



# S&T NEWS BULLETIN

THE LATEST IN SCIENCE AND TECHNOLOGY RESEARCH NEWS

[Advanced manufacturing \(2\)](#)

[Advanced materials \(4\)](#)

[Autonomous systems & robotics \(6\)](#)

[Breakthrough technology \(2\)](#)

[Communications technology \(1\)](#)

[Cyber security \(1\)](#)

[Energy \(2\)](#)

[Forecasting \(2\)](#)

[Foreign S&T \(2\)](#)

[Imaging technology \(1\)](#)

[Information technology \(1\)](#)

[Materials science \(2\)](#)

[Microelectronics \(3\)](#)

[Neuroscience \(2\)](#)

[Quantum science \(2\)](#)

[S&T policy \(1\)](#)

[Science without borders \(1\)](#)

[Sensors \(2\)](#)

[STEM \(1\)](#)

## FEATURE ARTICLES

### [Leap 3D Out-Kinects Kinect \(w/video\)](#)

[MIT Technology Review, 23MAY2012](#)

The technology can detect motion with up to a hundredth of a millimeter accuracy; it's nuanced enough to detect fingers, for instance, enabling the possibility of touch-free pinch-to-zoom. List of possibilities for the technology: consumers might use it to browse the web; engineers could mould virtual clay; designers could draw precisely in 2-D or 3-D; and new gaming possibilities could evolve. One is hard-pressed to name a profession that might not be changed by this technology: surgeons and pilots, architects and painters, cops and robbers alike will probably have their uses for it. [VIDEO](#)

*Tags: Breakthrough technology, Featured Article*

### [European Physicists Smash Chinese Teleportation Record](#)

[MIT Technology Review, 22MAY2012](#)

Today, physicists in Austria say they've broken the record again, this time by teleporting photons between the two Canary Islands of La Palma and Tenerife off the Atlantic coast of North Africa, a distance of almost 150 kilometres. [TECHINAL ARTICLE](#)

*Tags: Quantum science, Featured Article*

### [Totally RAD: Bio-engineers create rewritable digital data storage in DNA](#)

[Science Daily, 22MAY2012](#)

Scientists have devised a method for repeatedly encoding, storing and erasing digital data within the DNA of living cells. This seems to be an incredibly powerful tool for



Under ultraviolet light, petri dishes containing cells glow red or green depending upon the orientation of a specific section of genetic code inside the cells' DNA. The section of DNA can be flipped back and forth using the RAD technique. (Credit: Image courtesy of Stanford University Medical Center)

studying cancer, aging, organismal development and even the natural environment. In the computer world, their work would form the basis of non-volatile memory. In biotechnology, recombinase-mediated DNA inversion, after the enzymatic processes used to cut, flip and recombine DNA within the cell.

*Tags: Breakthrough technology, Featured Article*

## S&T NEWS ARTICLES

### ADVANCED MANUFACTURING

#### [DARPA, Venter launch assembly line for genetic engineering](#)

[KurzweilAI, 23MAY2012](#)

DARPA has launched a program called "Living Foundries," designed to apply the conventions of manufacturing to living cells. "Living Foundries" aspires to streamline genetic engineering for "on-demand production" of whatever bio-product suits the military's immediate needs, starting with a library of "modular genetic parts."

*Tags: Advanced manufacturing, DARPA, Government S&T*

#### [Humanoid robot works side by side with people](#)

[Science Daily, 22MAY2012](#)

For security reasons, robots have performed their work isolated in cages, and that prevented collaboration between workers and machines. Researches in Europe are embarking on a new era by incorporating the robot Hiro, developed by Kawada Industries in Japan, capable of working shoulder to shoulder with people.

*Tags: Advanced manufacturing*

### ADVANCED MATERIALS

#### [Better, stronger, lighter armor](#)

[R&D Magazine, 22MAY2012](#)

Engineers and applied scientists from CalTech will collaborate on a new project sponsored by the Army, focusing initially on magnesium alloys and boron carbide ceramics. Magnesium alloys are extremely strong, tough, and light-

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[BACK TO TOP](#)

weight. But like most traditional alloys, they have been made empirically so it is difficult to say if the alloys are performing at their peak or if the “recipe” could be improved.

