FLC NEWSLINK

March 2007

T² INSIDE

T² EVENTS

FLC National Meeting
Making the Connection
Arlington, Texas
May 15-18, 2007

•

World's Best Technologies Showcase 2007
Arlington, Texas
May 15-16, 2007

•

IBF Venture Capital Investing Conference
San Francisco, Calif.
June 6-8, 2007

•

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

•

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

T² FACT

VisiCalc, invented by Dan Bricklin and Bob Frankston in 1979, was the first computer spreadsheet program. VisiCalc was released in 1979 and ran on an Apple II computer. While most early microprocessor computers had been quickly supported by BASIC and a few games, VisiCalc introduced a new level in application software. Bricklin and Frankston invented VisiCalc while master's students at Harvard Business School. "VisiCalc took 20 hours of work per week for some people and turned it out in 15 minutes," said Bricklin.

- Mary Bellis, About.com

DC on T²

by Gary Jones, FLC Wash., DC Representative

Greetings from DC. It's that time of year again, when government employees get to see the Administration's plan for funding their activities over the next fiscal year. The President rolled out the FY 2008 budget on February 5, including funding requests associated with R&D initiatives government-wide, commonly referred to as the "R&D Budget."

At this time of year, analysts looking at the proposed R&D budget typically like to compare it to the existing (i.e., FY 2007) R&D budget to illustrate the Administration's evolving science and technology priorities.

Unfortunately, when the FY 2008 budget was rolled out, the FY 2007 budget was not yet completed (i.e., only two appropriations bills had been passed, defense and homeland security), so there remained some uncertainty over R&D funding for the current fiscal year. On February 15, the President signed a joint

See DC on T², page 5

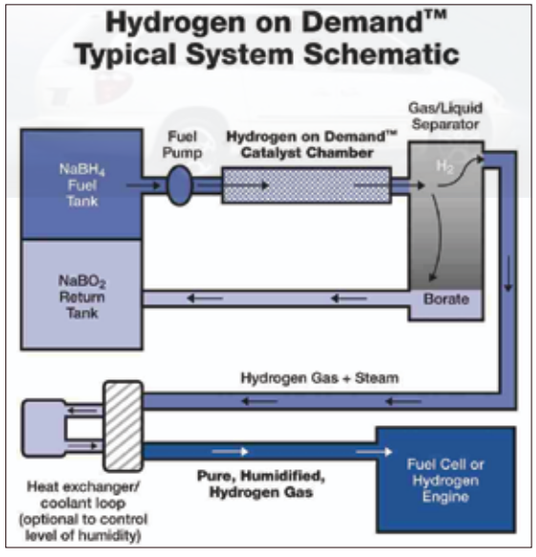
Once on the Martian surface, the Air Force Research Laboratory's solar panels deployed to power all spacecraft activities and instruments.

AFRL Solar Cells Power NASA's Mars Rovers

The Air Force Research Laboratory (AFRL) worked with Spectrolab, Inc. (a Boeing subsidiary in Sylmar, California), through the Dual-Use Science and Technology program to develop ultra-triple-junction (UTJ) solar cells. These cells subsequently powered the solar arrays aboard two NASA Mars rovers. The rovers Spirit and Opportunity landed on Mars in early 2004 to continue NASA's quest to explore the role of water on the planet. Once on the Martian surface, the solar panels deployed to form a total area of 1.3 m^2 of UTJ solar cells that powered all spacecraft activities and instruments.

The Mars Exploration Rover (MER) program posed significant engineering and technology challenges due to many design and operational constraints, including limited available panel area, changing illumination levels and temperatures, variable shadowing and atmospheric conditions, and dust accumulation on the rovers. As highly efficient

See AFRL Solar Cells, page 4



The Hydrogen On Demand™ fuel system developed by Millennium Cell as it appears in DaimlerChrysler's fuel cell research car, the Natrium.

