



S&T NEWS BULLETIN

THE LATEST IN SCIENCE AND TECHNOLOGY RESEARCH NEWS

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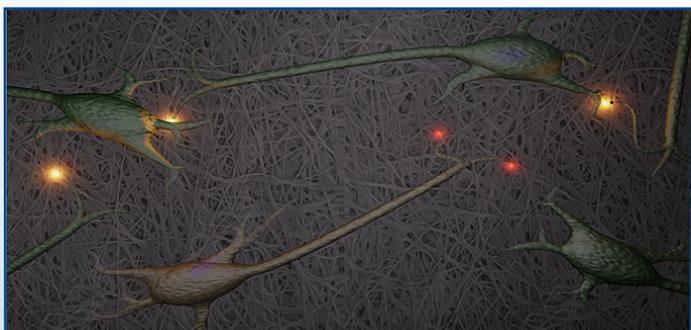
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FEATURE ARTICLES



Nerve cells growing on a three-dimensional nanocellulose scaffold. Functioning synapses are yellow; the red spots show where synapses have been destroyed (credit: Philip Krantz, Chalmers)

[First step toward creating a 3D artificial brain](#)

[KurzweilAI, 20MAR2012](#)

Researchers from the University of Gothenburg have taken the first step in creating a three-dimensional model of the brain by attaching neurons to a positively charged nanocellulose scaffold. The researchers found in their experiments that neurons began to develop and generate synapses and a neural network of hundreds of cells was produced. The researchers could then use electrical impulses and chemical signal substances to generate nerve impulses that spread through the network in much the same way as they do in the brain.

Tags: Breakthrough technology, Neuroscience, Featured Article

[How to see around corners](#)

[Nature News, 20MAR2012](#)

MIT researchers fire a pulse of laser light at a wall on the far side of the hidden scene, and record the time at which the scattered light reaches a camera. Photons bounce off the wall onto the hidden object and back to the wall, scattering each time, before a small fraction

eventually reaches the camera, each at a slightly different time. It's this time resolution that provides the key to revealing the hidden geometry. [VIDEO TECHNICAL ARTICLE: Andreas Velten, et al., Recovering three-dimensional shape around a corner using ultrafast time-of-flight imaging.](#)

Tags: Breakthrough technology, Imaging technology, Featured Article

[Robotics Trends for 2012](#)

[IEEE Spectrum, 20MAR2012](#)

We focused on emerging areas and we “followed the money,” looking at where funding is going. For example, the [National Robotics Initiative](#), spearheaded by the U.S. National Science Foundation, will put a lot of resources into robots that can collaborate with people. DARPA, for its part, has multiple programs that involve manipulation and bionic devices. Europe's Framework Programmes is funding development of “cognitive systems and robots” that can assist people in everyday tasks. And in Asia, the decades-long funding of healthcare robots for older adults has intensified.

Tags: Autonomous systems & robotics, Robotics, Featured Article

S&T NEWS ARTICLES

ADVANCED MATERIALS

[Explosibility of nanoparticles](#)

[Nanowerk, 20MAR2012](#)

Recent studies have found that nanomaterials - in this case dusts and powders having nanosize particles - exhibit an explosion severity which is not disproportionate to micrometer-sized materials, but the likelihood of explosion is quite high due to very low ignition energies and temperatures.

Tags: Advanced materials, Nanomaterials

continued...

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Tailored optical material from DNA: Light-modifying nanoparticles

Science Daily, 14MAR2012

In the human body genetic information is encoded in DNA. Using artificial DNA molecules, an international team of scientists have produced nanostructured materials that can be used to modify visible light by specification.

Tags: *Advanced materials, Nanomaterials*

AUTONOMOUS SYSTEMS & ROBOTICS

NRL Tests Robotic Fueling of Unmanned Surface Vessels

NRL, 20MAR2012

Engineers from the NRL Spacecraft Engineering Department (SED) successfully demonstrate the robotic fluids transfer from a stationary platform to an Unmanned Surface Vehicle (USV) in wave heights greater than three feet. The Rapid Autonomous Fuel Transfer (RAFT) project exhibits the ability to track the motion of a Sea Fox naval vessel, safely emplace a magnetic refueling fitting to an on-board refueling receptacle and successfully complete fluids transfer.

