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S&T NEWS BULLETIN

THE LATEST IN SCIENCE AND TECHNOLOGY RESEARCH NEWS

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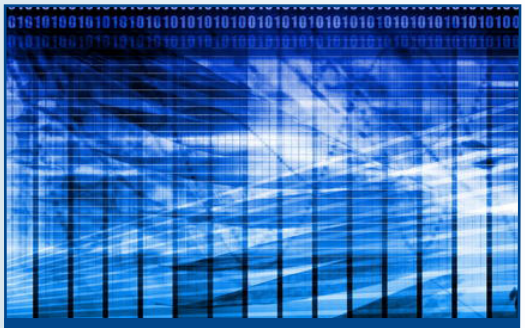
Feature Articles

Scientists Twist Light to Send Data

Science Daily, 25JUN2012

The twisted-light system transmits more than 85,000 times more data per second than broadband cable. Their work might be used to build high-speed satellite communication links, short free-space terrestrial links, or potentially adapted for use in the fiber optic cables that are used by some Internet service providers. The multi-national team of researches was led by the University of Southern California. TECHNICAL ARTICLE

Tags: Communications Technology, Featured Article



Artist's abstraction. Researchers have developed a system of transmitting data using twisted beams of light at ultra-high speeds -- up to 2.56 terabits per second. (Credit: © kentoh / Fotolia)

30 under 30: Predicting What New Physics Will Look Like

Scientific American, 22JUN2012

Every summer at Lindau, Germany, dozens of Nobel Prize winners exchange ideas with hundreds of young researchers from around the world. Whereas the Nobelists are the marquee names, the younger contingent is an accomplished group in its own right. In advance of this year's meeting, which focuses on physics, we are profiling several promising attendees under the age of 30.

Tags: Science without borders, Featured Article

Top technology innovations named for 50th R&D 100 Awards

R&D Magazine, 20JUN2012

These innovations represent a broad spectrum of new materials, instruments, consumer products, environmental and energy technologies, imaging systems, communications, and electronic instrumentation, as well as process technologies and safety systems. The winning technologies were developed by a cross-section of industry, academia, private research firms, and government labs. 2012 winners

Tags: Science without borders, Featured Article

S&T News Articles

ADVANCED MATERIALS

Faster, cheaper gas and liquid separation using custom designed and built mesoscopic structures

e! Science News, 26JUN2012

Using a new process they describe as "reverse fossilization," scientists in Japan have succeeded in creating custom designed porous substances capable of low cost, high efficiency separation. In what may prove to be a significant boon for industry, separating mixtures of liquids or gasses has just become considerably easier.

Tags: Advanced materials

Discovery of material with amazing properties

Niels Bohr Institute, 24JUN2012

Normally a material can be either magnetically or electrically polarized, but not both. Now researchers at the University of Copenhagen have shown that TbFeO3 is simultaneously magnetically and electrically polarizable when it is cooled to absolute zero. This opens up new possibilities for sensors technology of the future. TECHNICAL ARTICLE.

Tags: Advanced materials, Sensors

continued...

BACK TO TOP

Graphene drumheads tuned to make quantum dots

Nanowerk, 22JUN2012

Researchers working at the NIST and the University of Maryland have shown that subjecting graphene to mechanical strain can mimic the effects of magnetic fields and create a quantum dot. Creating semiconducting regions like quantum dots in graphene by modifying its shape might give scientists the best of both worlds: high speed and the band gap crucial to computing and other applications.

Tags: Advanced materials, Materials science

Nano-infused paint can detect strain (w/video)

Nanowerk, 22JUN2012

Rice University's fluorescent nanotube coating can reveal stress on planes, bridges, and buildings. Nanotube fluorescence shows large, predictable wavelength shifts when the tubes are deformed by tension or compression. The paint—and therefore each nanotube, about 50,000 times thinner than a human hair—would suffer the same strain as the surface it's painted on and give a clear picture of what's happening underneath. TECHNICAL ARTICLE

Tags: Advanced materials, Materials science

An Invisibility Cloak With An On-Off Switch

MIT Technology Review, 21JUN2012

Researchers in Scotland have worked out how to make an optical invisibility cloak that you can turn on and off. What makes this possible is a process known as electromagnetically induced transparency—a phenomenon in which certain materials become transparent when zapped by light from two carefully tuned lasers. TECHNICAL ARTICLE

Tags: Advanced materials

Taming light with graphene

Nanowerk, 20JUN2012

Spanish research groups have achieved first ever visualizations of light guided with nanometric precision on graphene. This visualization proves what theoretical physicists have long predicted; that it is possible to trap and manipulate light in a highly efficient way, using graphene as a novel platform for optical information processing and sensing.