*Tags: Advanced materials, Military technology*

### **Cloak of invisibility: Engineers use plasmonics to create an invisible photodetector**

[Science Daily, 22MAY2012](#)

Engineers at Stanford University have for the first time used “plasmonic cloaking” to create a device that can see without being seen—an invisible machine that detects light. At the heart of the device are silicon nanowires covered by a thin cap of gold. By adjusting the ratio of metal to silicon they capitalize on favorable nanoscale physics in which the reflected light from the two materials cancel each other to make the device invisible.

*Tags: Advanced materials*

### **Scientists attempt to grow nanocomposites faster**

[R&D Magazine, 22MAY2012](#)

The researchers will first make the metal nanoparticles in the laboratory via inert gas condensation and then use the nanoparticles to grow materials by LPE (liquid phase epitaxy). Instead of growing nanomaterials at one micron per hour LPE will enable us to grow nanomaterials at one micron per minute.

*Tags: Advanced materials*

### **Nano Devices Based on Block Copolymers Could Lead to Next Generation of Computing**

[IEEE Spectrum, 18MAY2012](#)

Irish researchers have demonstrated a method for fabricating large-area arrays of silicon nanowires through directed self-assembly of block copolymer nanopatterns that can be easily integrated into current manufacturing techniques. The development could revolutionize the manufacturing of silicon chips and lead to a new generation of computers and real-time 3D video processing.

*Tags: Advanced materials*

## **AUTONOMOUS SYSTEMS & ROBOTICS**

### **Microbots Made of Bubbles Have Engines Made of Lasers**

[IEEE Spectrum, 22MAY2012](#)

Researchers at the University of Hawaii have come up with a novel new way of creating non-mechanical microbots using robots made of bubbles with engines made of lasers. To get the bubble robots to move around in saline solution, a 400 mW 980nm laser is shone through the bubble onto the heat-absorbing surface of the working area. Moving the laser to different sides of the bubble gives you complete 360 degree steering, and since the velocity of the bubble is proportional to the intensity of the laser, you can go as slow as you want or as fast as about 4 mm/s. [VIDEO](#)

*Tags: Autonomous systems & robotics, Microrobots*

### **Morphing robots and shape-shifting sculptures: Origami-inspired design merges engineering, art**

[Science Daily, 22MAY2012](#)

Researchers at Purdue University have shown how to create morphing robotic mechanisms and shape-shifting sculptures from a single sheet of paper. The new method, called Kaleidogami, uses computational algorithms and tools to create precisely folded structures. They have created a variation called Kinetogami to create foldable robot-like mechanisms. They envision robots that can “re-configure” themselves to suit the terrain, morphing from a slithering inchworm motion to a six-legged walking gait.

*Tags: Autonomous systems & robotics*

### **Robotic fish to patrol for pollution in harbours (w/video)**

[BBC News, 22MAY2012](#)

The fish, which measure about 1.5m-long, may be a little larger than their real-life counterparts, but their movements closely mimic them. Instead of propellers or thrusters for propulsion it uses the fin of a fish to propel through the water. The fish use micro-electrode arrays to sense contaminants. In their current form they can detect phenols and heavy metals such as copper and lead, as well as monitor oxygen levels and salinity. But the team has tried to build in flexibility. [VIDEO](#)

*Tags: Autonomous systems & robotics, Robotics*

### **This Robot Makes Its Own Custom Tools Out of Glue**

[IEEE Spectrum, 18MAY2012](#)

Roboticians at ETH Zurich are trying to design a robot with just one tool, but the tool they've chosen is a hot glue Hot Melt Adhesive, or HMA, gun that their robot can use to manufacture any other tools that it needs for the task. [VIDEO](#)

*Tags: Autonomous systems & robotics, Robotics*

### **Video Friday: Robo Cheetah Goes for a Trot, Mind-Controlled Arms, and Robots Playing Football**

[IEEE Spectrum, 18MAY2012](#)

Also in the news this week was this story about brain implants being used by disabled humans to directly control robot arms with their thoughts. The concept has already been shown to work with monkeys, and now humans have shown that they can mentally direct robots to assist them with tasks like drinking coffee.

