigid polyurethane foam that features formulations with densities as low as 2 pounds per cubic foot.

News of TufFoam being considered as a potential replacement for surfboard manufacturing has spread rapidly through news agencies, television, magazines, newspapers, and trade journals since the licensing opportunity was announced in February.

"It can be used for thermal and electrical insulation, and potentially as a core material

See Sandia Surfboard, page 4

DC on T²: R&D Labor Force

by Gary Jones, FLC Washington, DC Representative

Greetings from (sweltering) D.C. A great deal has been written over the past year about the U.S. R&D labor force and its ability to continue attracting and developing the quality science and engineering (S&E) workforce necessary to compete globally in technology-intensive industries (see the April/May DC on T²).

Several new National Science Foundation (NSF) statistical reports (tabularized data) and an article in a prominent S&T policy journal provide more "grist for the mill" on this general discussion, which I thought might be of interest

See DC on T², page 5

NASA Kennedy Reduces Groundwater Contamination

A groundwater treatment technology developed at Kennedy Space Center (KSC) has won NASA's Government Invention of the Year and Commercial Invention of the Year awards for 2005.

The emulsified zero-valent iron (EZVI) technology was developed by a team of researchers from NASA and the University of Central Florida.

NASA inventors include Dr. Jacqueline Quinn, an environmental engineer in the Applied Sciences Division of the Kennedy Applied Technology Directorate, and Kathleen Brooks, an analytical chemist in the center's Materials Science Laboratory of the Center

See Groundwater Contamination, page 4

Fed Labs Flash | Technology Transfer Notes

Low Vitamin D Levels Reported in Young African-Americans

by Marcia Wood, Agricultural Research Service

In an ongoing study, physiologist Charles Stephensen uses a neutralizing antibody test to measure immune response in individuals receiving vitamin A supplements.

Low vitamin D levels among young African-Americans participating in a recent study were more common than in several previous investigations, university and Agricultural Research Service (ARS) nutrition experts have found.

The vitamin is essential for strong bones and a robust immune system, according to the study's lead author, immunologist Charles B. Stephensen.

He works at the ARS Western Human Nutrition Research Center, located at the University of California, Davis. Stephensen and his co-investigators have reported their findings in the current issue of the *American Journal of Clinical Nutrition*.

The scientists based their conclusion on levels of a form of vitamin D in the blood (plasma) of 359 volunteers, aged 15 to 19, tested at sites in 14 American cities. Volunteers were predominantly female African-Americans. Researchers found that 87 percent of the volunteers had an insufficient amount of 25-hydroxyvitamin D in their plasma.

Good sources of the nutrient include vitamin D-fortified milk, fatty fish and sunshine, which a natural chemical in skin converts to a form of the nutrient called previtamin D3.

Howard College Gets Grant for T²

Howard Community College has been awarded a three-year grant worth more than half a million dollars to bring more technology inventions to the marketplace.

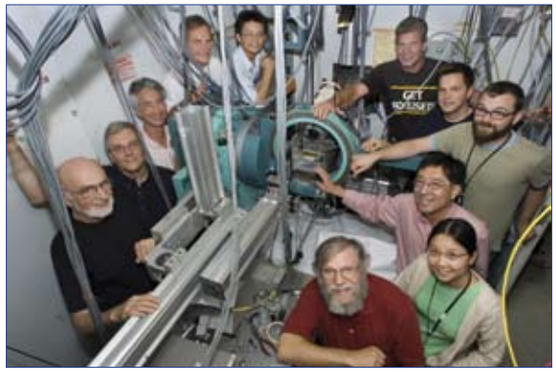
"The idea is to increase the development of inventions from government-funded labs and teach people how to take an invention, analyze it and develop it," said Martha Matlick, the college's project manager for the grant.

Matlick said the inventions could include communications and diagnostic equipment. The school is overseeing implementation of the Technology Assessment Program grant, worth about $600,000.

The college is partnering with the county Economic Development Authority, Howard County Public School System, Johns Hopkins University Applied Physics Laboratory, Goddard Space Flight Center, and Naval Research Laboratory.