Needing a Hydrogen Breakthrough

by David Thorn, Frances Stephens, Karl Jonietz, William Tumas, R. Tom Baker

Replacing petroleum-powered vehicles with hydrogen-powered vehicles requires a number of technological breakthroughs, but perhaps the greatest challenge is storing enough hydrogen on board to achieve an adequate driving range.

Without adequate range, hydrogen-powered vehicles will be confined to major cities, and consumers will be less likely to relinquish gasoline-powered cars for hydrogen vehicles. To help meet this challenge, Los Alamos National Laboratory (LANL) and several partners have come together to form the Chemical Hydrogen Storage Center of Excellence (The Center).

The FreedomCAR and Fuel Partnership—a collaboration between the Department of Energy (DOE), the U.S. Council for Automotive Research, and energy companies—has developed onboard hydrogen storage targets with the goal of "achieving similar performance and cost levels as current gasoline fuel storage systems."

In order to provide a 300-mile driving range between refueling without unacceptably bulky storage vessels, the DOE has established targets for year 2010 of storing 0.045 kg hydrogen per liter of storage system volume and 0.06 kg hydrogen per kg of storage system mass.

Longer-term targets are even more demanding: 0.081 kg hydrogen per liter, and 0.09 kg hydrogen per kg of storage

Hydrogen Breakthrough, page 4

Fed Labs Flash | Technology Transfer Notes

SRNL's SmartLatch™ Going to WBT

Savannah River National Laboratory's (SRNL) Technology Transfer Group has been notified by the World's Best Technologies (WBT) that the Acoustic Door Latch Detector (Smart Latch™) has been preselected from early submissions to be one of the top six technologies featured on its website. Other institutions (some working cooperatively) with preselected winners include the University of Hawaii, Medical College of Georgia, U.S. Army, U.S. Navy, DARPA, National Institutes of Health, and the University of Montreal. The early selection of the Smart Latch™ guarantees its inclusion within the top 25 technologies in this year's competition, as well as a 10-minute presentation of the technology at the Showcase. The Smart Latch™ is a "smart" door lock for industrial and consumer applications that uses existing state-of-the-art neural network technology to acoustically monitor lock performance and, in particular, the latching event.

WBT is the nation's premier event showcasing the largest collection of undiscovered technologies from top universities, laboratories, and research institutions across the country and around the globe.

The WBT is produced in cooperation with the FLC and the National Association of Seed and Venture Funds (NASVF).

FAA to Better Air Traffic Control

Seated , left to right: Dr. Wilson Felder, Director, William J. Hughes Technical Center; and Tom Payne, Vice President, UFA, Inc. Standing, left to right: Deborah Germak, FAA Technology Transfer Program Manager; Al Rehmann, FAA Principal Investigator; and Marie Denan, FAA Technology Transfer Program Analyst

The FAA recently entered into a Cooperative Research and Development Agreement (CRADA) in simulation with UFA, Inc.

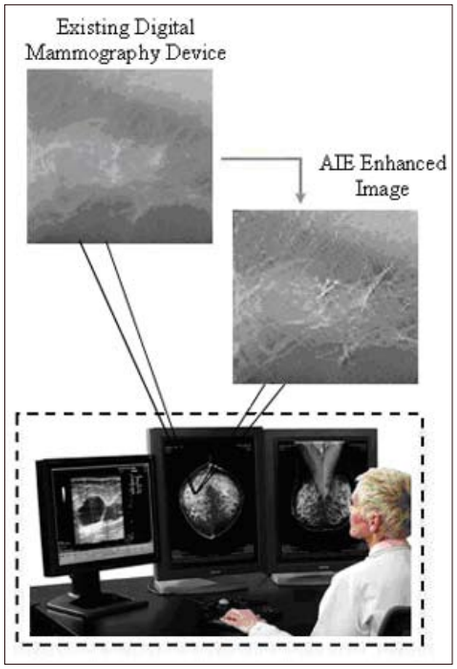
UFA has developed a unique capability with an application to air traffic control (ATC) in the areas of personnel training and airspace simulation.

