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## T<sup>2</sup> EVENTS

Partners in Environmental  
Technology Technical  
Symposium & Workshop  
Washington, D.C.  
December 4-6, 2007

IPv6 Transition: Stretch Run to  
Success & Beyond  
Bethesda, Md.  
December 12, 2007

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

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

WBT 2008  
Arlington, Texas  
March 26-27, 2008

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

## T<sup>2</sup> FACT

Crayola brand crayons were the first kids' crayons ever made, invented by cousins Edwin Binney and C. Harold Smith. The brand's first box of eight Crayola crayons made its debut in 1903. The word Crayola was created by Alice Stead Binney (wife of Edwin Binney), who took the French words for chalk (craie) and oily (oleaginous) and combined them.

- Mary Bellis, About.com

# FLC NEWSLINK

October/November 2007

## USPTO HIRING PRACTICES INSUFFICIENT TO REDUCE PATENT BACKLOG

by Gary Jones, FLC Washington, DC Representative



Greetings from DC. In the first week of October, the General Accountability Office (GAO) released a report focused specifically on the ability of U.S. Patent and Trademark Office (USPTO) hiring practices to reduce the existing

backlog of patent applications—a backlog that has increased by over 70 percent since 2002 to now number about 730,000 applications.

The conclusions are not encouraging for those with patent applications currently under review. The title of the report, "Hiring Efforts Are Not Sufficient to Reduce the Patent Application Backlog," effectively highlights the findings. As everyone in the S&T community is

*USPTO Hiring Practices, page 5*



*Duncan Earl, Oak Ridge National Laboratory researcher and founder of Sunlight Direct in Knoxville, Tenn., which is commercializing the hybrid solar lighting technology.*

## BUSINESS BEAMS OVER HYBRID SOLAR LIGHTING

by Oak Ridge National Laboratory Communications Staff

Step into the furniture showroom of Braden's in Knoxville, Tenn., Wal-Mart in McKinney, Texas, or an office cubicle at Minneapolis-based Aveda Corp. headquarters and the light beaming through the fixture above comes not from electrons but the sun.

Hybrid Solar lighting, a

technology developed at Oak Ridge National Laboratory (ORNL) and licensed to Sunlight Direct, based in Oak Ridge, Tenn., captures the sun's rays to illuminate the interior spaces of buildings by means of a tandem lighting fixture that is both solar and elec-

tric. The system uses a 48-inch-diameter lightweight, roof-mounted collector to concentrate visible sunlight into a bundle of plastic optical fibers.

The fibers are routed to multiple "hybrid" fixtures within the building,

*Solar Lighting, page 4*

## DHS TRANSPORTATION LAB MAKES FLYING SAFER

by Paul Jankowski, Department of Homeland Security



*Telair HULD during blast test of aircraft section*



*Non-blast resistant container for comparison*

Following the explosion of Pan American Flight 103 over Lockerbie, Scotland, in December 1988, the Federal Aviation

Administration (FAA) initiated the Commercial Aircraft Hardening Program (CAHP). Its immediate goal was to develop

such as explosion-resistant aircraft baggage/cargo containers (also known as HULDs).

*Safer Flying, page 6*

# FED LABS FLASH | TECHNOLOGY TRANSFER NOTES

## SANDIA, R&D AWARDS

Sandia National Laboratories received five 2007 R&D 100 Awards for excellence in innovation.

- ArcSafe© with Pulse Arrested Spark Discharge, a patented electrical wiring diagnostic effective in detecting and locating wiring insulation defects in commercial aircraft.

- Mode-Filtered Fiber Amplifier, a breakthrough technology that enables fabrication of practical, high-power, high-beam-quality laser sources that are compact, rugged, and extremely efficient.

- Novint Falcon and Novint/Sandia 3D-Touch Software, the first controller that makes high-fidelity interactive three-dimensional touch possible and practical for consumer computing applications.

- Self-Assembling Process for Fabricating Tailored Thin Films, a simple, economical nanotechnology coating process that enables development of nanoparticle thin films with architectures and properties unattainable by any other processing method.