The money will pay for a new course this fall called "Technology Transfer From Invention to the Marketplace," which is available to college and high school students.

BNL's Winning Team



Front left: Jonathan Hanson, Steven Hulbert, Shu Cheung, Anthony Lenhard, and Zhong Zhong. On the right, from front to back: Peter Siddons, Hui Zhong, Chi-Chang Kao, Dean Connor, Christopher Parham, and Richard Greene. Not pictured: Jerome Hastings.

The Department of Energy's (DOE) Brookhaven National Laboratory has won a 2006 R&D 100 Award for developing the first device able to focus a large spread of high-energy x-rays. The device, called a Sagittal Focusing Laue Monochromator, could be used in about 100 beamline facilities around the world to conduct scientific research in physics, biology, nanotechnology, and numerous other fields.

OSU, Better World Project

Did you know that breakthroughs made at Oklahoma State University (OSU) were recently celebrated as among more than 100 academic technology transfer success stories that have significantly improved the lives of people around the world? The Better World Project, recently launched by the Association of University Technology Managers (AUTM), brings to life technologies that were born in academic institutions and have gone on to improve lives, contribute to the economy, generate hundreds of thousands of jobs, and support further discoveries.

The OSU research has been included in the Better World Project among other breakthroughs such as Google, the nicotine patch, and devices leading to early detection of cancer.

These life-altering discoveries would not be available to people all over the world without the support of academic technology transfer.

Through this project, AUTM aims to bring greater attention to the benefits of technology transfer at institutions like your university, without which the world would be dramatically different.

More info: Megan Davidson, 312-233-1276, megan.davidson@edelman.com

FLC NewsLink

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Tech Watch | Laboratory Techs Ready for Transfer

NIH Immunotherapy

Abnormalities in immunoregulation are responsible for a wide variety of disorders such as autoimmune disease, chronic inflammatory diseases, and allergic diseases.

These diseases include systemic lupus erythematosus, rheumatoid arthritis, type I diabetes mellitus, inflammatory bowel disease, multiple sclerosis, Crohn's disease, and asthma. The defining event for induction of an immune-mediated disorder is the loss of T cell tolerance to self-antigens, which is provided by regulatory T cells.

Traditional methods for treating immune-mediated disorders involve the use of steroids or other immunosuppressive drugs, which have significant undesirable side effects. This latest invention, headed by National Institutes of Health researcher Peter Lipsky, provides methods for generating regulatory T cells by culturing CD4+CD25- T cells with autologous antigen-presenting cells (APCs) in the presence of the Th2 cytokines interleukin-4 (IL-4) and/or interleukin-13 (IL-13).

Immunotherapy via this mechanism is anticipated to have a large number of potential therapeutic applications, including: 1) treatment of autoimmune disease or inflammation; 2) prevention of graft rejection in a transplant recipient; 3) cancer treatment; and 4) diagnostic test for efficacy of an IL-4 antagonist in cancer treatment.

More info: Dr. Peter Lipsky, 301-594-0596, lipsky@mail.nih.gov.

PNNL's Radio Tags

Researchers at Pacific Northwest National Laboratory (PNNL) have developed miniature radio frequency (RF) tags that are ideal for rapid, remote inventory tracking and monitoring a wide variety of items. The PNNL technology provides long-range readings, simultaneous readings, the ability to monitor inputs and control outputs, and location tracking. RF tag systems offer an advantage over bar-coding inventory and monitoring systems because line-of-sight access to the tagged items is not necessary. The PNNL RF tags exhibit superior performance in difficult environments such as reading through container walls, paint, dirt, and in cluttered areas.

With more than ten years of experience and a broad range of expertise, PNNL's Electronic Systems Group offers three types of RF tags in its suite of available technologies: active, semi-passive, and passive. In addition to offering general features and benefits for different applications, PNNL can customize its tag systems to meet specific needs.

More info: http://availabletechnologies.pnl.gov/securityelectronics/rftags.stm

Pollution Control and Homeland Security From Los Alamos

Maintaining air quality is essential for human safety and environmental protection.