Tags: *Autonomous systems & robotics, Military technology, NRL, Robotics*

UA engineer launches robotic planetary Lake Lander

PhysOrg.com, 20MAR2012

Researchers at the University of Arizona have developed an autonomous robotic lake lander that could be used to explore this planet and others. Their aim is to endow robots with curiosity. They want robots to want to investigate certain situations and environments, and then learn from those investigations so they can make increasingly smarter choices about where to go and what to investigate next.

Tags: *Autonomous systems & robotics, Robotics*

VIDEO Friday: Skilled Gymnasts, Giant Spiders, Robot Beatdowns, and How to Murder a Grapefruit

IEEE Spectrum, 16MAR2012

You'll see a little robot gymnast showcase his talents on the high bar, a huge robot spider that can climb mountains, CHARLI-2 getting hit with a shoe on a stick, a fate marginally worse than being eaten for a hapless grapefruit, and more.

Tags: *Autonomous systems & robotics, Robotics*

Japan Makes Seat Cushion Sized Amoeboid Blob-like Robot

Next Big Future, 14MAR2012

Researchers in Japan are exploring the way in which robots that lack a centralized command center—i.e. a brain—can accomplish things anyway. Slime molds are a perfect

model for this sort of thing, because they don't even have the primitive neural nets that characterize the coordinated swimming and feeding actions in jellyfish.

Tags: *Autonomous systems & robotics, Robotics, S&T Japan*

COUNTER WMD

Killer silk: Making silk fibers that kill anthrax and other microbes in minutes

Science Daily, 14MAR2012

Researchers have developed a chlorinated form of silk, which involves soaking silk in a solution that includes a substance similar to household bleach and letting it dry. Silk treated for just an hour killed essentially all of the E. coli bacteria tested on it within 10 minutes and did similarly well against spores of a close anthrax relative used as a stand-in. They describe a range of potential uses for this new killer silk, including make-shift curtains and other protective coatings that protect homes and other buildings in the event of a terrorist attack with anthrax.

Tags: *Counter WMD*

ENERGY

Nuclear fusion simulation shows high-gain energy output

R&D Magazine, 20MAR2012

High-gain nuclear fusion could be achieved in a preheated cylindrical container immersed in strong magnetic fields, according to a series of computer simulations performed at Sandia National Laboratories. The simulations show the release of output energy that was many times greater than the energy fed into the container's liner.

Tags: *Energy, Government S&T, Nuclear energy*

NEC goes ultra-thin with 0.3mm-thick batteries

PhysOrg.com, 18MAR2012

NEC, which has been working on what is called "organic radical battery" (ORB) technology for some years, has announced its latest ORB breakthrough, the 0.3mm thick ORB. On full charge, the new battery prototype can refresh a screen 2,000 times. A recharge takes under a minute, about 30 seconds. The new batteries maintain 75 percent of their charge-discharge after 500 charges.

Tags: *Energy, Battery, S&T Japan*

Thermosolar power station in Spain works at night

PhysOrg.com, 18MAR2012

The mechanism is very easy to explain: the panels reflect the sun's rays on to the tower, transmitting energy at an intensity 1,000 times higher than that of the sun's rays reaching the earth. Energy is stored in a vat filled with molten salts at a temperature of more than 500 degrees C (930 F). Those salts are used to produce steam to turn the turbines and produce electricity.

Tags: *Energy, Solar energy*

continued...

“Every great advance in science has issued
from a new audacity of imagination.” JOHN DEWEY

Silicon electrodes for high density batteries

Next Big Future, 17MAR2012

Silicon, which undergoes 400% volume expansion when alloying with lithium, is an extreme case and represents an excellent model system for study. Here, we show that fracture locations are highly anisotropic for lithiation of crystalline Si nanopillars and that fracture is strongly correlated with previously discovered anisotropic expansion.