*Tags: Autonomous systems & robotics, Robotics*

### **Robots of the future designed at new Bristol laboratory**

[BBC News, 16MAY2012](#)

It is an academic lab, exploring the technologies that will build the robots of the future. Scientists at the lab come from 17 countries and have a range of specialisms. As well

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“The scientist is not a person who gives the right answers, he is one who asks the right questions.” CLAUDE LEVI-STRAUSS

as electrical engineers and mechanical engineers, they have got microbiologists, neuroscientists, surgeons, even psychologists working in the laboratory.

*Tags: Autonomous systems & robotics, S&T Policy, S&T UK*

## COMMUNICATIONS TECHNOLOGY

### **Researchers improve fast-moving mobile networks**

[e! Science News, 21MAY2012](#)

Mobile ad hoc networks (MANETs) allow people in multiple, rapidly-moving vehicles to communicate with each other -- such as in military or emergency-response situations. North Carolina State University researchers developed a method to improve the ability of each node in the network to select the best path for relaying data, as well as the best for transmitting the data that ensures reliable reception.

*Tags: Communications Technology*

## CYBER SECURITY

### **China Continues its Focus on Cyber: Report**

[Defense News, 18MAY2012](#)

China continues to develop cyber weapons that it is using to carry out computer network intrusions and data theft activities around the globe, according to the annual DOD report on China's military capabilities. [REPORT](#)

*Tags: Cyber security, S&T China*

## ENERGY

### **Bright future for solar power from space**

[Science Daily, 22MAY2012](#)

Researchers at the University of Glasgow have tested equipment in space that would provide a platform for solar panels to collect the energy and allow it to be transferred back to earth through microwaves or lasers directly to specific areas. This would provide a reliable, quality source of energy and would remove the need for storing energy.

*Tags: Energy, Solar energy*

### **Scientists uncover a photosynthetic puzzle**

[R&D Magazine, 22MAY2012](#)

The quantum effects observed in the course of the experiment hint that the natural light-harvesting processes involved in photosynthesis may be more efficient than previously indicated by classical biophysics. The result of the study could significantly influence efforts by chemists and nanoscientists to create artificial materials and devices that can imitate natural photosynthetic systems.

*Tags: Energy*

## FORECASTING

### **Wearable devices to usher in context-aware computing**

[Emerging Technology Trends, 18MAY2012](#)

This blog post lays out a vision for intelligent wearable devices and sensors that will redefine relevance and greatly simplify and automate the lives of users.

*Tags: Forecasting, Information technology*

### **New journal on disruptive science and technology launched by Mary Ann Liebert Inc. publishers**

[EurekAlert, 17MAY2012](#)

Disruptive Science and Technology provides a custom-designed forum for the publication of breakthrough science and engineering that has the capacity to dynamically improve our society. Bimonthly; \$1,595.00 per year; some open access articles. [Disruptive Science and Technology, Editorial board](#) (Clayton Christensen, Ray Kurzweil, George Whitesides among others)

*Tags: Forecasting*

## FOREIGN S&T

### **Chinese navigation system to cover Asia-Pacific this year**

[China Daily, 22MAY2012](#)

China began to build the Beidou system in 2000 with a goal of breaking its dependence on the U.S. Global Positioning System and creating its own global positioning system by 2020. Since its debut in 2000, the system has been widely used in transportation, fishery, hydrological monitoring, weather forecasting and disaster mitigation. Officials say China will launch three more satellites for the Beidou network this year and a global positioning satellite and navigation system will be completed by 2020.

