



S&T NEWS BULLETIN

THE LATEST IN SCIENCE AND TECHNOLOGY RESEARCH NEWS

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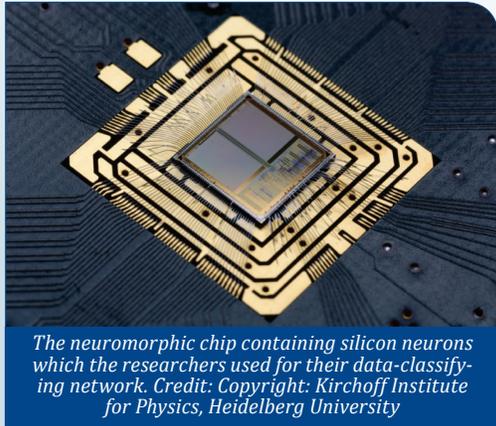
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FEATURE ARTICLES

[Computing with silicon neurons: Scientists use artificial nerve cells to classify different types of data](#)

Science Daily, 28JAN2014



Researchers in Germany refined a new technology that is based on parallel data processing. In the so-called neuromorphic computing, neurons made

of silicon take over the computational work on special computer chips. The neurons are linked together in a similar fashion to the nerve cells in our brain. If the assembly is fed with data, all silicon neurons work in parallel to solve the problem. Silicon 'neurons' could recognize handwritten numbers, or distinguish plant species based on their flowers. [TECHNICAL ARTICLE](#)

Tags: [Breakthrough technology](#), [S&T Germany](#), [Featured Article](#)

[Material developed could speed up underwater communications by orders of magnitude](#)

Science Daily, 24JAN2014

Researchers at the University of California, San Diego, have taken the first steps in a project to develop fast-blinking LED systems for underwater optical communications. Scientists have shown that an artificial metamaterial can increase the light intensity and "blink speed" of a fluorescent light-emitting dye molecule. [TECHNICAL ARTICLE](#)

Tags: [Communications Technology](#), [Featured Article](#)

S&T NEWS ARTICLES

ADVANCED MATERIALS

[Carbon dioxide paves the way to unique nanomaterials](#)

Science Daily, 23JAN2014

Researchers in Poland have produced unprecedented nanomaterials using carbon dioxide and approximately designed chemicals. The novel materials are highly porous, and in their class they show the most extended, and so the largest surface area. Prospective applications include storage of energetically important gases, catalysis or sensing devices. Moreover they emit light with quantum yield significantly higher than those of classical materials used in OLEDs. [TECHNICAL ARTICLE](#)

Tags: [Advanced materials](#)

[Soft hydrogels turned into ionic conductors with diverse applications, from artificial muscles to transparent speakers](#)

Science Daily, 22JAN2014

An international team of researchers (USA, Singapore) have developed a squishy, see-through gel that can act as integral components of stretchable devices thanks to an innovative ionic conduction mechanism. To demonstrate the high-frequency operation of the material, the researchers produced the world's first gel-based transparent loudspeaker. [TECHNICAL ARTICLE](#)

Tags: [Advanced materials](#)

[Engineering new properties on ultra-thin nanomaterials: Tool opens door for design of new phases of materials](#)

Science Daily, 21JAN2014

Researchers at the University of Arkansas found a way to apply pressure to the magnetic material by varying the distances between atoms with a crystal lattice substrate. The compression forced the material into new phases, with intriguing properties not attainable in the larger crystals, opening the door for researchers to design new classes of material for the next generation of electronic and other devices. [TECHNICAL ARTICLE](#)

Tags: [Advanced materials](#)

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Engineers create light-activated ‘curtains’[Science Daily, 21JAN2014](#)

Researchers at the University of California, Berkeley, layered carbon nanotubes onto a plastic polycarbonate membrane to create a material that moves quickly in response to light. The plastic expands in response to heat, while the nanotube layer does not, causing the two-layered material to bend. Potential applications include light-driven motors and robotics that move toward or away from light. [TECHNICAL ARTICLE](#)

*Tags: Advanced materials***BIG DATA****How a Database of the World’s Knowledge Shapes Google’s Future**[MIT Technology Review, 27JAN2014](#)

Compiling a giant database of all the facts in the world could help Google’s future products understand you better. Google says that will lead to Google’s future products being able to truly understand the people who use them and the things they care about. In this interview Google describes how a data store designed to link together all the knowledge on Earth might do that.