Numerous industrial processes require airborne particulate monitoring, concentration and filtration.

Escalating fears of airborne toxic contaminants and biotoxins are driving the emergence of new monitoring and filtration requirements.

The Aerosonic acoustic concentrator technology, developed by scientists at Los Alamos National Laboratory (LANL), is a novel method of particle concentration that can be used in these critical areas.

An Aerosonic tube uses acoustic energy to concentrate particulates in an aerosol.

Aerosonic devices are low-power, inexpensive, and have no moving parts. Employing a small piezoelectric tube to generate standing waves, the Aerosonic method uses sound pressure to locally concentrate many types of aerosols ranging from smog particulates to suspended microorganisms.

Concentrated aerosols can be directly isolated for analysis. When added as a front-end concentrator to existing sensors, the Aerosonic concentrator can improve overall detector sensitivity by an order of magnitude or more.

While consuming less than one-tenth the power of a typical HEPA filter, it can also function as a "filterless" filter with no moving parts.

The Aerosonic acoustic concentrator is an enabling technology for sensitive bio-detectors, airborne toxin monitors, environmental surveillance systems, and industrial process control components.

LANL invites inquiries for Aerosonic licensing and collaboration. Contact Laura Barber at 505-667-9266 or email at ljbb@lanl.gov, and visit the website at <www.lanl.gov/partnerships/license/technologies>.

Sandia Surfboard, from page 1

SNL materials researcher LeRoy Whinnery poses with two TufFoam samples. Originally created for the NNSA to protect sensitive electronic and mechanical structures from harsh environments, the foam's properties may be ideally suited for surfboard blanks and other applications such as car bumpers and airplane wings.

for the automobile and aerospace industries," said Scott Vaupen, who began the commercialization effort in Business Development Support Dept. 8529, where Jim Wilhelm is now handling TufFoam agreements and inquiries. Jim points out that the material is unique in its ability to withstand high-rate impact without fracture or loss of structural integrity. In addition, it's also being considered for use as industrial thermal insulation for liquefied natural gas storage tanks.

Clark Foam closed its doors suddenly late last year, citing the impact of ever-tightening environmental regulations on the manufacturing of their polyurethane surfboard blanks. The move led to near-panic, particularly in California, by manufacturers and sellers of surfboards who fear they will not be able to find the high strength-to-weight ratio surfboard blanks necessary to make the boards.

Surf historian Matt Warshaw, in an article in the *Santa Barbara News-Press*, said "it's the equivalent of removing lumber from the housing industry."

Largely due to its low density, SNL's TufFoam might very well fit the bill as a drop-in replacement material. A key feature of TufFoam is that it does not contain toluene diisocyanate (TDI), the chemical used in the production of the polyurethane foam surfboard blanks that is most problematic with respect to environmental regulations.

Another attractive feature of the SNL product is that all of the chemicals used to make TufFoam are commercially available in commodity quantities. The material is currently formulated to be processed in a batch mode, but the processing schedule can be modified for machine mixing or injection molding.

So, will a foam developed for America's nuclear weapons program save the American surfboard industry? Maybe. LeRoy hopes so.

"Yeah, I'm really looking forward to surfing on a TufFoam board," he said. "That would be pretty awesome."

Groundwater Contamination, from page 1

Operations Directorate. Drs. Christian Clausen, Cherie Geiger and Debra Reinhart are co-inventors from the university's Departments of Chemistry and Civil Environmental Engineering.

During the early history of the space program, the ground around Launch Complex 34 (LC-34) at KSC was polluted with chlorinated solvents used to clean Apollo rocket parts. Dense nonaqueous phase liquids (DNAPLs) left untreated in the ground contaminated fresh water sources in the area.

A DNAPL is a liquid that is denser than water and does not dissolve or mix easily in water. DNAPLs are a common cause of environmental contamination at thousands of DOE, DOD, NASA, and private industry facilities.

KSC's EZVI injection tool being lowered into the injection well.