Tags: Energy, Battery, Materials science

Solar Research Blooming in Israeli Desert

IEEE Spectrum, 14MAR2012

The Ben-Gurion National Solar Energy Center combines academic research with an industry testing facility. And it's pretty much located in the perfect place: The Negev Desert gets less than four inches of rain per year. Companies bring prototypes and equipment here to test alongside university researchers. In Israel, though solar power doesn't yet provide much in the way of electricity, 90 percent of homes get their hot water from a solar heater on the roof. Ben-Gurion publications

Tags: Energy, Solar energy

ENVIRONMENTAL SCIENCE

New paper by Notre Dame researchers describes method for cleaning up nuclear waste

EurekAlert, 20MAR2012

Researchers at the University of Notre Dame showcase Notre Dame Thorium Borate-1 (NDTB-1) as a crystalline compound which can be tailored to safely absorb radioactive ions from nuclear waste streams. Once captured the radioactive ions can then be exchanged for higher charged species of a similar size, recycling the material for re-use. Tests have shown that the Notre Dame compound successfully removes ⁹⁹Tc from nuclear waste and also exhibits positive exchange selectivity for greater efficiency.

Tags: Environmental science

GOVERNMENT S&T

Mysterious objects at the edge of the electromagnetic spectrum (w/video)

PhysOrg.com, 19MAR2012

NASA has many telescopes "working the wavelengths" up and down the electromagnetic spectrum. One of them, the Fermi Gamma-Ray Telescope orbiting Earth, has just crossed a new electromagnetic frontier. Before Fermi was launched in June 2008, there were only four known

celestial sources of photons in this energy range. In 3 years Fermi has found almost 500 more.

Tags: Government S&T, NASA, Science without borders

How to Kill China's 'Carrier-Killer' Missile: Jam, Spoof and Shoot

Wired, 17MAR2012

China has developed a missile that would turn an aircraft carrier into a two-billion-dollar hulk of twisted metal, flame, and dead sailors. "You want to spoof them, preclude detection, jam them, shoot them down if possible, get them to termination, confuse it," Adm. Jonathan Greenert said. "The concept is end-to-end, and the capabilities therein [are] what we're pursuing."

Tags: Government S&T, Military technology

Silicon-carbon electrodes snap, swell, don't pop

e! Science News, 14MAR2012

A study that examines a new type of silicon-carbon nanocomposite electrode reveals details of how they function and how repeated use could wear them down. The study also provides clues to why this material performs better than silicon alone. With an electrical capacity five times higher than conventional lithium battery electrodes, silicon-carbon nanocomposite electrodes could lead to longer-lasting, cheaper rechargeable batteries for electric vehicles.

Tags: Government S&T, Materials science

IMAGING TECHNOLOGY

Research offers new way to see inside solids

PhysOrg.com, 20MAR2012

Researchers at Yale University have developed a new way of seeing inside solid objects, including animal bones and tissues, potentially opening a vast array of dense materials to a new type of detailed internal inspection. The technique, a novel kind of magnetic resonance imaging (MRI), creates three-dimensional images of hard and soft solids based on signals emitted by their phosphorus content.

Tags: Imaging technology

Google making search smarter with 'semantic' capabilities

PhysOrg.com, 16MAR2012

Google says it is retooling its search machine to go beyond recognizing words in queries and begin understanding what it is people are asking for. To make search smarter, Google is tapping into the virtual brain of a Freebase database of knowledge regarding what things are and how they relate to one another.

Tags: Imaging technology

[The amazing technology that crafted the Webb Telescope technology](#)

PhysOrg.com, 16MAR2012

The creation of the next generation James Webb Space Telescope was only possible as a result of imagining and developing the industrial machines that would make it a reality. In the near future, some of that industrial technology could be in an exhibit for a museum of Industry and Technology.