*Tags: Big data***BIOTECHNOLOGY****‘Chameleon of the sea’ reveals its nanophotonic secrets**[Nanowerk, 29JAN2014](#)

Scientists at Harvard University hope new understanding of the natural nanoscale photonic device that enables a small marine animal to dynamically change its colors will inspire improved protective camouflage for soldiers on the battlefield. [TECHNICAL ARTICLE](#)

*Tags: Biotechnology, Biomimetics, Military technology***COMMUNICATIONS TECHNOLOGY****A 96-Antenna System Tests the Next Generation of Wireless**[MIT Technology Review, 28JAN2014](#)

Even as the world’s carriers build out the latest wireless infrastructure, 4G LTE, a new apparatus bristling with 96 antennas taking shape at a Rice University lab in Texas could help define the next generation of wireless technology. The Rice rig, known as *Argos*, represents the largest such array yet built and will serve as a test bed for “Massive MIMO.”

*Tags: Communications Technology***CYBER SECURITY****If This Is Cyberwar, Where Are All the Cyberweapons?**[MIT Technology Review, 27JAN2014](#)

Almost four years after Stuxnet was first publicly identified, Stuxnet is an anomaly: the first and only cyberweapon

ever known to have been deployed. Now some experts in cybersecurity and critical infrastructure want to know why. Are there fewer realistic targets than suspected? Are such weapons more difficult to construct than realized? Or is the current generation of cyberweapons simply too well hid?

*Tags: Cyber security***Global panel to review Internet security**[PhysOrg.com, 22JAN2014](#)

The Global Commission on Internet Governance, created by Canada and the UK, was announced Wednesday at the World Economic Forum in Davos, Switzerland. A group of some 25 experts from various backgrounds, including academia, government and civil society, led by Sweden will work together over the coming two years to create “a strategic vision for the future of Internet governance.”

*Tags: Cyber security, S&T Policy***ENERGY****Electrical current sensors harvest wasted electromagnetic energy**[Science Daily, 27JAN2014](#)

Researchers in Hong Kong have developed a chip using “magnetoelectric smart material” which can be placed on any sensing point of interest such as electrical cables, conductors, junctions, bus bars, etc. to detect changes in electrical currents and fault within the equipment. The chip can be tailored to harvest electromagnetic radiations emitted by the equipment being monitored and turn it into useful electrical energy.

*Tags: Energy***Nanoscale heat engine exceeds standard efficiency limit**[PhysOrg.com, 27JAN2014](#)

Researchers in Germany showed that when the high-temperature thermal reservoir to which the quantum heat engine is attached is “squeezed,” the heat engine’s efficiency at maximum power dramatically increases and can exceed the standard Carnot limit by a factor of two. Since the power of an engine vanishes at maximum efficiency, the efficiency at maximum power is the quantity of prime interest for practical applications. [TECHNICAL ARTICLE](#)

*Tags: Energy, Quantum science, S&T Germany***Engineer converts yeast cells into ‘sweet crude’ biofuel**[Science Daily, 22JAN2014](#)

Researchers at the University of Texas, Austin, have developed a cell-based platform that produces the highest concentration of oils and fats reported through fermentation. They were able to rewire yeast cells to enable up to 90 percent of the cell mass to become lipids, which can

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“The cure for a fallacious argument is a better argument, not the suppression of ideas.”

CARL SAGAN

then be used to produce biodiesel. [TECHNICAL ARTICLE](#)
Tags: Energy, Biotechnology

[Island channel could power about half of Scotland, studies show](#)
 e! Science News, 20JAN2014

An in-depth assessment by researchers in the UK offers valuable insights into how to develop and regulate clean energy resource effectively. According to the study an estimated 1.9 gigawatts could be generated by turbines placed in the Pentland Firth, between mainland Scotland and Orkney.

Tags: Energy, S&T UK, Wind energy

[Air pollution from Asia affecting world's weather](#)
 Science Daily, 21JAN2014

Using climate models and data collected about aerosols and meteorology over the past 30 years, researchers from JPL and Texas A&M University found that air pollution over Asia—much of it coming from China—is impacting global air circulations. The models clearly show that pollution originating from Asia has an impact on the upper atmosphere and it appears to make such storms or cyclones even stronger. [TECHNICAL ARTICLE](#)

Tags: Environmental science, Climatology

INFORMATION TECHNOLOGY

[New “Look And Link” Wireless Technology Enables Device-to-Device Links By Pointing](#)
 IEEE Spectrum, 27JAN2014

Researchers in South Korea demonstrated a new wireless technology using a novel beamforming technique, dubbed “Look And Link,” that could enable better device-to-device (D2D) communications, allowing smart gadgets such as phones to link to one another without going through a base station. Many researchers believe that D2D capability will be a key feature in the next generation of wireless networks after 4G LTE and LTE-Advanced.