*Tags: Foreign S&T, S&T China, Space technology*

### **Surprise! China's Stealth Jets Are 2 Years Ahead of Schedule**

[Wired, 18MAY2012](#)

According to the Pentagon's new report on the Chinese military, China has three nuclear-powered submarines. China also fielded an "improved" amphibious assault vessel last year. The Chinese military keeps its research, foreign military acquisitions and nuclear modernization off its books. The report estimates that China's declared \$106 billion annual military budget is really more like \$120 to \$180 billion.

*Tags: Foreign S&T, Military technology, S&T China*

## IMAGING TECHNOLOGY

**Zooming in On Bacterial Weapons in 3-D: Structure of Bacterial Injection Needles Deciphered at Atomic Resolution**[Science Daily, 21MAY2012](#)

Dangerous diseases such as plague and cholera are caused by bacteria which through sophisticated needle-like structures release molecular agents into their host cell, thereby evading the immune response. Researchers at the Max Planck Institute in cooperation with colleagues at the University of Washington have now elucidated the structure of such a needle at atomic resolution. Their findings might contribute to drug tailoring and the development of strategies which specifically prevent the infection process.

*Tags: Imaging technology, Biology*

## INFORMATION TECHNOLOGY

**Introducing the Knowledge Graph: things, not strings**[Google Blog, 16MAY2012](#)

The Knowledge Graph enables you to search for things, people or places that Google knows about—landmarks, celebrities, cities, sports teams, buildings, geographical features, movies, celestial objects, works of art and more—and instantly get information that's relevant to your query. Google's Knowledge Graph isn't just rooted in public sources. It currently contains more than 500 million objects, as well as more than 3.5 billion facts about and relationships between these different objects.

*Tags: Information Technology*

## FEATURED RESOURCE

**Futurity**

Futurity features the latest discoveries by scientists at top research universities in the US, UK, Canada, and Australia. The nonprofit site, which launched in 2009, is supported solely by participating universities. [RSS](#)

## MATERIALS SCIENCE

**Graphite Enters Different States of Matter in Ultrafast Experiment**[Science Newsline, 22MAY2012](#)

Using the Linac Coherent Light Source (LCLS) X-ray Free-Electron Laser (XFEL) at SLAC National Accelerator Laboratory at Stanford, researchers heated graphite to induce a transition from solid to liquid and to warm-dense plasma. Ultrafast phase transitions from solid to liquid and plasma states are important in the development of new material-synthesis techniques, in ultrafast imaging, and high-energy density science.

*Tags: Materials science***Rare-earth half-sandwiches prove rewarding**[RIKEN, 18MAY2012](#)

Mechanistic experiments revealed that the selectivity arose from preferential binding of the rare earth to pyridine's nitrogen atom—an action that simultaneously stabilizes the catalytic intermediate and activates the ortho-C-H bond. After the insertion of the olefin into the rare earth-pyridine bond, the reactive catalyst dehydrogenated another pyridine molecule. This action produced the newly modified pyridine derivative and regenerated the catalytic intermediate.

*Tags: Materials science*

## MICROELECTRONICS

**Full control of plastic transistors**[Science Daily, 22MAY2012](#)

If a transistor is to be usable in a logic circuit, the threshold voltage, where the transistor switches from off to on, or zero to one, must be well defined. Researchers in Sweden have shown that by changing the material on the gate electrode, the electrode in a transistor that governs the current through both the other electrodes, the threshold voltage can also gradually be shifted.

*Tags: Microelectronics***New silicon memory chip developed**[Nanowerk, 22MAY2012](#)

The novel structure developed by researchers at the University of London performs the switch in resistance much more efficiently than has been previously achieved. In their material, the arrangement of the silicon atoms changes to form filaments of silicon within the solid silicon oxide, which are less resistive. The presence or absence of these filaments represents a 'switch' from one state to another.