Tags: *Imaging technology*

FEATURED RESOURCE

[RIKEN Research \(Japan\)](#)

RIKEN is one of Japan's largest research organizations with institutes and centers in locations throughout Japan. RIKEN's 3000+ researchers publish several hundred research articles across a broad spectrum of disciplines in science and technology. RIKEN RESEARCH highlights articles published by RIKEN researchers. [RIKEN RSS](#)

INFORMATION TECHNOLOGY

[Lifebrowser: Data mining gets \(really\) personal at Microsoft \(w/video\)](#)

PhysOrg.com, 17MAR2012

Microsoft Research is doing research on software that could bring you your own personal data mining center with a touch of Proust for returns. In a recent video, Microsoft scientist Eric Horvitz demonstrated the Lifebrowser, which is prototype software that helps put your digital life in meaningful shape. The software uses machine learning to help a user place life events, which may span months or years, to be expanded or contracted selectively, in better context.

Tags: *Information Technology, Data analytics*

[A Quarter-Century of Losing Stuff](#)

MIT Technology Review, 16MAR2012

Today, Kroll Ontrack recovers 35 million GB of data a year (35 PB)—a suitably huge number. But in 1987, Kroll Ontrack only recovered a measly 1.2 GB of data, total—the merest fraction of what your laptop's hard drive is capable of holding. Another interesting tidbit from Kroll Ontrack: only about a quarter of data loss cases are due to human error; some 56% of data loss is a result of hardware failure. [Digital Era](#)

Tags: *Information Technology*

MATERIALS SCIENCE

[Exotic metamaterials will change optics](#)

PhysOrg.com, 18MAR2012

Duke University engineers believe that continued advances in creating ever-more exotic and sophisticated man-made materials will greatly improve their ability to control light

at will. They point out that while this advance was achieved in a specific wavelength of light, the principles used to design and create the metamaterial in their experiments should apply in controlling light in most frequencies.

Tags: *Materials science, Advanced materials*

[Scenic Route for Sound Allows Extra Control](#)

American Institute of Physics, 16MAR2012

Researchers in Hong Kong propose to alter sound waves by diverting them through an array of narrow, circuitous channels, a method that wouldn't work for light. Simulations confirm that so-called metamaterials composed of such channels have unusual properties that let them refract sound in the "wrong" direction and could improve ultrasonic imaging.

Tags: *Materials science, Imaging Technology, Metamaterials*

[Scientists reveal inner workings of magnets that could lead to faster computers](#)

R&D Magazine, 15MAR2012

Using a light source that creates X-ray pulses only one quadrillionth of a second in duration, scientists at the University of Colorado and NIST were able to observe how magnetism in nickel and iron atoms works, and they found that each metal behaves differently. The discovery suggests that the magnetic alloys in hard drives could be engineered to enhance the delivery of the optical energy to the spin system. Many technology experts believe that next-generation computer disk drives will use optically-assisted magnetic recording to achieve much higher drive capacities.

Tags: *Materials science, Information technology*

PHOTONICS

[APEX: At the forefront of what's needed for the next generation of light sources](#)

PhysOrg.com, 16MAR2012

The focus of Berkeley Lab's Advanced Photon Injector Experiment, APEX, is an extraordinary electron gun specially designed for the front end of superconducting accelerators. When it is completed, the APEX gun will be able to produce well-formed bunches of electrons in pulses a few trillionths or even mere quadrillionths of a second long, at rates of up to a million bunches per second.

Tags: *Photonics*

QUANTUM SCIENCE

[Light pulses take a quantum walk](#)

Nanowerk, 20MAR2012

Quantum random motions can now be simulated in two dimensions, providing new insights into the behaviour of quantum objects. Researchers at the Max Planck Institute are the first to successfully realise an arrangement for a quantum walk in two dimensions. The experimental setup can be used to investigate many quantum phenomena.

Tags: *Quantum science*

Physicists Simulate Strongly Correlated Fermions

Newswise, 18MAR2012

Combining known factors in a new way physicists at the University of Massachusetts, Amherst, have solved an intractable 50-year-old problem: How to simulate strongly interacting quantum systems to accurately predict their properties. It could lead to superconductor applications and solving high-energy physics and ultra-cold atoms problems.

Tags: Quantum science

Looking at quantum gravity in a mirror

Science Daily, 14MAR2012

Einstein's theory of gravity and quantum physics are expected to merge at the Planck-scale of extremely high energies and on very short distances. An international collaboration between the groups in Austria and UK has proposed a new quantum experiment using Planck-mass mirrors. Such an experiment could test certain predictions made by quantum gravity proposals in the laboratory.