Current approaches for remediation of DNAPL source areas are either inefficient or slow (e.g., pump and treat) or costly (e.g., thermal treatment).

In response to this environmental contamination, KSC developed EZVI for the in situ treatment of DNAPLs.

EZVI shows significant promise as a cost-effective remediation technology capable of expediting DNAPL source zone remediation and groundwater cleanup.

EZVI is composed of a food-grade surfactant, biodegradable vegetable oil, water, and ZVI particles (either nano- or micro-scale iron), which form emulsion particles that contain the ZVI in water surrounded by an oil-liquid membrane.

The conventional approach to this type of contamination is to use pump-and-treat systems that extract and treat the groundwater above ground.

This conventional technology is basically a plume control technology and would have to be implemented as long as groundwater contamination exists.

EZVI is an innovative in situ technology that will greatly exceed the capabilities of conventional pump-and-treat systems—both in time to achieve cleanup and cost avoidance.

This technology overcomes the previous understanding that the incorporation of zero-valent metal particles, such as iron particles, into a liquid membrane micelle would lead to passivation of the particle surface with regard to its ability to dehalogenate compounds.

Other than being quick, effective, and cost-competitive, the technology also provides for direct treatment of the contaminant source, does not mobilize contaminants, produces less toxic and more easily degradable by-products, and is environmentally safe. KSC signed five nonexclusive licenses with companies wanting to market and further develop EZVI.

One company in particular, GeoSyntec, intends to market this innovation to clients across North America, Europe, and Australia.

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Federal Laboratories Invited to Join IRI

Just as the FLC brings together federal laboratories for a common purpose, the Industrial Research Institute (IRI) does the same for R&D-intensive industries. Specifically, the IRI is an association of more than 200 companies and laboratories from multiple sectors. Members collectively invest over $100 billion annually in R&D worldwide.

The purpose of the association is to provide its member companies with the latest insights, solutions, and best practices in R&D management and technical innovation. This purpose is fulfilled through a variety of venues, including: annual meetings that address the state-of-the-art in innovation and R&D management; a series of "networks" organized by R&D functional specialties (e.g., R&D Finance, HR, external affiliation and collaboration management, etc.), which provide a forum where peers from member companies can exchange best practices in the context of that network's purpose; and, a series of research committees where members collaborate with one another to research innovation and R&D management techniques – essentially creating knowledge.

The IRI also publishes an award-winning bimonthly journal in which results of innovation and R&D management research are peer-reviewed, published, and disseminated. The common denominator in all of these venues is member networking, and the dominant characteristics of IRI events are openness and a spirit of sharing.

Recently, in recognition that federal laboratories face the same R&D management and innovation challenges as industry at the "80% level," IRI created an associate membership status for federal laboratories and has begun accepting memberships. To date, four federal laboratories and R&D centers from NASA, the Department

See IRI and Fed Labs, page 8

DC on T², from page 1

to *FLC NewsLink* readers. Although not 'analytically' addressing the U.S. S&T competitiveness issue, the NSF reports highlight some interesting demographic characteristics of U.S. S&E graduate education and doctoral employment, while the journal article focuses on proposed changes to undergraduate engineering education.

The next few paragraphs highlight: 1) salient demographic statistics for doctoral S&Es in the U.S. workforce, 2) select characteristics of graduate enrollment in S&E programs in the U.S., and 3) a "think piece" on the (in?)adequacy of current undergraduate engineering education in the U.S. I encourage you to look to the original sources for more detailed reading on these subjects.

First, in "Characteristics of Doctoral Scientists and Engineers in the US: 2003" (NSF 06-320, June 2006, www.nsf.gov/statistics/nsf06320/), the NSF provides statistical information on many employment-related characteristics (e.g., median salary, sector of employment, employer location, etc.) for doctoral S&Es in the U.S. According to the report, in 2003 there were 593,300 doctoral S&Es employed in the U.S. (both full- and part-time), with 468,570 in science and 101,500 in engineering. The male/female ratio in the sciences was approximately 70/30, while in engineering it was 92/8. In the sciences, the largest employer type was universities and colleges (46.5 percent of total doctoral scientists employed), while industry employed the highest percentage of engineers (55.9 percent of total doctoral engineers employed). Coincidentally, the federal government employed the same percentage of each, 6.9 percent.