*Tags: Microelectronics, Advanced materials***Return of the vacuum tube**[R&D Magazine, 22MAY2012](#)

With the advent of the solid-state transistor and semiconductor-based flat panel display technology, the vacuum tube has virtually disappeared from consumer electronics. But a team of researchers in Korea and at NASA's Ames Research Center have combined the best traits of both technologies to create a vacuum channel transistor just 150 nm long.

*Tags: Microelectronics*

## NEUROSCIENCE

**GPS for the brain: UGA researchers develop new brain map**[e! Science News, 22MAY2012](#)

University of Georgia researchers have developed a map of the human brain that shows great promise as a new guide to the inner workings of the body's most complex and critical organ. With this map, researchers hope to create a next-

*continued...*[BACK TO TOP](#) 4

generation brain atlas that will be an alternative option to the atlas created by German anatomist Korbinian Brodmann more than 100 years ago, which is still commonly used in clinical and research settings.

*Tags: Neuroscience*

### **Training the blind to 'see' using new device to 'listen' to visual information**

Science Daily, 22MAY2012

A method developed for training blind persons to "see" through the use of a sensory substitution device (SSD) has enabled those using the system to actually "read" an eye chart with letter sizes smaller than those used in determining the international standard for blindness. The device converts images from a miniature camera into "soundscapes," using a predictable algorithm, allowing the user to listen to and then interpret the visual information coming from the camera.

*Tags: Neuroscience*

## QUANTUM SCIENCE

### **Quantum computing: The light at the end of the tunnel may be a single photon**

EurekAlert, 18MAY2012

Researchers in Europe have taken one step toward this goal by creating an all-semiconductor quantum logic gate, a controlled-NOT (CNOT) gate. To produce the all-important initial photon, the researchers embedded a quantum dot in a microcavity on a pillar of silicon. A laser pulse then excited one of the electrons in the quantum dot, which emitted a single photon when the electron returned to its resting state.

*Tags: Quantum science*

## S&T POLICY

### **Global council aims to coordinate science**

Nature News, 21MAY2012

Not all national funding agencies manage their science in the same way which can hamper projects that span borders. To tackle the problem, a voluntary forum, the Global Research Council (GRC), has been formed to share best practice and encourage common principles. Last week, the leaders of about 50 national research-funding agencies met at the NSF to discuss the GRC's agenda: issues such as peer review, data sharing, research integrity, open access, career development and ethical conduct in research on humans.

*Tags: S&T policy*

## SCIENCE WITHOUT BORDERS

### **Scientists develop air-conditioned bulletproof vest to keep cops cool**

Digital Trends, 17MAY2012

Scientists in Switzerland have developed a vest which incorporates an integrated cooling system consisting of special water-filled pads and a number of small fans. As the

water evaporates it cools its surroundings, while the fans help to distribute the cool air around the wearer's body.

*Tags: Science without borders*

## SENSORS

### **New American Chemical Society Video: Behind the Scenes Tour of an Electronic Nose Lab**

Science Newsline, 21MAY2012

The e-noses have potential applications in public safety as bomb or toxic substance detectors. In the future, they might even go into general use in early diagnosis of disease by detecting telltale signs of tuberculosis, lung cancer and other disorders on a patient's breath. [VIDEO](#)

*Tags: Sensors*

### **University of Nevada, Reno, scientists design indoor navigation system for blind**

e! Science News, 21MAY2012

University of Nevada researchers explained how a combination of human-computer interaction and motion-planning research was used to build a low-cost accessible navigation system, called Navatar, which can run on a standard smartphone.

*Tags: Sensors*

## STEM

### **New report highlights the role of math and computational science in industrial innovation**

EurekAlert, 21MAY2012

Mathematical scientists in industry work in interdisciplinary team environments, with mathematical methods. Successes are often attributed to the larger dominant discipline of the team or research group. The goal of this report, which was funded by the National Science Foundation, is to underscore the essential role of mathematics in these diverse disciplines, and to help raise awareness of the value of mathematics in industry. [REPORT](#)

*Tags: STEM ■*

## ABOUT THIS PUBLICATION

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