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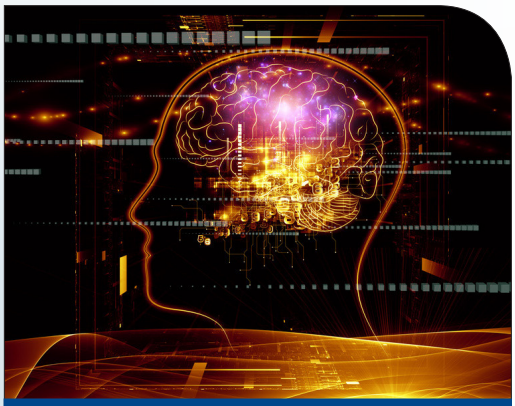
S&T NEWS BULLETIN

THE LATEST IN SCIENCE AND TECHNOLOGY RESEARCH NEWS

FEATURE ARTICLES

Scientists create circuit board modeled on the human brain

Science Daily, 28APR2014



Human brain and circuits illustration (stock image). Stanford scientists have developed faster, more energy-efficient microchips based on the human brain—9,000 times faster and using significantly less power than a typical PC. Credit: © agsandrew / Fotolia

Researchers at Stanford University have developed faster, more energy-efficient microchips based on the human brain—9,000 times faster and using significantly less power than a typical PC. This offers greater possibilities for advances in robotics and a new way of understanding the brain. TECHNICAL ARTICLE

Tags: Microelectronics, Neuroscience, Featured Article

A new twist in the properties of light

Nanowerk, 25APR2014

Researchers in Japan discovered that the momentum and spin of evanescent waves have transverse components that are oriented at right angles to the plane of propagation. Equally surprising, they also found that the transverse momentum, and not the transverse spin, is determined by the wave's circular polarization—precisely the opposite to the dependence seen in normal light. TECHNICAL ARTICLE

Tags: Photonics, S&T Japan, Featured Article

S&T NEWS ARTICLES

ADVANCED MANUFACTURING

Microscale 3-D Printing

MIT Technology Review, 26APR2014

Researcers at Harvard University print intricately shaped objects from "the ground up," precisely adding materials that are useful for their mechanical properties, electrical conductivity, or optical traits. This means 3-D printing technology could make objects that sense and respond to their environment. Integrating form and function is the next big thing that needs to happen in 3-D printing.

Tags: Advanced manufacturing

ADVANCED MATERIALS

Facet-controlled nanosheets improve Li-ion batteries

Nanotechweb, 28APR2014

Researchers at the University of Texas, Austin report that they have succeeded in synthesizing single crystalline {010}-oriented nanosheets of lithium iron phosphate ($LiFePO_4$). The nanosheet material could also be used to study the fundamental properties of $LiFePO_4$, such as nanoscale surface-dependent charge/mass transport processes and how surface modifications affect electrochemical performance. TECHNICAL ARTICLE

Tags: Advanced materials

Discovery of novel gold-based superconductor

Science Daily, 27APR2014

Researchers in Japan successfully synthesized a new compound, $SrAuSi_3$, and found that it exhibits superconductivity at an absolute temperature of 1.6 K (-271.55°C). The discovery could contribute to an understanding of the mechanism involved in superconductivity with broken spatial inversion symmetry, and development of new superconducting materials that can be used in a magnetic field. TECHNICAL ARTICLE

Tags: Advanced materials, S&T Japan

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AUTONOMOUS SYSTEMS & ROBOTICS

Video Friday: Obama vs. ASIMO, 3D Printed Hands, and Drone Delivery Fail

IEEE Spectrum, 25APR2014

It's utterly amazing to hear that a $50 3D printed open source prosthetic hand is actually preferable to the $42,000 cybernetic prosthesis.