Another interesting statistic is median salary (a potential indicator of how attractive the field is for future S&Es). The median salary across all S&E fields in 2003 was $82,000. Some interesting breakouts on this figure include: 1) by gender: median salary across all S&E fields for males was $86,500, for females $70,000; 2) by type: for science the median salary was $80,000 (physics was highest at $94,000), while engineering was $97,300 (electrical/computer engineering was highest at $104,000); 3) by citizenship: U.S. citizens (native born and naturalized) earned a median salary across all science fields of $90,000 versus non-U.S. citizens (permanent and temporary residents) earning $67,500; for engineering, the values are $100,000 and $83,000, respectively; 4) by organizational employment: S&Es working at private-for-profit organizations earned the highest ($100,000), followed by federal government ($91,000), self-employed ($90,000), not-for-profit ($80,000), university ($70,000), and state/local government ($68,000).

Second, "Graduate Students and Post Doctorates in S&E: Fall 2003" (NSF 06-307, March 2006, www.nsf.gov/statistics/nsf06307/) presents the distribution of graduate students in S&E by academic fields, demographics, institution and state (for 2003). As noted, "[G]raduate enrollment in science and engineering (S&E) programs reached an all-time high of 474,203 students in fall 2003, a gain of 4 percent over S&E enrollment in 2002 and a gain of 9 percent over 1993. Between 2002 and 2003 S&E graduate enrollment increased by 19,311 students: 18,052 U.S. citizens and permanent visa holders and 1,259 temporary visa holders. U.S. institutions reported 33,685 postdoctoral appointees (post docs) in S&E fields, also an all-time high."

It is interesting to note, however, that in a preliminary view of 2004 data (NSF 06-321, July 2006, www.nsf.gov/statistics/infbrief/nsf06321/), the NSF indicates that, "for the first time in the past decade, full time enrollment of students with temporary visas dropped, by 3 percent, whereas full time enrollment of students who were U.S. citizens or permanent residents rose by about 3 percent."

The combined message appears to be that while enrollment is on the upswing, there is a continuing challenge attracting foreign students to initiate full-time S&E programs in the U.S.

And finally, at the other end of the spectrum of university education in engineering, C. Judson King, director of the Center for Studies in Higher Education at Berkeley, has written a thought-provoking piece in the summer 2006 issue of *Issues in Science and Technology* (www.issues.org).

In it he posits that the issues with which engineers must engage have become "more and more multidimensional, interacting with public policy and public perceptions, business and legal complexities, and government policies and regulations …" However, he notes that engineering undergraduate degrees allow for very few general education courses, preparing the engineer for a very specific role in society. As a result, there are few engineers in Congress or other public or private leadership positions.

Consequently, he takes the strong position that undergraduate engineering degrees are too narrowly focused on "technical skills rather than broadly on the full role that engineers must play in the world ... [A]nd if engineers are to have time for a greater variety of courses in their college years, the professional engineering credential will have to be a postgraduate degree, as it is in law, business and medicine."

This is not a completely new perspective on undergraduate engineering programs (e.g. he identifies the National Academy of Engineering 2005 report, "Educating the Engineer of 2020," which had a similar recommendation), but it is certainly food for thought for those interested in engineering education and the role of the engineer in the U.S.

While the NSF reports are statistical rather than analytical, they do provide, along with the think piece on undergraduate engineering education, more fodder for any discussion on S&E education, including employment prospects for undergraduate and graduate S&Es, in the U.S.

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

INL Technology Receives R&D 100 Award and Nano 50 Award

New Environmental Protection Agency (EPA) standards have reduced the maximum concentration of arsenic in drinking water from 50 parts per billion (ppb) to 10 ppb, creating an expensive dilemma for 4,000 American municipalities and nearly 14 million homeowners.

