FLC NewsLink
February 2008

T2 INSIDE

T2 EVENTS

Global Venture Challenge
Oak Ridge, Tenn.
April 2-4, 2008

•

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

•

Aberdeen Proving Ground Industry and Technology Event Focused on C4ISR
Aberdeen, Md.
June 18-19, 2008

•

AUTM Central Region Meeting
Cleveland, Ohio
July 14-16, 2008

•

LES Annual Meeting 2008
Orlando, Fla.
October 19-23, 2008

T2 FACT

In 1893, Charles Proteus Steinmetz joined the newly organized General Electric Company in Schenectady, New York. Steinmetz's first important research was on the phenomenon of hysteresis, by which power is lost because of magnetic resistance. This research led him directly to a study of alternating current. Without this research, the expansion of the electric power industry in the U.S. in the early 20th century would have been impossible, or at least greatly delayed.

- Mary Bellis, About.com

Thirteen organizations have purchased commercial-use licenses for the LandScan technology, including The New York Times, National Geographic, and international mobile telephone companies,

ORNL Develops High-Res Population Model of World

by Larisa Brass

That 6.6 billion people occupy this planet is a well-known and much-cited statistic. It is much more difficult, albeit crucial to a number of the world's agencies and organizations, to identify where those people are. LandScan, a tool developed at Oak Ridge National Laboratory (ORNL), keeps tabs on Earth's population distribution—information that is used by disaster relief organizations, government agencies, businesses and media.

LandScan is a high-resolution population distribution model for the world. At 1-square-kilometer resolution, LandScan provides the most accurate global population data available, with 25 times higher resolution than the previous standard for a global population database. The system has become the community standard for estimating population at risk and is useful for coordinating disaster response, humanitarian relief, sustainable development and environmental protection.

A novel technology transfer process has been used to commercialize the LandScan Global Population Dataset. In a two-pronged approach, licenses are issued on both a cost and a no-cost basis. Commercial users enter into a one-year license on a fee basis to use the Dataset for commercial applications, while U.S. federal government users, United Nations humanitarian agencies, and educational institution users obtain a no-cost, one-year license.

More than 230 organizations from the U.S. and around the world have received licenses for the 2005 version of LandScan. The U.S. government's need for the technology encompasses a great range of uses, including

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Deemed Exports Committee Issues Report

by Gary Jones
FLC Washington, DC Representative

Greetings from DC. A year ago I highlighted several federal advisory committees then recently established by the Department of Commerce to study and report on issues important to our community. On December 20, 2007, one of those committees, the Deemed Export Advisory Committee (DEAC), issued its final report to Commerce Secretary Gutierrez.

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Evolving Fiber Optics Thru NanoTech

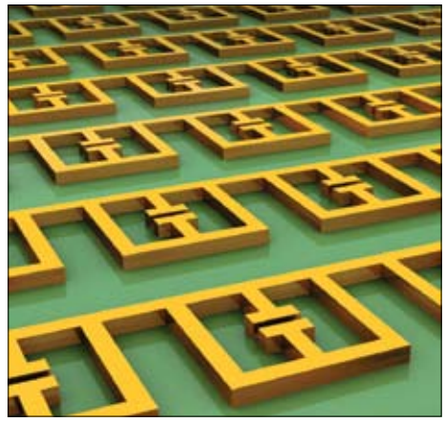

Illustration of the electronically switchable terahertz metamaterial device

Fiber optics revolutionized data transmission, yielding numerous advantages in telephone and cable television as well as cellular phones, thus replacing basic copper wire. Metamaterials, developed at Los Alamos National Laboratory (LANL), which may be the next step in the evolution of data transmission, are poised to greatly enhance the capabilities of fiber optics.

LANL scientists John O'Hara and Toni Taylor, post-doctoral researchers Hou-Tong Chen and Abul Azad, and collaborators Willie Padilla (Boston College) and Richard Averitt (Boston University) have been working together for almost two years to create new

Evolving Fiber Optics, page 4

Fed Labs Flash | Technology Transfer Notes

NASA's Pilots Recognized for Artwork

NASA research pilot and aerospace artist/photographer Mark Pestana has been recognized by *Aviation Week and Space Technology* magazine for his award-winning painting, "The Quest for Mach 10," which was published in the magazine's annual photography/art issue in late December. The painting depicts the NASA X-43 aircraft, chased by an F/A-18, after launch on its record-setting hypersonic flight to Mach 9.8 in November 2004. It took first place in the space category of the magazine's annual aviation art competition selected from paintings displayed at the American Society of Aviation Artists juried exhibit.