This capability uses proprietary voice recognition and generation processes to interpret and respond to clearances issued by air traffic controllers in real time.

UFA incorporates this product in an ATC operations training system and believes that the product can be incorporated in the simulation environment of all airspace regimes.

The objective of this collaborative partnership is to assemble a team that will possess the necessary skills and expertise to adapt the current voice recognition and response system into the FAA's laboratory structure.

Wavelets, Mathematics Detect Mines, Cancer



The Naval Undersea Warfare Center, Division Newport has developed a new technology called Digital Image Enhancement that allows small objects to be found in large complex areas, from underwater mines to microcalcifications in breast tissue. The technology uses wavelets and mathematical functions for multi-resolution analysis, feature enhancement, and noise reduction. This method is more robust than previous enhancement techniques and allows foreign objects to be more readily identified.

Advanced Image Enhancement, Inc. (AIE), which holds an exclusive license, recently completed a positive clinical study and has gained regulatory approval by the FDA to market the technology.

For more information, contact Dr. Theresa Baus at 401-832-8728.

Beverage Tech Money

The California Department of Conservation can award up to $20 million annually for the next 5 years for projects that improve markets for beverage container materials (aluminum, glass and plastic).

This includes research and development (R&D) for technologies that improve the processing of materials, allow greater use of recycled material in products, or improve system efficiencies.

Past projects have included R&D for improved optical sorting of broken glass, identification of processing barriers and opportunities at material recovery facilities, chemical and engineering adjustments to allow greater use of mixed-color glass in industrial furnaces, and a process to break down polyethylene terephthalate into its chemical components for reuse as raw materials.

For more information on the current grant cycle and application, go to <www.conservation.ca.gov> and click on "grants," or call 916-323-5878.

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Tech Watch | Laboratory Techs Ready for Transfer

LANL Gas Sensors

Los Alamos National Laboratory (LANL) scientists are looking for industry partners to develop and commercialize sulfur-resistant, high-temperature, solid-state gas sensors using patented chemically modified terbium-yttrium-zirconium oxide (Tb-YSZ) ceramic coatings.

LANL gas sensors can be used to monitor the presence and concentration of O_2, CO, NOx, and hydrocarbon with superior selectivity in most environments, especially in corrosive and high temperature settings.

LANL's solid-state gas sensors are accurate, reliable, and inexpensive to produce, and can last 40 times longer than competitive technologies. Potential applications include monitoring flue gas, coal- and oil-fired industrial boilers, process heaters and furnaces that use waste gases, and spent-acid furnaces.

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

Handling Hyperactivity

Attention Deficit Hyperactivity Disorder (ADHD), the most common behavioral disorder in childhood, is estimated to affect three to five percent of people in the United States, both children and adults. Treatment typically involves a combination of behavior modification, educational interventions, and medication. A variety of medications is available for treatment of ADHD; the most frequently prescribed drugs are stimulants or antidepressants. However, there currently is no way to tell in advance which medication will be most helpful for a particular individual.

National Institutes of Health inventors Maximillian Muenke, Mauricio Arcos-Burgos, and F. Xavier Castellanos have identified haplotypes of latrophilin 3 (LPHN3) that increase the susceptibility for development of ADHD. LPHN3 is a G-protein coupled receptor that is specifically expressed in the brain's mesolimbic system, which is associated with ADHD. The invention describes methods of identifying LPHN3 haplotypes in an individual for determining susceptibility for development of ADHD. Identification of LPHN3 haplotypes in an ADHD-affected individual may also make possible individualized drug treatment plans.

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

Licensing Status: Available

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

Method to Improve the Strength of Rubber, Plastic Products

Agricultural Research Service (ARS) scientist Lei Jong has discovered a method using defatted soy products to improve the strength of rubber products.