- ElectroNeedle™ Biomedical Sensor Array, a device that, when pressed against the skin, can make rapid, multiplexed diagnostic measurements in a point-of-care setting.

## FAB LABS MAKE MANUFACTURING PERSONAL

by Jared Sagoff



*This chair, built by students at the Barcelona Fab Lab, was created from a single 4-by-8 foot piece of plywood manipulated using the Fab Lab technology.*

To build a treehouse, you'll need a hammer, some nails, and a tolerance for splinters. To print treehouses, however, you'll probably need a Fab Lab. Argonne National Laboratory (ANL),

in conjunction with the University of Chicago, recently helped to launch a Fab Lab at Chicago's Museum of Science and Industry, and others may soon arrive both onsite and at several locations in greater Chicagoland.

Conceived by Professor Neil Gershenfeld, director of MIT's Center for Bits and Atoms (CBA) in 2002, Fab Labs—short for fabrication laboratories—support the burgeoning field of “personal manufacturing” by providing nontechnical laity as well as engineers with access to the tools and knowledge necessary to create products that satisfy their individual needs.

Each Fab Lab uses open-source software programs developed at and provided by the CBA to run a group of off-the-shelf tools: laser cutters, miniature milling machines that print circuit boards, jigsaws with a precision of a millionth of a meter and a few others.

Instead of cranking an Allen wrench or turning a screwdriver, newly minted inventors need only write a bit of computer code and press a couple of buttons to create their devices. Other users can

then take the code used to create these products to make perfect replicas, or they can tweak the instructions and create an original design. Although the Fab Labs currently in operation use common tools and software, the devices they have produced vary widely from lab to lab. In rural northern Norway, a shepherd started a Fab Lab to build wireless tags so he could keep track of his sheep as they grazed; eventually he converted his lab to supply wireless technology for his town. Likewise, at an old Hindu hermitage outside of Pune, India, students have built everything from temporary bamboo shelters to gears for photocopiers using Fab Lab technology.

“If you look at Fab Labs around the world, the products that they have made represent individual or community needs and not the needs of the originators of the Fab Labs,” said Harold Myron, director of ANL's Division of Educational Programs.

Although no definite arrangements have been made, Myron hopes to bring a Fab Lab to the ANL Information Center within the next several months.

## OFFICE OF TECHNOLOGY TRANSFER ANNOUNCES DEVELOPMENT AWARDS

The Office of Technology Transfer and Commercialization (OTTC) at California State University, San Bernardino (CSUSB) today announced over \$151,000 in product development funding has been awarded to three small companies currently developing technologies for use by the U.S. military and the Department of Homeland Security (DHS).

With funds from the Department of Defense, OTTC is contracted by the Center for Commercialization of Advanced Technology (CCAT) to identify, evaluate, fund and fast-track the development of technologies for use by the DOD, DHS, and first responders.

Ionian Technologies, Inc., of San Diego was awarded \$57,155 to complete development of its Detect to Protect biosensor for DHS. The sensor sits in a handheld device and can detect the presence of viral, bacterial and toxic biothreat agents such as anthrax, ricin or smallpox.

Also of San Diego, E-Band Communications has been notified of its product development award totaling \$56,600 to aid in the engineering of its multi-gigabit capacity wireless communication systems for commercial and military telecommunications networks requiring high bandwidth. A \$37,245 award was given to Physical Sciences of Andover, Mass.,

to further advance work on its fuel monitoring system. The system monitors fuel contamination (sediment and water) and is currently in use aboard ships in the U.S. Navy's fleet.

The three companies selected had previously received funding from OTTC and had shown substantial progress in the development and design of their technologies since their initial OTTC award.

“Each company's outstanding commercialization potential and achievements were recognized by OTTC and ultimately awarded additional funding for continued product advancement,” said Timothy R. Gerrity, OTTC Director.