Now, Idaho National Laboratory (INL) nanotechnology researchers have engineered a revolutionary and affordable material called Nano-Composite Arsenic Sorbent, or N-CAS, that is up to seven times more effective than the best material currently available.

This technology will aid millions of Americans, but also more than 70 million people around the globe, who are exposed to dangerous arsenic concentrations in their drinking water.

Because of the far-reaching impact N-CAS will have throughout the world, *R&D* magazine recently announced that INL will receive an R&D 100 Award.

N-CAS contains high concentrations of arsenic-adsorbing nano-particle metal oxides embedded in a strong composite polymer matrix. It excels in offering significant reaction kinetics, exceptional strength and an extreme surface area. In fact, one gram of N-CAS contains 40% more adsorbent surface area than the square footage of the average American home.

It is estimated that one gallon of N-CAS can treat 350-400,000 gallons of water compared to 50,000 for the next best material today.

N-CAS will also be recognized by Nanotech Briefs, a digital magazine from the publishers of *NASA Tech Briefs* – the country's largest-circulation design engineering magazine. Called the Nano 50 Award, this award in its second year recognizes the top 50 technology advancements conducted at the nanotechnology level.

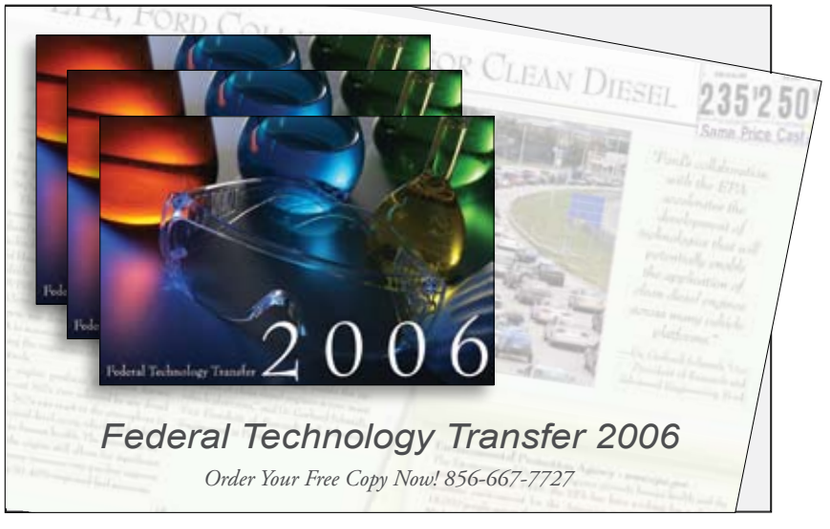
N-CAS was selected for this award because this nano-engineered composite removes arsenic from drinking water effectively, efficiently and affordably.

Troy Tranter, research team leader, said, "We are hoping that our long-lasting, high-capacity nanocomposite polymer will help deliver safe drinking water to Americans and people around the world. The exceptional recognition for our team's success is very gratifying."

INL researchers developed a long-lasting, high-capacity nanocomposite polymer particle engineered to remove arsenic concentrations from water, rendering it safe to drink and compliant with U.S. and world standards.

According to Nanotech Briefs, the winners are the "best of the best" – the innovative people and designs that will move nanotechnology to key mainstream markets.

Extending INL's consecutive award-winning streak to a full decade, N-CAS researchers, along with three other INL technologies, will be honored at Chicago's Navy Pier in October during the 2006 R&D 100 Award presentation. Nanotech Briefs will honor its Nano 50 awardees in November at the NASA Tech Briefs National Nano Engineering Conference in Boston.



NASVF: Innovation Capital Done Right

Join the most advanced thinkers in the world of seed and startup investing, and hear how they're making it work. Don't miss the chance to hear Senator Hillary Rodham Clinton as the keynote speaker.

The 13th annual National Association of Seed and Venture Funds (NASVF) conference—September 20-22, 2006, at the Hyatt Regency, Rochester, N.Y.—promises to draw attendees from around the world who represent the entire "food chain" of venture capital. The conference is attracting registrants from as far away as Australia and Japan.