Defatted soy products do not contain soybean oil. All of the steps and the equipment for ARS's method are the same as current commercial practices.

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

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

Various organic and inorganic fillers, such as carbon black, have been used to reinforce polymer materials. The advantage of using this technology versus other conventional fillers is that defatted soy products give a higher reinforcement effect in rubbers at a comparative or lower cost.

The advantage is a cost saving by partial replacement of carbon black. The technology provides a high-performance and low-cost alternative to petroleum-based carbon black and other inorganic fillers. It also improves the biodegradability of cross-linked rubbers that are known to be difficult to recycle or dispose.

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

AFRL Solar Cells, from page 1

collectors of the sun's energy, single-crystal multijunction (MJ) solar cells maximize solar panel electrical output. These solar arrays provide nearly a 50% improvement in cell efficiency compared to the single-junction solar cells used on the earlier Mars Pathfinder mission. The UTJ cells employ a three-layered structure to more effectively capture and convert solar energy into electricity. Each junction cell converts a different portion of the solar spectrum into electricity, greatly improving energy conversion efficiency.

The MJ solar cells used for the MER program were UTJ solar cells with a 27.5% beginning-of-life efficiency. By directly replacing lower-efficiency cells, they permit increases in solar array power output without increasing solar panel size or number, thereby minimizing costs in programs such as NASA's Global Positioning System effort, wherein engineers accommodated the power needs of an additional payload by switching to high-efficiency cells.

By maintaining the power level of a legacy spacecraft design, these cells reduce both deployed array area and stowed volume, a critical reduction for programs required to downsize from a Titan IV launch vehicle to an evolved expendable launch vehicle, which has 33% less shroud volume.

NASA also used MJ solar cells successfully in other interplanetary missions: the Mars Global Surveyor, which monitored Martian weather patterns; the Beagle 2, which served as another Mars exploration spacecraft; and the Near Earth Asteroid Rendezvous spacecraft, which reached a distance from the sun marking the farthest travel of any solar array.

Hydrogen Breakthrough, from page 1

mass by the year 2015. The DOE has also established targets of 60% for the overall energy efficiency of storing hydrogen.

To put the storage density target numbers into context, note that compressed hydrogen gas at 200 atmospheres pressure is only 0.017 kg hydrogen per liter, and the pressure tank requires additional volume and mass. The greatest density of hydrogen that can ever be practically achieved is that of liquid hydrogen itself, only 0.07 kg per liter. Thus, compressed or liquefied hydrogen can never meet the DOE's 2015 target density.

Many researchers and industry partners believe that the key to reaching, and even exceeding, the DOE target hydrogen storage densities is to store not pure elemental hydrogen, but hydrogen that is physically or chemically bound to materials that can be made to release the hydrogen under well-defined conditions. One such means of storing hydrogen is by using metals that react with hydrogen at room temperature to form a hydride phase and release the hydrogen when heated.

Another such means of storing hydrogen is chemical hydrogen storage, whereby the chemically bound hydrogen is released not by heat alone, but by a more tangible chemical reaction or catalytic chemical process.

One of the best-known means of chemical hydrogen storage is called Hydrogen On Demand™ by its developer, Millennium Cell, and involves the catalyzed reaction between sodium borohydride and water to release hydrogen and form sodium borate.

Even though hydrogen-storing materials and hydrogen-releasing reactions have been known for some time, none presently meets both the DOE storage density and energy efficiency targets.

In 2003, the DOE issued the grand challenge storage call, asking for Centers of Excellence to develop new materials and processes that could meet all targets for storing hydrogen.

Three Centers of Excellence have been formed in response to this grand challenge.

Sandia National Laboratories (California) and its partner institutions are working to develop reversible metal hydride storage materials that use light elements to meet storage density targets.

The National Renewable Energy Laboratory (Colorado) and its partner institutions are working to develop high-capacity hydrogen-sorbing materials based on carbon.