Tags: Advanced materials, Materials science

AUTONOMOUS SYSTEMS & ROBOTICS

Watch This Mind-Blowing Quadrotor Performance (w/video)

IEEE Spectrum, 26JUN2012

A swarm of quadrotors performed at the Cannes Lions International Festival of Creativity this week, and it's absolutely mind-blowing. This video involves swarms of flying robots, as opposed to lights on strings. There isn't a lot of information outside of the video, but we did spot a Vicon system up above the stage, which explains how the quadrotors were able to move so precisely.

Tags: Autonomous systems & robotics

Video Friday: Knife-Edge Maneuvering, Adopt a Husky Robot, and the X-37B Is Back

IEEE Spectrum, 22JUN2012

Watch a little robotic airplane from MIT weave its way through a fake forest, and much much more.

Tags: Autonomous systems & robotics

BIG DATA

Sifting through a trillion electrons

Nanowerk, 26JUN2012

Researchers in the US developed novel software strategies for storing, mining, and analyzing massive datasets—more specifically, for data generated by a state-of-the-art plasma physics code called VPIC. Using their tools, the researchers wrote each 32 TB file to disk in about 20 minutes, at a sustained rate of 27 gigabytes per second. By applying an enhanced version of the FastQuery tool, the team indexed this massive dataset in about 10 minutes, then queried the dataset in three seconds for interesting features to visualize.

Tags: Big data

BIOTECHNOLOGY

Organ simulator chips hope to revolutionize drug development, reduce animal testing

Digital Trends, 25JUN2012

At the moment, researchers at Harvard's Wyss Institute have come up with lung-on-a-chip, heart-on-a-chip, and most recently, gut-on-a-chip. The miniature simulators may be tiny, but all pack the full features of each organ represented, including live human cells growing within the chip. This involves the team replicating flexible human membranes to mimic a real organ system that cells require to survive.

Tags: Biotechnology, Medical Sciences, Medical technology

COMMUNICATIONS TECHNOLOGY

Making GPS-like localization work indoors

PhysOrg.com, 26JUN2012

A team of researchers in the US have shown that commercially available signals in the range of 100 megahertz, such as FM signals, can be used along with Wi-Fi signals to achieve the most accurate indoor localizations. Combining these low-frequency signals with the existing, high-frequency Wi-Fi signals could enable highly accurate indoor localization.

Tags: Communications Technology

continued...

"No doubt those who really founded modern science were usually those whose love of truth exceeded their love of power." C.S. LEWIS

ENERGY

Scientists spark new interest in the century-old Edison battery

PhysOrg.com, 26JUN2012

Stanford University reserachers have created an ultrafast nickel-iron battery that can be fully charged in about 2 minutes and discharged in less than 30 seconds. They have increased the charging and discharging rate by nearly 1,000 times. The high-performance, low-cost battery could some day be used to help power electric vehicles.

Tags: Energy

ENVIRONMENTAL SCIENCE

Could Dust Packed Missiles Clean Low-Earth Orbit?

Defense Update, 24JUN2012

Scientists at the U.S. Naval Research Laboratory suggest that ballistic missiles loaded with tons of tungsten dust could be used to 'sweep' space debris from their LEO orbit, slowing and lowering them into the upper atmosphere, where they will decay by the heat generated from drag induced by the upper earth atmosphere.

Tags: Environmental science, Satellite technology, Space technology

FOREIGN S&T

China submersible breaks 7,000-metre mark

PhysOrg.com, 25JUN2012

A manned Chinese submersible broke through the 7,000-meter mark for a new national record. Experts say China intends to use the submersible for scientific research, such as collecting samples of undersea life and studying geological structures, as well as future development of mineral resources.

Tags: Foreign S&T, S&T China

GOVERNMENT S&T

An online encyclopedia that writes itself

KurzweilAI, 26JUN2012

Concise profiles of people and organizations—complete with lists of connected organizations, people, and events—are written by computers. The prototype system is part of a nonpublic site built for intelligence agencies by Raytheon BBN in Cambridge, Massachusetts, and scheduled for delivery to the government later this year. It gathers information from 40 news websites written in English, Chinese, and Arabic, and eventually it will cover hundreds of news sites in all major languages. Research was sponsored by DARPA.