## FLC NEWSLINK

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# TECH WATCH | LABORATORY TECHS READY FOR TRANSFER

## LBNL IMPROVES BATTERIES

Marca Doeff, Robert Kostecki, and colleagues at Lawrence Berkeley National Laboratory (LBNL) have developed improved carbon coatings for LiFePO<sub>4</sub> materials used in lithium ion batteries. The coatings enhance electrochemical performance without sacrificing the energy density of the battery. The researchers have produced very thin carbon coatings (<10 nm) on non-conductive LiFePO<sub>4</sub> particles, increasing the electronic conductivity of the composite as much as six orders of magnitude compared to the native material. The low carbon content (<2 wt. %) allows high power operation without compromising energy density. The coatings are extremely durable; no evidence of degradation was found after more than 100 full charge-discharge cycles. The process involves co-synthesizing LiFePO<sub>4</sub> and carbon by adding optimal amounts of specific organic and organometallic precursors to the reaction mixture prior to calcinations. The method is both low cost and highly compatible with existing LiFePO<sub>4</sub> manufacturing processes.

Applications include carbon coatings for electrode materials used in lithium ion or lithium metal batteries for applications such as power tools and hybrid vehicles.

More info: 510-486-6467, TTD@lbl.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 (also known as SCID 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.

One potential explanation for this is that they express higher levels of brain-derived neurotrophic factor (BDNF), which is associated with neurogenesis, memory formation and suppression of anxiety and depression. Moreover, DNA-PKcs-deficient cells produce less oxidative stress. Thus, inhibition of DNA-PKcs may have unexpected utility in the treatment of a wide range of diseases and conditions.

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

## NASA IMPROVES IMAGE, VIDEO QUALITY

NASA Goddard Space Flight Center invites companies to license a new technology proven to enhance the image quality of compressed grayscale or color JPEG images and MPEG video clips commonly used on websites, online applications, and streaming media.

The Estimated Spectrum Adaptive Postfilter (ESAP) algorithm helps to improve the objective and subjective quality of these images, as well as enhance their perceptual visual quality as compared to baseline JPEG images.

Goddard's ESAP algorithm is an image-adaptive postfiltering method designed to minimize the discrete cosine transform (DCT) blocking distortion caused by compressing JPEG images. The ESAP algorithm method improves both the measurable and the subjective quality of the images.

The ESAP algorithm consists of an ESAP encoder, which includes a JPEG encoder and a JPEG decoder. The JPEG decoder uses the DCT coefficients to estimate the two-dimensional bandwidth of each pixel in the image.

The local pixel bandwidths are then used to adaptively postfilter the decoded image. The postfiltered image shows minimal blurring of its true edges, while blocking distortion is significantly reduced.

Default video and image encoding algorithms for JPEG, MPEG, and HDTV files produce many quality-reducing blocking effects when operating at low bit rates. Previous techniques to overcome this problem were mostly nonlinear filtering methods based on limiting, local pixel statistics rather than on more accurate local frequency content. These techniques offer lower peak signal-to-noise ratio (PSNR)



NASA's technology enhances JPEG images and MPEG video clips.

and lower subjective quality than the techniques based on Goddard's algorithms. In addition, ESAP can be cost-effectively implemented in firmware to enable real-time image results.

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

### Benefits

**Innovative:** Minimizes the loss in image quality that occurs in compressed JPEG images.

**Accurate:** Yields minimal blurring of an image's true edges while significantly reducing the blocking artifacts resulting from high image compression.

**JPEG-compliant:** Adheres to the coded stream syntax of the Independent JPEG Group (IJG) software.

**Cost-effective:** Can be implemented in firmware or a fast processor, eliminating the need for additional overhead expenses.

More info: ESAP@gssc.nasa.gov







## Innovation at Work

Be a part of the only open event on sensing, detecting, and imaging technologies for defense and security. The face-to-face collaboration between researchers from multiple disciplines at this event has accelerated technological advancement and discovery in defense and security, making this the largest event of its kind in the world.

U.S. Marine photo by Cpl. Spencer M. Murphy  
U.S. Air Force photo by Master Sgt. Lance Chung

16-21 March 2008 | Exhibition: 18-20 March 2008  
Orlando World Center Marriott Resort & Convention Center  
San Diego, California, USA



spie.org/events/dss

*Solar Lighting, from page 1*

*The collector for the hybrid solar lighting system, mounted atop the roof of a building, tracks and captures the sun's rays to light the rooms beneath.*

which blend the natural light with artificial light to maintain a constant level of room lighting. One collector powers 8 to 12 hybrid light fixtures, which can illuminate about 1,000 square feet.