LANL, in partnership with Pacific Northwest National Laboratory, seven universities and four companies, is working to develop chemical hydrogen storage materials.

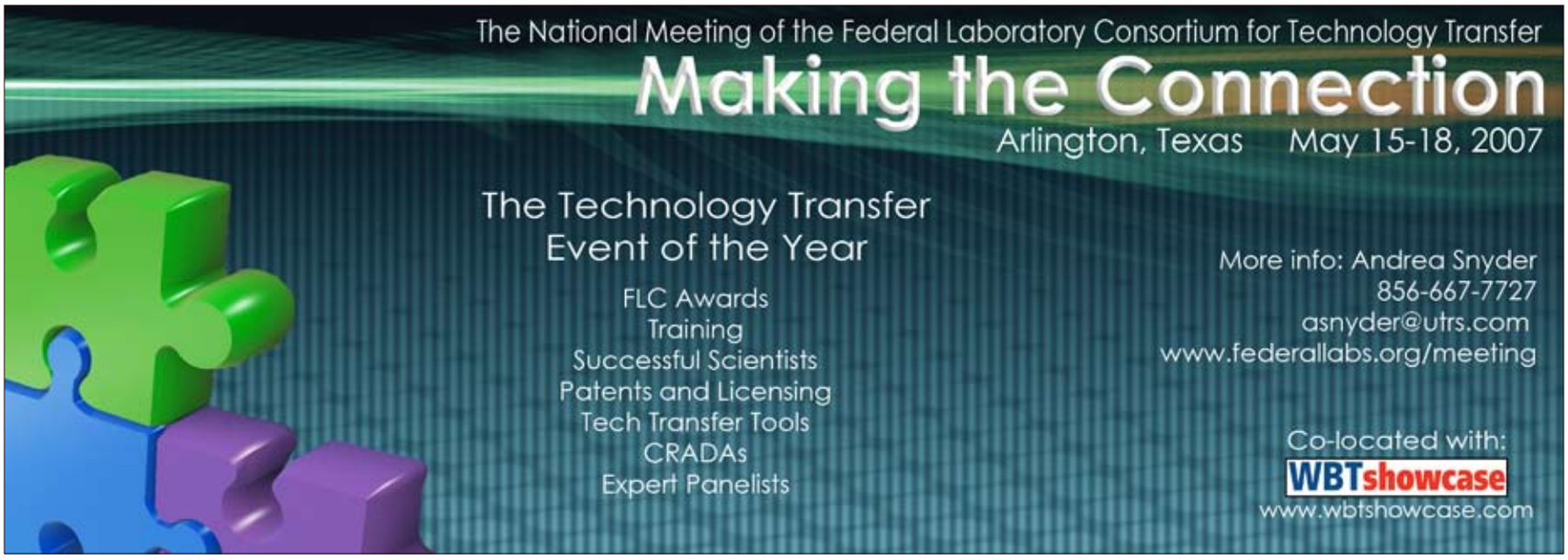
The Chemical Hydrogen Storage Center of Excellence, which started work in early 2005, is pursuing a multi-pronged research approach aimed at meeting DOE targets. Center partners are focusing on enabling the Hydrogen On Demand™ system by developing new routes for regenerating sodium borohydride from the product sodium borate.

Fundamental thermodynamic properties of sodium borohydride establish the maximum possible energy efficiency of storing hydrogen in this system as 70%, meeting the DOE efficiency target and considerably greater than the actual energy efficiency of the present manufacturing process.

The Center is currently addressing the hard question by carefully scrutinizing what is known about sodium borohydride chemistry: can we realistically expect to devise a new cost-effective manufacturing process that approaches 70% energy efficiency?

At the same time, the Center is pursuing a second tier of research aimed at developing the chemistry of other boron-hydrogen materials, materials that may provide an even greater density of stored hydrogen and more energy-efficient regeneration than sodium borohydride. It is also exploring how hydrogen can be stored using other reaction and material concepts, including novel organic compounds and reaction mixtures as well as nanostructured materials based on light elements.