Tags: Government S&T, DARPA, Military technology

IMAGING TECHNOLOGY

A Gigapixel Camera Composed of Dozens of Microcameras (w/video)

IEEE Spectrum, 25JUN2012

Researchers at Duke University are building gigapixel cameras, which produce images that resemble some of the panoramic mosaics you may have seen. The difference is that their cameras can take giga-snapshots, capturing the entire scene all at once rather than forcing you to take a series of images and later stitch them together. TECHNICAL ARTICLE

Tags: Imaging technology

INFORMATION TECHNOLOGY

Data scientists the Alexander Flemings of the future

Alpha Galileo Foundation, 26JUN2012

The process by which drugs, treatments and cures are developed could soon be radically improved by people with absolutely no biological, chemical or pharmacological knowledge whatsoever. That's the conclusion of a groundbreaking data science experiment. This showed that crowd-sourcing made it possible to radically improve the predictive power of models used to predict the pharmaceutically relevant biological responses of a compound based solely on the knowledge of calculated molecular properties-for example size, shape, or elemental constitution.

Tags: Information Technology

UCLA-led research team develops world's most powerful nanoscale microwave oscillators

EurekAlert, 26JUN2012

The new electron spin-based oscillators focus on spin-transfer torque magnetoresistive random access memory or STT-RAM, which has great potential over other types of memory currently in use for both speed and power efficiency. The new oscillators could lead to mobile communication devices that are less expensive to manufacture and deliver a much better signal quality.

Tags: Information Technology, Communications Technology

continued...

Charging your cell phone with your T-shirt

Nanowerk, 25JUN2012

Researchers are already pushing ahead with electronic textiles (e-textiles). To address the issue of power source researchers at the University of South Carolina demonstrate how cotton textiles can be functionalized into activated carbon textiles (ACTs) by a simple chemical activation route—a traditional dipping, drying and curing process. During this process, the cellulose fibers are converted into activated carbon fibers. Researchers have found a simple way to provide cotton with a new function—storing energy.
TECHNICAL ARTICLE

Tags: Information Technology, Flexible electronics

MATERIALS SCIENCE

Scientists gain understanding of self-cleaning gecko foot hair

R&D Magazine, 25JUN2012

A research team at the University of Akron has revealed that geckos have tiny sticky hairs on their toes called setaes, and due to the attaching and detaching mechanism caused by the rolling and peeling motion of their toes as they walk, they release the dirt particles leaving their feet clean.
A gecko-inspired adhesive can function under conditions where traditional adhesives do not, such as in a vacuum, outer space or under water.

Tags: Materials science, Biomimetics

Featured Resource

Scientific Reports - A Nature Publication

Online and open access, Scientific Reports is a primary research publication from the publishers of Nature, covering all areas of the natural sciences. Rapid dissemination of accepted papers to the widest possible audience is achieved through a programme of continuous online publication. Scientific Reports are Fast, Rigorous, Open, Visible, Interlinked, Global. RSS

Unraveling the mysteries of exotic superconductors

e! Science News, 25JUN2012

Superconductors, materials that when cooled have zero electric resistance, have the promise of someday increasing the efficiency of power distribution. An international team of researchers found that magnetism may be helping or even responsible for superconductivity in iron-based superconductors. Typically, magnetism is detrimental to superconductivity, but when it is weakened enough, it might actually be helping.

Tags: Materials science

Graphene Research: Trapping Light in a Carbon Net

Science Daily, 21JUN2012

The high mobility of electrons in graphene arises from the fact that they are confined to the hexagonal lattice. An international team has now shown that photons too can be trapped within the lattice and move freely along it. Since the light is confined to nanocables with dimensions of a millionth of a millimeter, switching times could be reduced to less than a picosecond. It might even be possible to develop computers whose graphene transistors could be switched both optically and electrically.

Tags: Materials science

MICROELECTRONICS

Microelectronics: Two at a time

Science Daily, 25JUN2012

A new design reduces the areal footprint of nanowire transistors by a factor of two. Scientists have now integrated two transistors onto a single vertical silicon nanowire, pushing the areal density limit of nanowire transistors even further. TECHNICAL ARTICLE

Tags: Microelectronics

NEUROSCIENCE

Penn Researchers Show 'Neural Fingerprints' of Memory Associations

Science Newsline, 26JUN2012

Researchers have long been interested in discovering the ways that human brains represent thoughts through a complex interplay of electrical signals. Recent improvements in brain recording and statistical methods have given researchers unprecedented insight into the physical processes under-lying thoughts.