According to Sunlight Direct estimates, one unit can save about 6,000 kilowatt hours per year in lighting and another 2,000 kilowatt hours in reduced cooling needs for a total of 8,000 kilowatt hours

per year. For parts of the country where the utility rates are 10 cents per kilowatt hour, savings can total up to \$8,000 per system over 10 years.

For large floor spaces—100,000 to 200,000 square feet—this translates into energy cost savings of between \$1 million and \$2 million over 10 years, according to the company.

Operation and maintenance savings could account for another \$300,000 in cost reductions over the same period.

There are other benefits, too. Because hybrid solar lighting brings the sunshine inside, the technology offers the bonus of improved sales, productivity and overall wellness as a result, according to studies that examine human

response to natural lighting.

As a result, the system has applications in a variety of settings, from offices to schools to retail outlets.

Current customers include Sacramento Municipal Utility District customer service headquarters, San Diego State University, the University of Nevada-Las Vegas, Wal-Mart, Pacific Northwest National Laboratory, a Staples store on

Long Island, N.Y., and Aveda Corp., as well as ORNL, which boasts two installations.

The system was invented by Jeff Muhs and Duncan Earl at ORNL, which patented the technology in 2003 and licensed it to Sunlight Direct in 2005.

That year the company also made available its first commercial product. Earl serves as principal of Sunlight Direct. The technology has won numerous awards, including an R&D 100 Award and an FLC award.

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# GROWTH OF CHINA, INDIA MEANS CHALLENGE, OPPORTUNITY FOR GLOBAL INNOVATION

by Lauren Pafumi, FLC Washington, DC Office

Speakers from the United States, China and India came together to discuss the implications of China and India's growing importance in global science, technology and innovation.

On September 24 and 25, 2007, the National Academy of Sciences Board on Science, Technology and Economic Policy (STEP) hosted "The Dragon and the Elephant: Understanding the Development of Innovation Capacity in China & India" in Washington, D.C.

Many speakers drew parallels to the launch of Sputnik as its 50th anniversary approached, seeing the rise of China and India as a similar turning point in history. Several expressed the hope that it might galvanize the American population into higher aspirations in science and technology (S&T).

According to Pete Engardio of *BusinessWeek*, the

U.S. is "still catching up with the idea that the world has already changed on us." China is already a major market of producers and consumers. Many speakers predicted its growth would continue for years. India, while smaller in scope, is also increasing its global capacity in S&T.

Several speakers stated that many are trying to answer the wrong questions in addressing the changes China and India have brought to global S&T. Vivek Wadhwa of Duke University presented statistics revealing that, contrary to popular wisdom, there is no shortage of American engineers. Wadhwa's studies showed that employers consider American engineers more qualified than their Chinese and Indian counterparts. Yet Chinese and Indian engineers are increasingly attractive hires due to lower labor costs. Multinational corporations often prefer to train less qualified foreign employees rather than pay the higher salaries Americans expect. Speakers from several

multinational corporations described their companies' training programs in Asian countries.

According to several speakers, including those from multinational corporations, Western corporations have often been the force behind these recent gains, but this trend may change as Chinese and Indian scientists and engineers receive training from corporations and move on. The Chinese government has recently increased efforts to promote "indigenous innovation," although it has left the definition of that phrase ambiguous.

Overall, panelists dismissed the possibility of conflict breaking out as balances shift, but some still anticipate a difficult transition. "We are moving toward an energy-constrained world," said Marco Di Capua of the Department of Energy. "We're in for a couple of rocky years."

Several speakers pointed out U.S. intellectual property restrictions and visa policies as barriers to continued American

*Global Innovation, page 8*

## USPTO Hiring Practices, from page 1

no doubt aware, there have been significant efforts recently in Congress and within the Administration focused on the U.S. patent system, e.g., comprehensive patent reform legislation is working its way through Congress, while the USPTO recently issued new rules and procedures on several issues associated with the patent application process.