The special issue also features Pestana's photograph of a hot air balloon, one of the participants in the July 4 celebration in Bear Valley Springs, hovering over Cub Lake in the Tehachapi Mountains of Calif. Pestana's artwork and photography have appeared as honorable mentions in previous *Aviation Week and Space Technology* photography/art issues.

Several of his paintings are part of the Air Force art collection at the Pentagon, and he has also designed nine space shuttle mission patches.

A retired Air Force colonel, Pestana has been a research pilot and project manager at NASA's Dryden Flight Research Center at Edwards Air Force Base, Calif., for the past nine years.

AFCEE Workshop

Space is filling up fast at the 2008 Air Force Center for Engineering and the Environment (AFCEE) Technology Transfer Workshop, March 25-28, 2008, at the Hyatt Regency in in San Antonio, Texas.

The theme of the workshop is "Focus on the Goal – RIP by 2012" and it brings together professionals from military services; industry; academia; and local, state, and federal agencies to translate ideas, success stories, case histories, current trends, and technologies into solutions for environmental restoration.

Over 100 technical presentations by hand-selected, leading experts in the field will be offered. In addition to the educational value and the networking opportunities, workshop attendance will provide an opportunity to earn professional development hours. Make plans now to be in historic San Antonio to experience firsthand the event that will prove invaluable to environmental restoration programs.

To register, visit the workshop website, www.afcee.brooks.af.mil/products/techtrans/workshop/default.asp. There is no registration fee for state or federal employees; industry registration is $350. As the workshop is limited by facility constraints, industry workshop registrants are restricted to current AFCEE contractors, including their AFCEE teaming partners.

Sandia Wins Enviro Award

By Mike Janes, Sandia Media Relations

Sandia National Laboratories' Livermore, Calif., site has been selected by the Livermore Chamber of Commerce as recipient of its inaugural Environmental Spirit Award.

The award was presented to Sandia for its environmental programs and ongoing commitment to protecting the environment, wildlife, and numerous species on the laboratory's 400-acre site, said Dale Kaye, Chamber president and CEO.

"Sandia has not only shown tremendous sensitivity to the land they occupy, but also a dedicated commitment to its community," said Kaye. "This is an organization that helps to protect our world and we are delighted to be able to present them with this award."

Correction

The December 2007 cover story concerning Ames Laboratory incorrectly captioned the cover picture. The correct caption is *"Mark Gordon of Ames Laboratory is developing a chemistry code that could change the way we make rocket fuels, optical materials, and coatings."*

NREL Commercialization Project Accelerates PV Tech

Crystalline silicon cells continue to dominate the market for photovoltaic (PV) modules and systems. To support the commercialization of these PV devices, National Renewable Energy Laboratory (NREL) researchers continue to reduce their manufacturing costs and increase their efficiency, but also work to develop thin-film PV cell technology from both silicon and alternative materials.

A recent collaborative research effort between NREL and Ampulse, a venture-backed company with funding from Battelle Ventures and its affiliate, Innovation Valley Partners, will take silicon technology one step further with a new innovative approach.

"The partnership with Ampulse aims to make inexpensive silicon PV film with the efficiency of today's crystalline silicon cells," said NREL researcher Howard Branz. "It also will help Ampulse, which focuses on film PV on flexible substrates, to enter the marketplace with commercially viable products."

"We are confident that the NREL team has the combined talent, skill and experience to create potentially breakthrough products with market-leading efficiencies and advantageous economics," said Glenn Kline, Innovation Valley Partners general partner and Ampulse acting CEO.

The NREL and Ampulse partnership is evolving through a $500,000 Cooperative Research and Development Agreement (CRADA). The CRADA received support from the Department of Energy's Technology Commercialization Development Fund (TCDF) Program, which has provided NREL with $4 million to establish such commercialization efforts.

"Without TCDF Program support, this commercialization opportunity would not have happened," said Tom Williams, NREL Technology Transfer Office Director. "In addition to the program funding, the flexibility and speed possible under the TCDF were essential to moving the collaboration forward with all the key stakeholders."

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Tech Watch | Laboratory Techs Ready for Transfer

LBNL's Thermal Rectifier

Alex Zettl, Arun Majumdar and colleagues at Lawrence Berkeley National Laboratory (LBNL) have invented the first solid-state thermal rectifier.