At this stage the decisions for the Center have focused on what materials and concepts to pursue based on a combination of thermodynamic considerations and DOE target criteria.



DC on T², from page 1

continuing resolution (CR) funding the government, including the R&D components, for the remainder of FY 2007.

In this column I highlight select R&D implications of the FY 2007 CR (as identified by the appropriators) and provide an initial look at the FY 2008 R&D budget—and point to where more details on the budget can be found.

Under the FY 2007 CR, according to the House Appropriations Committee, "[M]ost programs are funded at FY 2006 levels…" The CR also cuts over 60 programs, strips earmarks and uses these savings to "address critical investment needs." Select science-related critical investments include: $28.9 billion to NIH (an increase of $619.5 million) to support various research initiatives; $50 million in new funding at NIST for physical science research; $4.7 billion to NSF (an increase of $335 million) to fund "innovation programs"; $3.8 billion (an increase of $200 million) to the DOE Office of Science for energy technology research; and $1.5 billion (an increase of $300 million) to DOE Energy Efficiency and Renewable Energy to accelerate research in these programs.

As the AAAS notes, the FY 2008 R&D budget continues some of the general themes from earlier budgets, with "large proposed increases for the three physical sciences agencies in the American Competitiveness Initiative (ACI), increases for weapons development and human spacecraft development, and declining funding for the rest of the federal research and development (R&D) portfolio." (The ACI agencies include NIST, DOE Office of Science and NSF.)

The total FY 2008 R&D budget would increase to $143 billion, an increase of 1.4 percent over FY 2007. Within this total, basic research is up $129 million (0.5 percent), applied research is down $1.2 billion (-4.4 percent), and development is up $2.4 billion (3 percent). Defense and non-defense will increase by $700 million (0.9 percent) and $1.3 billion (2.2 percent), respectively.

These and all figures associated with the FY 2008 R&D budget are based on a preliminary analysis compiled by the AAAS. (Note: At the time of that analysis, the joint CR for FY 2007 was not final, and all comparisons to FY 2007 are to the then-expected final numbers in the joint CR, some of which may have changed slightly before passage).

These preliminary figures suggest an overall increase in the R&D budgets for some agencies and a decrease for others (see figures to the right).

These figures tell only part of the story, of course. As noted in last year's "budget column," they reflect the net result of numerous programmatic changes within agencies.

Further, changes in agency R&D budgets do not necessarily reflect a changing commitment to the function associated with that agency.

For example, while DHS R&D funding is in decline for the second year in a row, funding for homeland security R&D activities in general is not.

The House Science and Technology Committee, which has jurisdiction over all civilian R&D programs, held its initial hearing on the R&D budget on February 14, with testimony from Dr. John Marburger, Director, Office of Science and Technology Policy. Chairman Bart Gordon (D-TN) set the tone for the current R&D budget debate by noting that while he appreciated Dr. Marburger's responses to committee questions, he was "still not convinced this budget proposal is informed or realistic." Some of Chairman Gordon's concerns include the proposed elimination of the Advanced Technology Program, reduction in funding for the Manufacturing Extension Program, and the placement of 70 percent of the math and science education budget within the Department of Education, while related funding is cut at NSF.

FY 2008 R&D Budget Increases	
DOE Science	15.8%
NIST	10.8%
NSF	8.3%
NASA	7.7%
DOD Weapons	5.5%
DOT	2.0%
DOE Defense	1.5%
Veterans Admin.	0.5%

FY2008 R&D Budget Decreases	
NIH	-1.1%
DHS	-1.5%
USGS	-3.4%
EPA	-3.5%
DOE Energy	-9.2%
NOAA	-9.5%
USDA	-10.8
DOD Sci &Tech	-20.3%

The FY 2008 budget process is just beginning, but with a new majority at the congressional helm for the first time in 12 years—who are sometimes at odds with the R&D priorities of the current administration—I think it's safe to say that the process, good or bad depending on your perspective, will at the very least be different from years past.