While these actions certainly have the potential to affect the current system in a number of ways, one of the greatest sources of frustration for those with applications currently under review is the growing length of time between filing and issuance, a period that can last many years depending on the industry and circumstances. It was with this in mind that the GAO was asked to assess whether current USPTO hiring practices were adequate to hire and retain a patent examination workforce adequate to not only meet the current demand, but to effectively begin to work off the continually expanding backlog.

The USPTO currently employs about 5,000 patent examiners to review and take action on all patent applications. They determine the number of new examiners to hire, according to the GAO, based "on the agency's funding levels and institutional capacity to support additional staff and not on the existing backlog."

The GAO reports that while the USPTO hires as many new patent examiners as its budget projections will allow and that this method is consistent with Office of Personnel Management (OPM) workforce planning strategies, the annual increase in examiners is significantly offset by a high attrition rate. Further, this attrition rate is particularly pronounced among examiners with less than 5

years' experience – precisely those examiners typically responsible for focusing on the backlog.

Between 2002 and 2006, the agency lost one examiner for every two hired, with over 70 percent of those leaving having less than 5 years' experience. And the backlog continues growing.

The one area where the GAO and USPTO differ in their findings/opinions concerns the apparent reasons for the high attrition rate. USPTO management identified "personal reasons, such as the job not being a good fit or family reasons" as the primary driver for examiners leaving early in their tenure. The GAO, however, based on a survey of patent examiners, reports that the primary reasons for the high attrition rate are the agency's production goals, production goals set and unchanged since 1976, long before the current backlog crisis.

The GAO reports that "70 percent of patent examiners reported working unpaid overtime during the past year, in order to meet the production goals."

The report also addressed incentive and workforce flexibility initiatives recently employed by the USPTO, noting that these initiatives were often identified as the reasons why many examiners are staying.

For instance, USPTO management specifically pointed to three initiatives as particularly effective in retaining examiners: special pay rates (potentially 25 percent over comparable federal salaries), bonuses for exceeding production goals (over \$10.6 million paid in 2006), and opportunities to work from remote lo-

cations (in 2006 about 20 percent of the examiner workforce participated in the telework program). Ultimately, the GAO made a single recommendation based on its concerns regarding the basis for USPTO hiring practices and its inability to work down the backlog – which in turn could affect U.S. competitiveness. It recommended that the USPTO "under-

take a comprehensive evaluation of the assumptions that the agency uses to establish patent examiner production goals and revise those assumptions as appropriate."

The USPTO has agreed to the findings and recommendation in the report, issuing a concurrent press statement indicating that they would "review the assumptions underlying the current production standards." In the statement, USPTO Director Jon Dudas noted, "I am pleased that, after careful study, the GAO agrees with our assessment that hiring alone will not reduce the backlog of patent applications." He went on to identify

a number of internal measures implemented by the agency, several identified in the GAO report, resulting in improvements in patent quality and production. He stated, "A next logical step in bringing the USPTO fully into the 21st century is to reevaluate how these initiatives impact our goals."

One final note. An interesting patent just issued by the USPTO was brought to my attention recently. Patent #7,272,572 was issued in September for "a method and system for facilitating the transfer of intellectual property." It seems to be an apparent business method patent that many in our community might want to take a look at. What is interesting to note is that this patent was filed in 2000 and issued in late 2007—a seven-year member of the backlog.

Gary can be reached at [gkjones@fldc.cncost.com](mailto:gkjones@fldc.cncost.com).



# IDAHO LABORATORY BRINGS SCIENCE TO ITS FUTURE



INL Photo

Dale Ingram of LIGO Hanford Observatory demonstrates the effects of gravitational waves to students attending the Expo.

For the past seven years, Idaho National Laboratory (INL) and its partner, the Museum of Idaho, have brought science and engineering to life for thousands of students – grades six through eight – with the INL Science and Engineering Expo.