Tags: Quantum science, Science without borders

S&T POLICY

Nanopore: the Oxford story

PhysOrg.com, 16MAR2012

Professor Hagan Bayley of Oxford University says "we need to make it simple for academics to form a company, don't make them take a year out from their academic work or quit their university job to get things going." The support he received from Isis Innovation and others around the University indeed made spinning out a firm 'relatively easy'. His message to funders and universities is that it's how you treat your researchers that counts; support them and, in time, everyone will reap the rewards.

Tags: S&T policy, S&T UK

China developing low to medium speed maglev as light rail alternative

Next Big Future, 14MAR2012

The medium-low speed S1 Line will make China only the second country, after Japan, to have such a line, said Chang, who led the research team that developed the magnetic levitation, or maglev, technology. Construction is expected to cost about a billion dollars and be completed in 2013, according to earlier reports.

Tags: S&T policy, S&T China

China's Economic Environment: Implications for Military Development

China Sign Post, 14MAR2012

This four-part series will examine four major issues: China's Near Seas military focus and capabilities; China's economic environment and implications for military development; Chinese energy and resource imports and their

potential to drive naval expansion; China's conflict triggers and mitigating factors, particularly economic interdependence.

Tags: S&T policy, Military technology, S&T China

Inside NRL's Laboratory for Autonomous Systems Research

NRL, 14MAR2012

On Friday, March 16, 2012, the Naval Research Laboratory will open a new facility—the Laboratory for Autonomous Systems Research (LASR), at its main site located in Washington, D.C. In advance of the opening, SPECTRA magazine got the inside scoop from Alan Schultz, Director, Autonomous Systems Research at NRL.

Tags: S&T policy, Autonomous Systems & Robotics, Government S&T, Robotics

More than half of Americans doubt US global leadership in 2020

EurekAlert, 14MAR2012

"A lackluster investment in science and innovation is driving fears among Americans about our world dominance in the years ahead," said Research!America Chair and former Illinois Congressman John E. Porter. These concerns will likely increase unless policy makers take action to avoid serious consequences, such as a major loss of U.S. jobs, business, medical breakthroughs and output in innovation.

Tags: S&T policy

Putin promises science boost

Nature News, 14MAR2012

His government will aim to establish several "world-class" research universities by 2020. Putin also promised a substantial increase in public funding of basic and applied research. Putin has promised to increase the amount of grant money distributed by funding agencies from around 15 billion roubles (US\$500 million) a year to 25 billion roubles by 2018. The average size of grants awarded by the Russian Foundation for Basic Research, for example, currently \$12,000 per year, will be "made comparable to Western grants."

Tags: S&T policy, R&D Funding, S&T Russia

China Aims to Launch 100 Satellites with 100 Rockets during 2011-2015

Chinese Academy Of Sciences, 13MAR2012

On average, China will complete about 20 launch missions each year before 2015. It launched 19 satellites, a target orbiter Tiangong-1 and Shenzhou-8 spacecraft with 19 Long March rockets last year, a record high for China's space program in launch numbers. In 2012, China has planned 30 satellite launches with 21 rockets, including the launch of Shenzhou-9 spacecraft, which is scheduled to carry out China's first manned space rendezvous and docking with Tiangong-1 between June and August.

Tags: S&T policy, S&T China

SCIENCE WITHOUT BORDERS

Russia Drafts New Space Exploration Strategy Space Travel, 16MAR2012

By 2030, the Russian orbital satellite clusters must meet up to 95 percent of the domestic demand for services in civilian and defense sectors. Russia is planning to carry out several space exploration missions, including a piloted flight to the Moon with landing on its surface and sending probes to Venus and Jupiter.

Tags: Science without borders, S&T Russia, Space technology

Neutrinos transmit message through solid rock

Nature News, 15MAR2012

First there was the telegraph, then there was the wireless radio, fibre optics and now... neutrinos? Yes, the scions of physics have successfully transmitted a message from a particle accelerator to an underground detector using the ghostly particles.

Tags: Science without borders ■

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