The device consists of a boron nitride nanotube (BNNT) loaded at one end with high mass density materials, specifically, trimethyl cyclopentadienyl platinum (C9H16Pt). The researchers achieved thermal rectifications as high as 7 percent at room temperature. Mass-loaded carbon nanotubes (CNTs) were found to display thermal rectification of 2 percent.

The LBNL nanoscale solid-state device is to thermal systems what the diode is to electronics. Controlling the direction of heat flow could lead to radical improvements in thermal management across a range of products.

For example, the LBNL thermal diode might prevent overheating in microelectronic devices, currently a barrier to significant size reductions.

The new thermal diode could also result in computing systems that use photons instead of, or in addition to, electrons for manipulating and transporting information bits.

Applications include thermal management for microelectronic devices, solar cells and solar energy management systems, refrigerators, hybrid biological/inorganic systems, and nanoscale calorimeters.

More info: TTD@lbl.gov

Licensing Opp for Treatment of Cardiovascular Disease

The Department of Health and Human Services (HHS) seeks a Cooperative Research and Development Agreement (CRADA) and/or license(s) with a pharmaceutical or biotechnology company to develop and commercialize amphipathic helical peptides potentially useful for the treatment and prevention of cardiovascular disease. The CRADA would have an expected duration of one to five years. The goals of the CRADA include the rapid publication of research results and timely commercialization of products, methods of treatment or prevention that may result from the research. The CRADA collaborator will have an option to negotiate the terms of an exclusive or nonexclusive commercialization license to subject inventions arising under the CRADA defined by the CRADA research plan.

More info: Dr. Denise Crooks, crooksd@nhlbi.nih.gov

FAA's Electronic Flight Data Interfaces

Dr. Todd Truitt, an engineering research psychologist with the Federal Aviation Administration's (FAA) William J. Hughes Technical Center in Atlantic City, N.J., and member of the Human Factors and Ergonomics Society, has created "Concept Development and Design Description of Electronic Flight Data Interfaces for Airport Traffic Control Towers."

Dramatic projected increases in air traffic and focused modernization efforts have led the FAA to consider replacing paper flight progress strips with an electronic alternative. Electronic flight data (EFD) interfaces can potentially increase a controller's ability to acquire, track and record information, as well as communicate and coordinate that information with others. More importantly, EFD can improve controller efficiency by providing new methods of flight data management that integrate information into a single source, enhancing safety.

The first prototype interface, the Integrated EFDI, combines textual EFD with an airport surface situation display provided by Airport Surface Detection Equipment - Model X (ASDE-X) radar. The second prototype interface, the Perceptual-Spatial (P-S) EFDI, combines textual EFD with an airport surface map, without using

ASDE-X radar. This interface also functions as a backup flight data management system to the Integrated EFDI if ASDE-X capabilities were to fail.

"We were excited to demonstrate the effectiveness of electronic flight data interfaces to such an influential target audience," said Deborah Germak, the FAA's Technology Transfer Program Manager. "This new design and technology has the potential to enhance the performance of air traffic controllers and the National Airspace System, overall."

More info: Deborah Germak, deborah.germak@faa.gov

FLC Technology Locator

Personalized 1:1 Assistance!

Need assistance locating information on federal technologies, federal laboratory expertise, or collaboration possibilities?

Contact the FLC Technology Locator, Frank Koos, at 856-667-7727

2008 FLC Calendar

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Population Model, from page 1

emergency planning and response border security, risk management associated with space vehicles, and chemical and biological exposure scenario development.

One hundred fifty educational institutions from around the world have requested and received no-cost licenses for LandScan. University licensees use the data during the development of educational research, such as forestry management, epidemiological responses, crime management, natural resource management, global sustainability, and land use/urban sprawl detection.

U.N. organizations use the Dataset for response activities associated with natural and man-made disasters. In these efforts, LandScan aids in decision-making regarding the type and amount of foodstuffs and the number of tents, beds, and emergency medical personnel required to respond to any disaster or emergency in the world.

Thirteen organizations have purchased commercial-use licenses. These include major news agencies and magazine publishers such as *The New York Times* and *National Geographic*, international mobile telephone companies, space technology organizations, and traditional geospatial data companies. These organizations utilize the Dataset in many ways, including development of applications in national and homeland security, emergency planning and management, consequence analysis, epidemiology, exposure analysis, and tracking of urban sprawl.