Tags: Neuroscience

Scientists trace a wiring plan for entire mouse brain

Nature News, 22JUN2012

Scientists at Cold Spring Harbor Laboratory have started making public detailed images of mouse brain circuitry, releasing on June 1 the first installment of about 500 terabytes. The goal of the effort, called the Mouse Brain Architecture Project (MBA), is an entire rodent brain wiring plan that would represent the first such mapping of the circuits of a vertebrate brain.

Tags: Neuroscience, Biology

continued...

QUANTUM SCIENCE

Rewriting quantum chips with a beam of light

Nanowerk, 26JUN2012

Researchers at Berkeley and City College of New York have developed a technique to use laser light to pattern the alignment of "spin" within atoms so that the pattern can be rewritten on the fly. Such a technique may one day lead to rewritable spintronic circuits. The technique could pave the way for quantum computing.

Tags: Quantum science

S&T POLICY

FY 2013 House Defense Appropriations Bill: Science and Technology Programs

American Institute of Physics, 26JUN2012

Six of the twelve FY 2013 appropriations bills will have been considered on the House floor by the end of this week. Awaiting floor action, which may occur in late July, is H.R. 5856, the FY 2013 Department of Defense Appropriations Bill. The full House Appropriations Committee passed this bill by voice vote, and has issued House Report 112-493, a 356-page document containing funding and policy recommendations.

Tags: S&T policy, R&D Funding

Putin Wants a DARPA of His Own

Wired Danger Room, 25JUN2012

Russian industry and defense leaders announced plans last week to bankroll the Russian Foundation for Advanced Research Projects in the Defense Industry. Russia's newly re-coronated president, Vladimir Putin, has already sent a bill to parliament to authorize the agency, which will be tasked with keeping track of projects that "can ensure Russian superiority in defense technology," according to news service RIA Novosti.

Tags: S&T policy, S&T Russia

SCIENCE WITHOUT BORDERS

Countering Crowd Control Collapse: Crowd Disasters Likened to Unstable Fluid Flows

Science Daily, 26JUN2012

Physicists investigating a recent crowd disaster in Germany found that one of the key causes was that at some point the crowd dynamics turned turbulent, akin to behaviour found in unstable fluid flows. Contrary to previous thinking, crowd disasters are not always due to crowds becoming uncontrollable because individuals panic. The authors also introduce a new scale to assess the criticality of conditions in the crowd designed to help implement preventative measures before the crowd reaches a critical state.

Tags: Science without borders

Scientists who went to war

New Scientist, 22JUN2012

Like necessity, war breeds invention, so it is not surprising that many great scientists and engineers have made significant contributions to warfare. Our gallery shows how conflict has sparked innovation—and sometimes regret.

Tags: Science without borders

SENSORS

Lab-on-a-chip detects traces of toxic vapors in homes near air base

R&D Magazine, 26JUN2012

In a first-of-its-kind departure for lab-on-a-chip technology, a new device was successfully field-tested by the University of Michigan researchers to detect trace amounts of air contaminants near the Utah Air Force Base. Even in the presence of 50 other indoor air contaminants, microsystem found very low levels of targeted contaminants.

Tags: Sensors

Researchers amplify variations in video, making the invisible visible

MIT Technology Review, 22JUN2012

Researchers from MIT present new software that amplifies variations in successive frames of video that are imperceptible to the naked eye. Using the system to amplify motion rather than color requires a different kind of filtration, and it works well only if the motions are relatively small. The system could be used for "contactless monitoring" of hospital patients' vital signs. Boosting one set of frequencies would allow measurement of pulse rates, via subtle changes in skin coloration; boosting another set of frequencies would allow monitoring of breathing.

TECHNICAL ARTICLE, VIDEO

Tags: Sensors

Researchers advance biometric security

Science Daily, 21JUN2012

Researchers in Canada have developed a biometric security system that simulates learning patterns and cognitive processes of the brain. The key is in the ability to combine features from multiple sources of information, prioritise them by identifying more important/prevalent features to learn and adapt the decision-making to changing conditions such as bad quality data samples, sensor errors or an absence of one of the biometrics.

Tags: Sensors, Biometrics

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