The next few months should prove very interesting.

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

Idaho Lab Promotes the Future of R&D by Making Students Engineers for a Day

An engineer from Micron Technology, uses a catapult to teach students how engineers solve problems using the scientific method during the Engineering Extravaganza at Boise State University.

by Marilyn L. Whitney

For the past seven years, Idaho National Laboratory (INL) has partnered with Northwest Nazarene University (NNU) and Boise State University (BSU) to offer hands-on, inquiry-based science workshops to Treasure Valley educators and students. This year, from Jan. 29-Feb. 2, close to 2,000 students and teachers had the chance to experience the world of engineering through interactive workshops and engaging seminars.

Students who attended the Engineering Extravaganza at BSU explored Newton's laws and rocket science with INL scientist Kevin Young. They learned how the basic rocket engine works, how gravity and velocity keep a satellite in orbit, and how satellites send information back to Earth. Students also rotated through sessions where they designed and built bridges and saw demonstrations by BSU engineering students on the function of hydro-turbines, how a wind tunnel tests aerodynamics, the properties and effects of liquid nitrogen, and the physics behind the Segway transport.

At NNU, students were introduced to Idaho amphibians and held salamander races to examine salamander locomotion. Participants saw demonstrations on pressure using a vacuum chamber, a marshmallow gun and a vortex cannon. They constructed their own ecospheres, explored the human brain, examined how air pollution forms, and learned how meteorologists analyze data to forecast weather.

These annual workshops give teachers an opportunity to help students make the connection between what they are learning in school and how it relates to real-world applications. In concert with these weeklong sessions, INL also partners with BSU and numerous business and civic groups to present Discover Engineering at Boise State University.

The free event, held this year Feb. 2-3, provided area families an opportunity to experience a day of hands-on engineering and science activities. Because of growing popularity, this year INL and its co-sponsors welcomed more than 2,000 participants to the event.

Entrepreneur Caleb Chung, inventor of Furby and the new interactive life-form Pleo, shared his creative process and how he turns dreams and ideas into reality. Participants built rockets with NASA education specialist Tony Leavitt. They learned the language of computers using jelly beans, learned how the police bomb squad uses robots, and explored the sources of electricity, among numerous other hands-on activities.

Holly MacLean, principal of the Treasure Valley Mathematics and Science Center, attended Discover Engineering at BSU and said, "I was so impressed with the quality of demonstrations and the ability of the presenters to bring it down to an understandable level for such diverse audiences. Every one of the people that we listened to turned out to be excellent."

The intent of these efforts is to raise the level of interest and understanding of the many aspects of engineering, and to encourage young people to consider careers and coursework in the science, math and engineering fields. It also provides the opportunity to highlight the multiple aspects of engineering in Idaho.

Sponsors for Discover Engineering included: Boise State University, Boise Independent School District, Boise Police Department, Crucial Technology, Discovery Center of Idaho, Idaho Department of Environmental Quality, Idaho Office of Science and Technology, Idaho Power, Micron Technology, NASA, United Water, University of Idaho and Washington Group International.

More information about the events is available at http://jasonidaho.boisestate.edu/.

Lab Classifieds | Available Technologies, Facilities, and Partners

Secure Networks

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

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

Biomarkers for CVD

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

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

ARS Aids Biodiesel Fuel

Agricultural Research Service (ARS) researchers have developed a time-saving method that could be used to produce biodiesel fuel. This method eliminates oil seed extraction, which is typically required to produce biodiesel. Companies often produce biodiesel through a process requiring hexane to extract oil from oil seeds. This method requires an extra step to produce fuel—adding to production costs. ARS's invention uses alcohol and alkali catalysts added directly to flaked oil seeds such as soy, coconut, corn, cotton, flax, rapeseed (canola), palm, safflower, or animal fats and oils to produce biodiesel. No prior oil purification or isolation is involved in ARS's method, potentially reducing production costs. Companies that conduct oil extraction for biodiesel production, or that conduct biodiesel production themselves will find this invention useful.