The LandScan team of developers is composed of Budhendra Bhaduri, Edward Bright, Phillip Coleman, Amy King and Eddie Tinnel. LandScan won both FLC and R&D 100 awards.

Evolving Fiber Optics, from page 1

devices capable of filtering, switching and modulating terahertz wavelength energy using metamaterials.

Metamaterials is probably one of the most popular new areas of nanotechnology research. Invisibility cloaks, lightweight lenses, stealthy antennas, and faster computers are just a few of the anticipated future applications for metamaterials.

Metamaterials are basically mimics of nature's atoms—but on a much larger scale. LANL scientists create metamaterials by depositing patterns of tiny metal rings on the surface of semiconductor wafers. Like atoms, the rings act like tiny oscillators temporarily storing and then re-emitting energy.

The size and shape of the rings determine exactly how the metamaterial will interact with the terahertz wave.

Currently, LANL is one of only a handful of research institutions developing metamaterials for terahertz wavelengths. While the LANL metamaterials concepts can be scaled to other wavelengths, such as microwaves, O'Hara says that by making metamaterials capable of interacting with terahertz waves, a long-standing technology gap may be filled, opening the door to a new class of faster electronics, high-speed communication links and novel imaging techniques.

Because the metamaterials developed at LANL are still in a discovery stage, scientists believe the technology will have endless capabilities and applications in industry and science.

President's Budget Requests 22 Percent Boost for NIST Core Programs

President George W. Bush's fiscal year (FY) 2009 budget proposal for the National Institute of Standards and Technology (NIST) includes $634 million for core research and facilities programs, a 22 percent increase (excluding congressionally directed grants) over the FY 2008 appropriations for these programs.

"This budget continues the Administration's commitment to work toward a doubling of NIST's core budget by 2016 as called for in the President's American Competitiveness Initiative (ACI) and authorized through 2010 by the America COMPETES Act," said James M. Turner, acting director of NIST.

The total request of $638 million for NIST is divided into three appropriations:

• Scientific and Technical Research and Services (STRS), $535 million—This category includes $526.5 million for NIST laboratory research and $8.5 million for the Baldrige National Quality Program.

• Construction of Research Facilities (CRF), $99 million.

• Industrial Technology Services (ITS), $4 million.

The proposed NIST research budget would add four new R&D initiatives: Nanotechnology: Environment, Health and Safety Measurements & Standards (+$12 million); Measurements and Standards to Accelerate Innovation in the Biosciences (+$10 million); Comprehensive National Cyber Security Initiative: Leap-Ahead Security Technologies (+$5 million), and Going at Light Speed: Optical Communications and Computing (+$5.8 million).

In addition, the request includes an additional $2 million for the ongoing expansion of the NIST Center for Neutron Research, plus $36.3 million for another nine initiatives previously described in the FY 2008 budget, including the National Earthquake Hazards Reduction Program, and research programs on quantum information science, nanotechnology, measurements and standards for climate change science, innovations in measurement science, disaster-resilient structures, hydrogen fuel, biometrics and manufacturing supply chain integration.

The research facilities budget includes construction initiatives that would fund a limited expansion of JILA, a joint institute of the University of Colorado and NIST, adding 4,610 square meters (49,600 square feet) of new office and laboratory space (+$13 million), and completing laboratory renovations at NIST's Boulder, Colo., campus (+$43.5 million).

A new NIST initiative is intended to develop tools for measuring the health, safety, and environmental impacts of nanomaterials. Shown here is a carbon nanotube on the hair of an ant's leg.

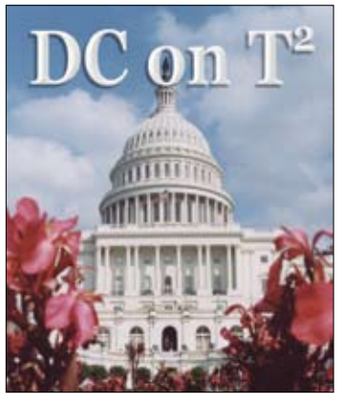
For full details of the NIST FY 2009 budget request, see <www.nist.gov/public_affairs/releases/budget_2009.htm>.