Tags: Information Technology

MATERIALS SCIENCE

[An artificial material with depth](#)
 Nanowerk, 29JAN2014

Researchers in Singapore have created a novel type of three-dimensional metamaterial that can influence both the electric and magnetic parts of visible light. Their approach provides a simple route to constructing unusual devices such as optical cloaks, which enable ‘invisibility’, and hyper-lenses that offer super-resolution. [TECHNICAL ARTICLE](#)

Tags: Materials science, Military technology

[Magnetic switch gets closer to application](#)
 PhysOrg.com, 27JAN2014

An international team of researchers (France, UK, Germany) have grown a materials system whose robust ferromagnetism can be switched on and off close to room temperature by using low electric fields. Their results are inspiring for future applications such as low-power spintronics and fast, efficient and nonvolatile data storage technologies. [TECHNICAL ARTICLE](#)

Tags: Materials science, S&T France, S&T Germany, S&T UK

[Engineers teach old chemical new tricks to make cleaner fuels, fertilizers](#)
 Science Daily, 26JAN2014

An international team of researchers (USA, Denmark) engineered an efficient and environmentally friendly catalyst for the production of molecular hydrogen, a compound used extensively in modern industry to manufacture fertilizer and refine crude oil into gasoline. The technology could be scaled to meet the global demand at a production cost competitive with current practices.

Tags: Materials science

[A new wrinkle in the control of waves](#)
 MIT News, 24JAN2014

Flexible, layered materials textured with nanoscale wrinkles could provide a new way of controlling the wavelengths and distribution of waves, whether of sound or light. The new method, developed by researchers at MIT, could eventually find applications from nondestructive testing of materials to sound suppression, and could also provide new insights into soft biological systems and possibly lead to new diagnostic tools. [TECHNICAL ARTICLE](#)

Tags: Materials science

[Fur and feathers keep animals warm by scattering light](#)
 Science Daily, 23JAN2014

An international team of researchers (Belgium, Morocco) have calculated that hairs that reflect infrared light may contribute significant insulating power to the exceptionally warm winter coats of polar bears and other animals. The work has major implications for improving the performance of building insulation. [TECHNICAL ARTICLE](#)

Tags: Materials science

[From a carpet of nanorods to a thin film solar cell absorber within a few seconds](#)
 Science Daily, 22JAN2014

Researchers in Ireland have discovered a novel solid state reaction which lets kesterite grains grow within a few

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seconds and at relatively low temperatures. With fast heating they succeeded in producing kesterite thin film with near micrometer-sized crystal grains, which could be used in thin film solar cells. [TECHNICAL ARTICLE](#)

Tags: Materials science, Solar energy

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MEDICAL SCIENCES

[Cracks in cellular transport system can be key to new generation of cancer therapies](#)

[Science Daily, 27JAN2014](#)

An international team of researchers (USA, Japan) shows that a narrow seam that runs along the length of the microtubules is the weakest point. If the seam cracks and splits, the microtubule dissolves. By building microtubules with extra seams in the laboratory the researchers found that the more seams the microtubule has, the more unstable it becomes. The search is now on for factors inside the cell that influence the stability of microtubule seams.

[TECHNICAL ARTICLE](#)

Tags: Medical Sciences, Biology

[Plague or Black Death could re-emerge: Cause of one of the most devastating pandemics in human history revealed](#)

[Science Daily, 27JAN2014](#)

An international team of researchers (USA, Canada, Australia, Germany) has discovered that two of the world's most devastating plagues—the plague of Justinian and the Black Death were caused by distinct strains of the same pathogen, one that faded out on its own, the other leading to worldwide spread and re-emergence in the late 1800s. These findings suggest a new strain of plague could emerge again in humans in the future. [TECHNICAL ARTICLE](#)

Tags: Medical Sciences, Biology

MICROELECTRONICS

[Active microfluidic chips inkjet-printed on normal paper](#)

[Nanowerk, 23JAN2014](#)

Researchers in South Korea have used paper as a platform material for actively actuating an electronic microfluidic chip. This novel, powered fluidic chip—known as an active paper open chip (APOC)—allows the full range of fluidic operations by implementing an electric input on paper via an electrowetting technique. [TECHNICAL ARTICLE](#)

Tags: Microelectronics, Advanced manufacturing

NEUROSCIENCE

[In the brain, timing is everything](#)

[MIT News, 23JAN2014](#)