Tags: Autonomous systems & robotics

BIOTECHNOLOGY

Nanosponge decoy fights superbug infections (w/video)

Nanowerk, 28APR2014

Nanosponge developed by researchers at UC San Diego is made from biocompatible, biodegradable polymer nanoparticles and it is camouflaged with a red blood cell membrane. It circulates in the bloodstream, absorbing the toxins produced by infection. Once the nanosponges are fully loaded with toxins, they are safely disposed of by the liver. They are designed to work with any type of infection or poison that attacks the cellular membrane.

Tags: Biotechnology

COMMUNICATIONS TECHNOLOGY

Improving optical communications with new device

Science Daily, 27APR2014

Researchers in Singapore have developed an improved low-loss design for modulators, suitable for silicon computer chips. The device has a speed and optical losses comparable to existing technology such as lithium niobate. The new design reduces light absorption in the chip. TECHNICAL ARTICLE

Tags: Communications Technology

Japan's Plan for Centimeter-Resolution GPS

IEEE Spectrum, 23APR2014

Tokyo-based Mitsubishi Electric Corp. reports that they're on track to start up the first commercial, nationwide, centimeter-scale satellite positioning technology. As well as spot-on navigation, the technology will also usher in a variety of innovative new applications, its proponents say.

Tags: Communications Technology, S&T Japan

Quantum communications leap out of the lab

Nature, 23APR2014

This week, China will start installing the world's longest quantum-communications network, which includes a 2,000-kilometre link between Beijing and Shanghai. And a study reports "encouraging" results from a network field trial, suggesting that quantum communications could be feasible on existing fibre-optic infrastructure.

Tags: Communications Technology, S&T China

ENERGY

Flexible battery, no lithium required: Lab creates thin-film battery for portable, wearable electronics

Science Daily, 28APR2014

Researchers at Rice University have developed a flexible material with nanoporous nickel-fluoride electrodes layered around a solid electrolyte to deliver battery-like supercapacitor performance. It combines the best qualities of a high-energy battery and a high-powered supercapacitor without the lithium found in commercial batteries today. TECHNICAL ARTICLE

Tags: Energy, Battery

'Double-duty' electrolyte enables new chemistry for longer-lived batteries

EurekAlert, 24APR2014

When ORNL researchers incorporated a solid lithium thiophosphate electrolyte, the battery generated a 26 percent higher capacity than its theoretical maximum if each component acted independently. The increase is caused by the cooperative interactions between the electrolyte and cathode. As the battery discharges, it generates a lithium fluoride salt that further catalyzes the electrochemical activity of the electrolyte.

Tags: Energy, Battery, Government S&T

This portable battery can charge your phone or jumpstart your car

Digital Trends, 24APR2014

A company in California has developed an external battery that is capable of jump starting a completely dead car battery in minutes. It has 6,000 milliamps (six times the electric current in a normal iPhone charger) and comes with a 5V 2.1A output for charging smartphones and tablets.

Tags: Energy, Battery

Air Force research creates alternative energy source for ground vehicles, equipment

Wright Patterson Air Force Base , 22APR2014

Researchers at the Air Force Research Laboratory have developed a mobile alternative energy system that creates liquid diesel fuel from synthetic gas (syngas). Syngas is passed through a sealed reactor vessel over copper condenser tubes that are coated with a cobalt catalyst. Applying proper heat in the reactor causes a chemical reaction that results in synthetic diesel fuel.

Tags: Energy, Government S&T

continued...

"Technology is the knack of so arranging the world that we do not experience it."

MAX FRISCH

Chernobyl's birds adapting to ionizing radiation

Science Daily, 24APR2014

Researchers in the UK have shown that birds in the exclusion zone around Chernobyl are adapting to—and may even be benefiting from—long-term exposure to radiation. The study is the first evidence that wild animals adapt to ionizing radiation. TECHNICAL ARTICLE

Tags: Environmental science, Nuclear energy

FORECASTING

System detects global trends in social networks two months in advance

Science Daily, 28APR2014

A system developed by researchers in Spain works using just 50,000 Twitter accounts, predicting what will "go viral" across the entire Internet. It can be used in real time, about different topics, in different languages and geographical areas, thus allowing for different contexts to be covered. TECHNICAL ARTICLE