Exports Committee, from page 1

The report's conclusions regarding the efficacy of the current deemed export regime are unambiguous, stating that it "no longer effectively serves its intended purpose and should be replaced with an approach that better reflects the realities of today's national security needs and global economy." The current regime has been made obsolete, it noted, by a combination of significant developments in S&T, freely flowing information exchange, human resource mobility, evolving national economies, and the changing character of threats to America's security. The report proposes a fundamentally new approach to controlling deemed exports.

As the report describes, a deemed export is essentially the release of technology or source code having both military and civilian applications to foreign nationals within the United States. The control of deemed exports has clear commercial and security implications. In practical terms, U.S. industry that has foreign nationals working in a lab environment may be constrained from allowing that individual access to information in the normal course of business if that information has military applications. The same issue may arise when foreign nationals participate as students in university research. In both cases, export licenses may be required.

The challenge in deemed export policy is trying to balance the recognition that foreign nationals make profound contributions to U.S competitiveness and national security, particularly in the area of S&T, with the reality that there are bad people in the world who would like to harm us, using advanced technology developed in the United States if possible. The dilemma in establishing deemed export policy, clearly identified in the report, is that any rules that are "too permissive may allow scientific and engineering knowledge possessed by the United States to be accessed by foreign nationals intent on harming the United States, whereas rules that are too restrictive may deny the United States ready access to the world's scientific and engineering community and the expanding base of knowledge it possesses." The report does concede that no matter how that balance is struck, there will always be inherent risks that some damage may occur to either our competitive or security interests.



They suggest that the "wall" built around U.S. scientific and technological communities via the current policy is too encompassing; essentially protecting not only highly sensitive information but other less sensitive information while also denying necessary access to vast talent and knowledge developed elsewhere. They argue convincingly that erecting these walls is not only impractical but counterproductive and, in many cases, irrelevant. Their recommendations for a new approach and requirements for implementation are spelled out in the report, but in general, the overarching theme is to build and maintain "high walls" around "small fields" of knowledge rather than "nominal walls" around "larger fields."

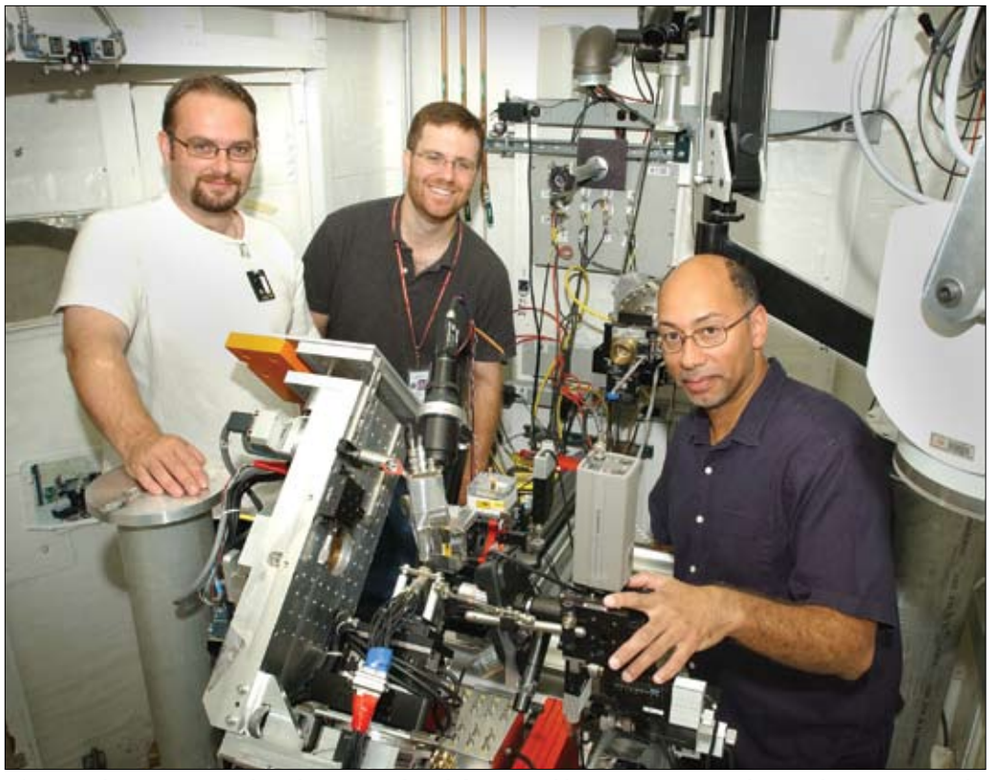
Among the findings were some interesting statistics highlighting, among other things, the level of (un)awareness among industry and academia on this issue. About 900 deemed export license requests are submitted in the United States each year, with less than 1 percent actually rejected (some are returned for other reasons). Fifty-four percent of recently processed applications were submitted by only three U.S. companies (giving the wrong impression that only three U.S. firms are conducting sensitive S&T work and employing foreign nationals). These findings are cited as further proof that an important component of any new policy needs to be enhanced efforts at educating those potentially affected by the policy.