"Being in Australia, we're a long, long way from major markets. Attending the NASVF Conference looks like a great way to get to know the small fund market in the U.S. and to meet our counterparts to share ideas on running funds and growing business." said Amanda Heyworth of Playford Capital, a technology seed fund based in South Australia.

According to Sue Strommer, NASVF CEO, "The NASVF chose to hold the 2006 conference in Rochester because the community is aggressively, enthusiastically, and energetically leveraging its abundant resources to compete in the new global business community of the 21st century. It is Rochester's teamwork among governmental, educational, and business communities that suggests it knows where it is going."

Topics include Want to Know How to Raise a Seed Fund?; How Angels Think and Invest; How to Work With Later Stage VCs; and How Corporations Scout Out Tech Deals.

Interested in training? Two workshops are being offered—Seed Investing as a Team Sport, an interactive seminar that will expand attendees' understanding of business investing; and Starting an Angel Organization, the new Kauffman Foundation workshop at which attendees will be given a comprehensive overview of the steps necessary to create an angel organization.

More info: Visit www.nasvf.org or contact Julie Evans at jevans@nasvf.org.

Lab Classifieds | Available Technologies, Facilities, and Partners

ANL's Fuel System

To reduce the nation's dependence on foreign oil, 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 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>.

Already, more than 2,000 GREET users in both the public and private sectors are registered throughout North America, Europe, and Asia.

More info: Dr. Michael Wang, 630-252-2819, mqwang@anl.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

NREL's Power

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). 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

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

No Collimation

Scientists at the Department of Energy, National Nuclear Security Administration's Special Technologies Laboratory 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. A patent application has been filed with the U.S. Patent and Trademark Office.

More info: B.J. Willeford, Jr., ips@nv.doe.gov, 702-295-0256, www.bechtelnevada.com/techtrans/index.html

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

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

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.

More info: Richard D. Offeman, 510-559-6458, roffeman@pw.usda.gov

IRI and Fed Labs, from page 5

of Energy, and the Department of Commerce have joined IRI in this new category. Discussions have also been initiated with DOD laboratories and R&D centers, as well as similar entities in other executive departments. Associate members can participate fully in all IRI meetings, networks, research committees, special courses, and other IRI offerings.

The associate member status was approved based on the recommendation of a former federal laboratory executive who joined industry after retirement from a federal R&D career and observed the "win-win value proposition" when industry and federal laboratory R&D leaders and managers get together to discuss mutual R&D management challenges. Participation by federal labs to date seems to be bearing out that value proposition.

IRI would welcome the opportunity to share more about its organization and the benefits of federal lab involvement with any and all FLC members who might be interested. An annual IRI meeting will be held this fall in Washington D.C., with a special focus on the linkages and interfaces between federal government and private industry.

That meeting would be an ideal time for FLC members to attend a major IRI activity, meet IRI member company leaders and managers, and get a feel for the dynamics and atmosphere of IRI.

To learn more about IRI and the upcoming fall meeting, contact IRI Membership Chair Dick Paul (richard.r.paul@boeing.com, 206-655-0747) or IRI President Ed Bernstein (bernstein@iriinc, 703-647-2582.)

Argonne Engine Valves, from page 1

tering from the subsurface can be used to measure variations in subsurface microstructure — without contacting the material's surface.

The ANL researchers investigated the machining-induced damage in silicon-nitride ceramic valves intended for use in diesel and natural gas engines. The team developed a high-speed, automated, laser-scattering system for the NDE of these valves. The valves were subjected to a coarse and a finish machining process, then tested in a bench rig. The NDE system scans the entire valve surface and generates a two-dimensional scattering image that is used to identify the location, size, and relative severity of subsurface damage from the machining process and the rig tests. The results indicated that the machining damage in coarse-machined valves was significant. In particular, severe damage at the edge of the keeper groove caused premature failure of a valve during the rig test.

After finish machining, the team found that most of the initial damage in the valves was removed. The data were analyzed and compared with surface photomicrographs.

ANL is currently evaluating these valves in 1,000-hour engine durability testing.

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