Researchers at MIT have discovered how two neural circuits in the brain work together to control the formation of time-linked memories. The interaction of these two circuits allows the brain to maintain a balance between becoming too easily paralyzed with fear and being too careless, which could result in being caught off guard by a predator or other threat. [TECHNICAL ARTICLE](#)

Tags: Neuroscience

[Watching molecules morph into memories: Breakthrough allows scientists to probe how memories form in nerve cells](#)

[Science Daily, 23JAN2014](#)

Researchers at Yashiva University stimulated neurons from the mouse's hippocampus, where memories are made and stored, and then watched fluorescently glowing beta-actin mRNA molecules form in the nuclei of neurons and travel within dendrites. They discovered that mRNA in neurons is regulated through a novel process described as “masking” and “unmasking,” which allows beta-actin protein to be synthesized at specific times and places and in specific amounts. [TECHNICAL ARTICLE 1, 2](#)

Tags: Neuroscience

[Unlocking the brain's secrets using sound](#)

[Science Daily, 21JAN2014](#)

According to the model developed by researchers in Israel, when ultrasonic waves encounter a cell, the two layers of the cellular membrane begin to vibrate. Cell membranes also act as capacitors, storing electrical charge. They were able to use the model to predict experimental results that were then verified using brain stimulation experiments performed in mice. This new understanding could lead to important new medical advances. [TECHNICAL ARTICLE](#)

Tags: Neuroscience

QUANTUM SCIENCE

[New quantum dots herald a new era of electronics operating on a single-atom level](#)

[Nanowerk, 27JAN2014](#)

Researchers in Poland have shown that other magnetic elements—such as chromium, iron and nickel—can be used in place of a manganese atom in quantum dots. These elements do not have nuclear spin, which should make quantum dots that contain them easier to manipulate. This finding suggests that using lighter elements should prolong the time quantum dots containing single magnetic ions store information, perhaps even by several orders of magnitude. [TECHNICAL ARTICLE](#)

Tags: Quantum science

Study doubts quantum computer speed

BBC News, 17JAN2014

Researchers in Switzerland set random math problems for a D-Wave machine pitting it against a desktop machine. Their results revealed that there were some instances in which D-Wave Two was faster than the “classical” computer, but likewise there were others where it performed more slowly. The comparison found no evidence the D-wave computer was exploiting quantum mechanics to calculate faster than a regular machine.

Tags: Quantum science, S&T Switzerland

SCIENCE WITHOUT BORDERS**How the ‘Matthew Effect’ helps some scientific papers gain popularity**

PhysOrg.com, 27JAN2014

An MIT study reports that citations of papers increase by 12 percent, above the expected level, when their authors are awarded prestigious investigator status at HHMI. They found much more of an effect on recent papers, published in a short window before the prize. Moreover the greatest gains come for papers in new areas of research, and for papers published in lower-profile journals. Younger researchers who had lower profiles previously were more likely to see a change as well. The effect was much more pronounced when there was more reason to be uncertain about the quality of the science. [TECHNICAL ARTICLE](#)

Tags: Science without borders, Bibliometrics

New research warns world to prepare for power outages

Science Daily, 27JAN2014

According to an international team of researchers (UK, New Zealand) power cuts will become more regular around the globe as electrical supply becomes increasingly vulnerable and demand for technology continues to grow at an unprecedented rate. US household electricity usage increased by 1,300% between 1940 and 2001. In the future, demand for electric vehicles and air conditioning systems is expected to rocket. Western societies therefore face a significant social problem.

Tags: Science without borders

SENSORS**Microwires as mobile phone sensors**

Science Daily, 28JAN2014

A new study by an international team of researchers (Spain, Poland) is making progress in furthering the understanding of the surface magnetic behavior of glass-coated microwires and has concluded that they are the major candidates for use as high sensitivity sensors, in mobile phones, for example. [TECHNICAL ARTICLE](#)

Tags: Sensors

Near error-free wireless detection made possible

Science Daily, 23JAN2014

Researchers in the UK have developed a new long-range wireless tag detection system with potential applications in health care, environmental protection and goods tracking. It can pinpoint items with near 100 percent accuracy over a much wider range than current systems. [TECHNICAL ARTICLE](#)

Tags: Sensors, S&T UK

Human-computer interactions could be improved by a new efficient and accurate hand-gesture-recognition model

PhysOrg.com, 22JAN2014

Programming a computer to accurately identify hand gestures is particularly challenging because of the speed, complexity and dexterity of human hand movements. Researchers in Singapore have successfully tested a new model capable of estimating hand movements and poses using only raw data, thus allowing for faster processing. [TECHNICAL ARTICLE](#)

Tags: Sensors ■

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