This report is only one step in developing a new deemed export policy regime. The next step is for the Department of Commerce's Bureau of Industry and Statistics, which has jurisdiction over global dual-use policy, to review and act appropriately on the report's recommendations.

The final report, "Deemed Export Rule in an Era of Globalziation," can be found at <http://tac.bis.doc.gov/2007/deacreport.pdf>. Background information on the DEAC can be found at <http://tac.bis.doc.gov/deacchart.htm>.

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

Breaking the Barrier Toward Nanometer X-ray Resolution



The research team at NSLS beamline X13B, from left: James Ablett, Aaron Stein, and Kenneth Evans-Lutterodt

A team of researchers at the Department of Energy's Brookhaven National Laboratory (BNL) have overcome a major obstacle for using refractive lenses to focus x-rays. This method will allow the efficient focusing of x-rays down to extremely small spots and is an important breakthrough in the development of a new, world-leading light source facility that promises advances in nanoscience, energy, biology, and materials research.

At BNL's Synchrotron Light Source (NSLS), the scientists exceeded a limit on the ability to focus "hard," or high-energy, x-rays known as the "critical angle." Their results are described online in the September 28, 2007, edition of *Physical Review Letters*.

The critical angle is the maximum angle that light can be deflected, or bent, by a single surface. Imagine a beam of laser light traveling toward a glass lens. Depending on the characteristics of the lens material and the angle at which the beam is pointed, the light can be refracted, that is, transmitted, through the lens but deflected. However, when this light approaches the lens at angles less than the critical angle, the beam does not pass through the lens but is instead reflected. This results in a maximum deflection angle for light that passes through the lens.

The maximum deflection angle determines the minimum spot size to which x-rays can be focused. This poses a problem for researchers who are using x-rays to study molecules, atoms, and advanced materials at the nanoscale—on the order of billionths of a meter. Such small subjects require tightly focused beams.

"One measure of the quality of an x-ray optic is how small a focused spot it can make," said NSLS researcher Ken Evans-Lutterodt. "The problem is that nature does not allow a single lens to deflect the x-rays very much. This limits how small of a spot you can create, and this translates to some fuzziness in the image. To get a sharper image, you need a lens that's more able to deflect the x-rays."

In 2003, a trio of BNL researchers—Evans-Lutterodt, Aaron Stein, and James Ablett—were the first to notice the critical angle limit while investigating the properties of a so-called kinoform lens for focusing hard x-rays. This efficient type of refractive lens is similar to those found in lighthouses. The research team proposed a solution to the critical angle problem of a compound kinoform lens, and both the problem and proposed solution were also suggested later by other researchers in the field.

In the current publication, the researchers implemented their idea by creating a compound lens from a series of four kinoform lenses placed one after the other. Using this setup at NSLS beamline X13B, they showed that the critical angle can be surpassed with hard x-rays, while still focusing like a single lens.

"Thanks to the excellent fabrication resources at Brookhaven's Center for Functional Nanomaterials and at Alcatel-Lucent, we are able to fabricate the lenses to the precision required," Stein said.

This is an important step for the National Synchrotron Light Source II (NSLS-II), a state-of-the-art synchrotron facility that will produce x-rays up to 10,000 times brighter than those generated by the current NSLS and could lead to advances such as alternative-energy technologies and new drugs for fighting disease. One of the major goals of the facility is to probe materials and molecules with just one-nanometer resolution—a capability needed to study the intricate mechanisms of chemical and biological systems.

"Without exceeding the critical angle, the refractive lens resolution would be limited to 24 nanometers or more," Ablett said. "Even though in this experiment we just barely exceeded this limit, we've shown that it can be done. This is just the first step."

Next, the researchers will measure the resolution their new lens system produces, and will continue to fabricate and test optics that push further beyond the critical angle and closer to the one-nanometer benchmark.

"We've broken the barrier, now there's still more work to be done to get down to those small x-ray spots," Evans-Lutterodt said. "Hopefully this will be one of the routes that NSLS-II and others will use."