Tags: Forecasting

GOVERNMENT S&T

ALIAS Seeks to Provide Portable, Flexible Advanced Autopilot Capabilities

DARPA News, 18APR2014

Aircrew Labor In-Cockpit Automation System (ALIAS) envisions a tailorable, drop-in, removable kit that would enable the addition of high levels of automation into existing aircraft to enable operation with reduced onboard crew, reduce pilot workload, augment mission performance and improve aircraft safety. More information

Tags: Government S&T, DARPA, Government S&T

IMAGING TECHNOLOGY

Bake your own droplet lens: Cheap, high-quality lenses made from droplets of transparent silicone

Science Daily, 24APR2014

Researchers in Australia have created a new type of lens that costs less than a penny to make, and can be used in a 3-D printed attachment that turns a Smartphone into a dermascope, a tool to diagnose skin diseases like melanoma. It costs a mere $2 and is slated to be commercially available in just a few months. TECHNICAL ARTICLE

Tags: Imaging technology, S&T Australia

INFORMATION TECHNOLOGY

Wearable tech devices hit another bump in the road

PhysOrg.com, 27APR2014

Wearable fitness trackers are in survival-of-the-fittest mode. Touted as the next big thing in technology, wearable tech has spawned a dizzying array of Internet-connected wristwatches and head-mounted devices. But in racing to meet the hype, many companies may have outpaced demand and rushed out products too soon.

Tags: Information Technology

More speed, less interference: Computing, improving electromagnetic interference

Science Daily, 21APR2014

A semi-analytical model recently developed by researchers in Singapore can compute electromagnetic interference on an electronic circuit board ten times faster than existing commercial software. TECHNICAL ARTICLE

Tags: Information Technology

MATERIALS SCIENCE

The magic of Molybdenite: solar cells and light-emitting diodes

Nanowerk, 25APR2014

Researchers in Switzerland built several prototypes of diodes made up of a layer of molybdenite superposed on a layer of silicon. At the interface, each electron emitted by the MoS_2 combines with a "hole" in the silicon. The two elements lose their respective energies, which then transforms into photons. TECHNICAL ARTICLE

Tags: Materials science, S&T Switzerland, Solar energy

New shape discovered using rubber bands

Science Daily, 23APR2014

Researchers at Harvard University stumbled upon a surprising discovery: the hemihelix, a shape rarely seen in nature. Knowing precisely how to make the structures, predictably and consistently, may enable scientists to mimic the geometrical features in new molecules that could lead to possible advances in modern nanodevices, including sensors, resonators, and electromagnetic wave absorbers. TECHNICAL ARTICLE

Tags: Materials science

continued...

Ultrasensitive Diamond Magnetometers

American Physical Society Spotlight, 23APR2014

Researchers at UC Berkeley report a magnetometer based on the spin state of a diamond defect called a nitrogen-vacancy center, which exhibits unprecedented sensitivity at room temperature. This opens up possibilities for applications such as high-precision field measurements and novel nuclear magnetic resonance sensors. TECHNICAL ARTICLE

Tags: Materials science

New material coating technology mimics nature's lotus effect

Science Daily, 21APR2014

A two-step template-free electrodeposition process developed by researchers at Virginia Tech allows the coating material to be made of the same material as the substrate, thereby preserving its thermal and electrical properties. The coatings can minimize or eliminate "fouling" in heat exchangers, reduce pressure drop in flow through tubes, provide improved corrosion resistance, and mitigate creep failure in electronic printed circuit board applications. TECHNICAL ARTICLE

Tags: Materials science, Advanced materials

Featured Resource

ResearchSEA

ResearchSEA is Asia's first research news portal, a one-stop centre where journalists and members of the public can gain access to news and local experts from the research world in Asia. RSS