Through this annual event, INL partners with many businesses and industries, professional societies, universities and other government agencies to bring new

developments in science and state-of-the-art technology to the public. Exhibitors and presenters stimulate curiosity, and inform and teach through engaging hands-on activities and experiments, interactive demonstrations, simulations and crowd-pleasing presentations.

All activities are linked to the National Science Education Standards and correlated Idaho State Achievement

Strands II-X. The theme for the 7th Annual INL Science and Engineering Expo, held Sept. 20-22, was “I Spy – The Magic of Science.” The Expo featured Al Stawicki, The Great PHEOC. Stawicki is a mystifying science magician who involves his audiences in problem-solving situations filled with laughs, educational lessons and unforgettable, magical entertainment. (PHEOC is an acronym for the scientific method of problem, hypothesis, experiment, observation and conclusion.)

The Great PHEOC uses his amateur magician skills and 30 years of math and science teaching wisdom to make science fun for students.

He interacts with the audience by asking questions, allowing some students to come on stage to help perform magic tricks; he sends them away at the end of his performance chanting, “Science is fun!”

Another 30 demonstrations and interactive exhibits were set up at the Expo to encourage young people to discover the “magical” concepts of science, mathematics, engineering and technology. Interactive demonstrations included principles of light, optics and electromagnetism.

One exhibit featured mousetraps acting as U-235 atoms and ping-pong balls representing neutrons to depict a nuclear chain reaction. A geothermal exhibit showed how hot water can be brought to the land surface and used to make electricity and heat buildings. LIGO, the Laser Interferometer Gravitational-wave Observatory, demonstrated how gravitational waves work and provided a variety of experiments with waves.

While geared toward students in grades six through eight, the Expo offers a variety of activities and exhibits for learners of all ages. This year’s two student days, Sept. 20 and 21, brought 24 schools and more than 2,800 students to the Expo. Some students enjoyed the Expo so much they brought family members back for Family Day, Sept. 22. An estimated 3,000 people attended Family Day.

Idaho National Laboratory has a strong commitment to education and community outreach efforts. The Expo offers a high-impact, inquiry-based education and community outreach experience that exposes students, their teachers and parents to a diverse range of potential careers in science, mathematics, engineering and technology.



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## Safer Flying, from page 1

Both SRA, a leading provider of technology and strategic consulting services, and Telair International, a designer of complete on-board cargo handling systems, developed HULDs that are qualified in terms of blast resistance performance and FAA airworthiness certification.

### SRA HULD Design

SRA uses a material called Glare in its HULD design. Glare is a “GLASS-REinforced” Fibre Metal Laminate composed of several very thin layers of aluminum interspersed with layers of glass-fibre, bonded together with a matrix such as epoxy. The panels are held together with an aluminum frame structure designed with a locking door mechanism.

### Telair HULD Design

The Telair HULD design uses Kevlar,

the same material associated with the development of body armor. Kevlar consists of fibers of a long molecular chain molecule with many inter-chain bonds that make the material extremely strong.

HULDs are currently being evaluated by TSA through implementation of a congressionally mandated HULD pilot program. HULDs are being flown in regular airline operational service to determine the economic and operational impacts of implementing HULD technology.

Subsequent to removal from flight operations, the HULDs are blast tested by TSL to ascertain the effect of operational service on continued HULD explosive mitigation performance. Based on the success of the second generation optimized Telair HULD, a third generation Telair

*Safer Flying, page 8*



# LAB CLASSIFIEDS | AVAILABLE TECHNOLOGIES, FACILITIES, AND PARTNERS

## TREATING DISEASE

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

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

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

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

## NAVY COATING

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

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

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

## MEAT QUALITY

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

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

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

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

## ACOUSTIC INSPECTION

Pacific Northwest National Laboratory (PNNL) has developed a new spin on an existing acoustic inspection technology. This ultrasonic technology eliminates the need for time-consuming and costly sampling of slurries in large containers. Savings like this are particularly appealing to fermentation-based industries, such as beer and pharmaceuticals.

Through this technology's capabilities, the size and concentration of particles within opaque slurries can be tracked by attaching an acoustic-based technology to the outside of a large tank or vat, much like those used to make beer and medicinal drugs.