Natasha Bozovic, from San Jose State University, also collaborated on this research. Funding was provided by the Office of Basic Energy Sciences within the Department of Energy's Office of Science.

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

Heat-Resistant Fabric

Agricultural Research Service scientists Jeanette Cardamone and Anand Kanchager have discovered a new heat-resistant material that can be applied to wool and other fabrics to prevent them from burning. This material is applied within the fabric structure. Current fabrics that come in contact with fire or extreme heat can cause physical injuries. Underwear currently worn by U.S. soldiers can burn with a perpetuating flame and form a hard bead that drips into an open wound, causing physical trauma. ARS's technology uses a polymer applied with additives that are nonhazardous. It can provide safety and protection from high-temperature ignition in fire-hazard situations. Applications of technology can be made from a water solution in textile mills during the wet finishing process that occurs after dyeing, and before or after finishing with existing mill equipment.

More info: www.ars.usda.gov/research/patents/

Fluid Control

Idaho National Laboratory (INL) researchers have developed a system, apparatus and method of controlling the flow of a fluid. In accordance with one embodiment of the present invention, a flow-control device includes a valve having a flow path defined through, and a valve seat in communication with, the flow path with a valve stem disposed in the valve seat. A gear member is coupled with the rotary stem and a linear positioning member includes a portion that complementarily engages the gear member.

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

NCI's Tumor Suppressor

Snorri Thorgeisson of the National Cancer Institute led a team of researchers in the development of BOG (B5t Over-Expressed Gene) with the gene product pRb of the well-known tumor suppressor gene RB, retinoblastoma susceptibility gene.

The complex formed between Rb and BOG typically does not contain E2F-1 in vivo. This binding property suggests that cells that are transformed/transfected with cDNA or other functional nucleotide sequences that encode the BOG gene product will be useful as tools for studying cell cycle control and oncogenesis.

Applications include a method to diagnose and treat liver cancer; a method to study cell cycle control and oncogenesis; and liver cancer therapeutics.

More info: Dr. John Hewes, 301-496-0477, hewesj@mail.nih.gov

Combating HIV

Christopher Michejda, Marshall Morningstar, and Thomas Roth of the National Cancer Institute have developed a novel class of NNRTIs effective in the inhibition of HIV-RT wild type, as well as against variant HIV strains resistant to many non-nucleoside inhibitors. These NNRTIs are highly specific for HIV-1 RT and do not inhibit normal cellular polymerases, resulting in lower cytotoxicity and fewer side effects than the nucleoside analogues, such as AZT. This novel class of compounds could significantly improve the treatment of HIV by increasing compliance with therapy.

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

LANL's Particle Detection

Los Alamos National Laboratory researchers have developed a particle detection system comprised of drift cells, which can track incoming and outgoing charged particles as they pass through a target placed within the scanner. Applications include detection of shielded and unshielded special nuclear materials, as well as detection and identification of other high-density materials that may represent threat objects.

More info: Erica Sullivan, 505-667-9219, eab@lanl.gov

Fighting Obesity

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

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

Thwarting Terrorism, Pollution

A new award-winning innovation developed at the Department of Energy's Argonne National Laboratory (ANL) can covertly detect chemical plumes at great distances and may help thwart future chemical- or nuclear-based terrorist attacks.

The technology has a number of other uses as well, from detecting environmental pollution to determining the extent of tissue damage in burn victims without physical contact.

Passive millimeter-wave spectroscopy (PmmWS) was pioneered by Sami Gopalsami, Sasan Bakhtiari, Paul Raptis and Thomas Elmer, all of ANL's Nuclear Engineering Division. The technology has the capacity to identify chemical plumes at ranges of up to a few kilometers and at concentrations as low as 100-1000 ppm.

The ANL team designed PmmWS primarily to monitor chemical signatures emitted by processing facilities suspected of unauthorized nuclear activity.

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

Better Batteries

Marca Doeff, Robert Kostecki, and colleagues at Lawrence Berkeley National Laboratory (LBNL) have developed improved carbon coatings for $LiFePO_4$ materials used in lithium ion batteries. The researchers have produced very thin carbon coatings (<10 nm) on non-conductive $LiFePO_4$ particles, increasing the electronic conductivity of the composite as much as six orders of magnitude compared to the native material. Applications include carbon coatings for electrode materials for applications such as power tools and hybrid vehicles.

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

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