More info: www.ars.usda,gov

Clinical Manufacturing

Available for licensing from the National Institutes of Health is a method for large-scale production, recovery, and purification for plasmid DNA manufacturing meeting human clinical trial requirements. The overall recovery of this process is greater than 400 mg of formulated final product per kilogram (wet weight) of *E. coli* cell paste. This technology has potential uses in drug manufacturing and clinical studies. In the United States alone, more than 40,000 clinical trials were conducted.

More info: Dr. John Hewes, 301-496-0477

NASA Fiber Optics

NASA Goddard Space Flight Center (GSFC) invites companies to license new technologies that can improve the quality and reliability of fiber-optic assemblies. These technologies cover three areas:

- Chemical stripping of optical fibers: The stripping fixture holds a cable end for immersion in a chemical bath, allowing a precise length of fiber to be stripped, preparing it for assembly.
- Reduced bubbles in adhesives: The bubble remover holds and seals a liquid-adhesive-filled connector for use in a centrifuge. Spinning forces drive out problem-causing bubbles.
- Optical fiber connector polishing: This device controls connector polish geometry to promote consistent mechanical interfaces, performance and reliability.

NASA invites companies to consider licensing these manufacturing device technologies for fiber-optic assemblies.

More info: *fiber-optic-assemblies@gsfc.nasa.gov*.

Crush and Spray

Adam Wiese and co-workers from the U.S. Forest Service's Northern Research Station in Rhinelander, Wisc., have created a simple device that first crushes weeds to the ground and then sprays them with herbicide through high-pressure nozzles. This machine increases weed control by 15% compared to traditional weed control methods, even in overgrown fields. The "crush-and-spray" device promises to increase the efficiency of field preparation for controlling weeds when tree and shrub seedlings are planted. By crushing weeds with an adjustable, heavy roller and placing the spray nozzle close to the ground, the new applicator achieves precise weed control, thus improving growth.

The "crush-and-spray" machine can also be used for weed control in powerline rights-of-way, wildlife food plots, vineyards, crop rows, tree farms, seed orchards, and invasive plant removal projects.

More info: Deb Dietzman, 651-649-5031

Home Heating

James Lutz of Lawrence Berkeley National Laboratory (LBNL) has invented a gas water heater that is up to 30 percent more efficient than conventional gas water heaters.

The design replaces traditional central tube heating with a side-arm heat exchanger, thereby eliminating standby energy losses that occur when heat is transferred from the hot water to the cooler central dip tube when not actively being heated.

Applications include residential gas water heating.

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

Identifying Viruses, Life Forms

The Naval Health Research Center (NHRC) San Diego is one of the first diagnostic labs to utilize the TIGER (triangulation identification for genetic evaluation of risks) system.

TIGER (recently renamed the T-5000), developed by IBIS Biosciences, is designed as a universal diagnostic device, theoretically capable of identifying all life forms and viruses using DNA/RNA sequence information.

NHRC is using this device to identify pathogenic bacteria and viruses found in throat swab samples from military personnel with symptoms of upper respiratory disease.

NHRC has a collaborative research agreement with IBIS to study the uses of TIGER relevant to avian influenza identification and coronavirus detection, using the TIGER machine currently in service in the NHRC Respiratory Disease Advanced Diagnostics facility.

More info: Dr. Van Orden, 619-553-9289

FLC T² Desk Reference

The FLC Technology Transfer Desk Reference presents a comprehensive introduction to technology transfer and technology transfer initiatives and mechanisms, as well as to the Federal Laboratory Consortium for Technology Transfer (FLC).

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