PNNL's patented technique is novel in its fusion of information extracted from both acoustic backscatter—referring to the deflection of energy from a sent signal—and transit measurements, including velocity, amplitude and frequency data.

*More info:* www.pnl.gov

## BROOKHAVEN TECH MEASURES AEROSOL

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

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

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

*More info:* www.bnl.gov

## MICRO/NANO MACHINES

Lawrence Berkeley National Laboratory (LBNL) is seeking a qualified partner(s) to work in a collaborative effort to further develop, test, and commercialize improved micro and nano machining technologies to manufacture medical cardiac stents used to shore up weak blood vessels leading to the heart.

LBNL's technology offers the potential to lower stent production costs, improve quality, and provide safer operation.

*More info:* Ka-Ngo Leung, KNLeung@lbl.gov, 510-486-7918

## ANL'S NANOLUBE

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

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

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

## BUG REPELLANT

Agricultural Research Service (ARS) scientists have isolated a natural compound, callicarpenal, from the American beautyberry that has been shown to repel mosquitoes, ticks, and fire ants. Callicarpenal, an all-natural insect repellent, is an alternative to commercially available synthetic repellents and more effective than currently available natural repellents on the market.

Callicarpenal is as effective as DEET and more effective than picaridin (Bayrepel) in the bioassays used against mosquitoes, and is also as effective as DEET and picaridin against the deer tick. It could be a good alternative to synthetic repellents such as DEET and picaridin, and could be marketed as an all-natural repellent. Callicarpenal is potentially a safer and perhaps more effective insect repellent. The market potential is huge because 38 percent of Americans use a DEET-based product every year.

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*Global Innovation, from page 5*

relevance. Visa restrictions have caused even U.S.-based corporations to move high-level meetings overseas, which Di Capua calls “very distressing.” Wadhwa anticipates “a pretty sizeable brain drain,” with many skilled workers “stuck in immigration limbo.” Even for this National Academy of Sciences conference, some foreign speakers were originally denied visas. Several speakers called for a revision of the U.S. patent system, saying it did not promote innovation.

The U.S. has the opportunity to lead, even in a changed system, said Denis Simon of SUNY’s Levin Graduate Institute. Increased international cooperation could help solve pressing global problems like pollution and a looming energy crisis.

Kuan Wang of the National Institutes of Health discussed an unexpected opportunity for collaboration that has risen out of China’s increased global presence. His lab works with Chinese scientists to combine Western and Chinese traditional medicine.

According to Kuan, collaborating with foreign labs is no more difficult than working with a university. However, several speakers noted that cultural differences and a lack of

trust between governments can impede cooperation leading to difficulties associated with international collaborations.

Differences in patent systems can also cause problems. Soonhee Jang of Eli Lilly said Chinese patents are easy to get but unenforceable, while in India, “you can’t get a patent, so there’s nothing to enforce.”

Charles Cooney of the Massachusetts Institute of Technology posed a question that seems to strike the heart of the discussion: “What will the world look like in 2020?” Although none could predict a complete answer, each panelist had a different piece of this puzzle to fill in.

All concluded that China and India’s recent growth are changing the global field of science and technology. These changes, panelists agreed, are crucial to recognize.

They provide both great challenge and great opportunity for scientists, governments, companies, and individuals around the world.

The key is to recognize that the changes are already happening – according to some, faster than we think – and that responding to those changes is necessary to fit into the world of 2020.

*Safer Flying, from page 6*

HULD is currently under development and slated for explosive validation testing in 2008. The program has been focused on determining and identifying the minimum size explosive that would result in immediate catastrophic loss.

The data collected in this research has been used to validate and refine explosives detection standards for checkpoints, checked luggage and air cargo.

In addition, methods and technologies that can be applied to current and future fleets of commercial aircraft to decrease the level of vulnerability to internal explosive effects have also been a topic of study.

The success of the HULD program is the result of the cooperative efforts of the Department of Homeland Security; the Federal Aviation Administration; the Departments of the Army, Navy, and Air Force; and the private sector.



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