MICROELECTRONICS

Transistor for light to transform optical signal processing

Science Daily, 27APR2014

'Photonic transistor' design, developed by researchers in Singapore, consists of a circuit of coupled silicon waveguides that guide infrared light with a wavelength of 1.5 micrometers. The design enables a switching gain of greater or equal to 2, which means the output signal is more than double the strength of the input signal. TECHNICAL ARTICLE

Tags: Microelectronics, Communications Technology

NEUROSCIENCE

Strategic thinking strengthens intellectual capacity

Science Daily, 28APR2014

Researches at the University of Texas, Dallas have shown that positive physical changes within the brain and cognitive improvement across populations in response to strategy-based mental training demonstrate the neuro-regenerative potential of the brain. TECHNICAL ARTICLE

Tags: Neuroscience

PHOTONICS

New quantum-cascade laser operates at significantly higher temperatures than previously

PhysOrg.com, 28APR2014

Researchers in Germany achieved the high operating temperatures by developing a semiconductor hetero-structure, which requires only a very low driving power. The laser ridge is only about 10-15 microns high and 15 microns wide, while the emission wavelength is about 100 microns. The active region is confined by two metal layers, which are almost perfect mirrors in the terahertz range. TECHNICAL ARTICLE

Tags: Photonics, S&T Germany

QUANTUM SCIENCE

Remote Controlled Entanglement

American Physical Society Spotlight, 28APR2014

Optical photons are the natural choice for entangling spatially separated systems. But researchers at the University of California at Berkeley reported realizing entanglement using microwave radiation to measure, and thereby entangle, superconducting circuits separated by 1.3 meters of coaxial cable. TECHNICAL ARTICLE

Tags: Quantum science

Superconducting qubit array points the way to quantum computers

Science Daily, 24APR2014

Researchers at UC Santa Barbara have moved one step closer to making a quantum computer a reality by demonstrating a new level of reliability in a five-qubit array. Quntum computing relies on superposition, the notion that any physical object, such as an atom or electron can exist in all of its theoretical states simultaneously. This could take parallel computing to new heights. TECHNICAL ARTICLE

Tags: Quantum science

continued...

Mapping the road to quantum gravity

Science Daily, 23APR2014

The road uniting quantum field theory and general relativity—the two great theories of modern physics—has been impassable for 80 years. Could a tool from condensed matter physicsists in Canada finally help map the way?

Tags: Quantum science, S&T Canada

SCIENCE WITHOUT BORDERS

Cosmic illusion revealed: Gravitational lens magnifies supernova

Science Daily, 24APR2014

Researchers in Japan announced the discovery of a galaxy that magnified a background, Type Ia supernova thirty-fold through gravitational lensing. The discovery may improve our understanding of our expanding universe. TECHNICAL ARTICLE

Tags: Science without borders, S&T Japan

SENSORS

Smartphone sensors leave trackable fingerprints

Science Daily, 28APR2014

Researchers at the University of Illinois demonstrated that fingerprints exist within smartphone sensors, mainly because of imperfections during the hardware manufacturing process. The researchers focused specifically on the accelerometer but their findings suggest that other sensors could leave equally unique fingerprints.

Tags: Sensors

Mysterious robotic plane hits 500 days in space; what's it doing?

PhysOrg.com, 27APR2014

The Boeing-built X-37B Orbital Space Vehicle is one-fourth the size of the Endeavour Space Shuttle. It has very real capabilities, travels low in orbit, staying around 110 to 500 miles above the Earth at a cruising speed of about 17,500 mph. It's equipped with special heat-shield tiles for re-entry, which are billed by Boeing as tougher than Endeavour's.

Tags: Sensors, Space technology

Using Ultrasound to Feel Virtual Objects

MIT Technology Review, 24APR2014

Technology developed by a company is England could improve upon touch-free interfaces, such as those enabled by Microsoft's Kinect, or Leap Motion's device, by reflecting air pressure waves off the hand in a way that can create different sensations for each fingertip. According to the company you actually feel like you're interacting with a thing and getting immediate tactile feedback.

Tags: Sensors, S&T UK ■

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