



# S&T NEWS BULLETIN

THE LATEST IN SCIENCE AND TECHNOLOGY RESEARCH NEWS

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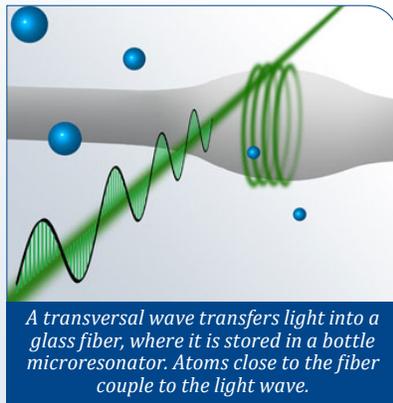
## FEATURE ARTICLES

### [Helicopter-light-beams—a new tool for quantum optics](#)

[Nanowerk, 27MAY2013](#)

Scientists at the Vienna University of Technology performed atom-physics experiments with light oscillating in the longitudinal direction. This opens up the possibility of constructing extremely sensitive sensors with the ability to detect single atoms with light. [TECHNICAL ARTICLE](#)

Tags: [Photonics](#), [Featured Article](#)



### [Scientists build record-setting metamaterial flat lens](#)

[Nanowerk, 25MAY2013](#)

For the first time, scientists at NIST have demonstrated a new type of lens that bends and focuses UV light in such an unusual way that it can create ghostly, 3D images of objects that float in free space. The easy-to-build lens could lead to improved photolithography, nanoscale manipulation and manufacturing, and even high-resolution three-dimensional imaging. [TECHNICAL ARTICLE](#)

Tags: [Government S&T](#), [Featured Article](#)

### [Sensitive bomb detector to rove in search of danger](#)

[EU R&D News, 23MAY2013](#)

The EU-funded OPTIX (Optical Technologies for the Identification of Explosives) team uses advanced optical technologies that can be mounted on a compact remote vehicle and then used to detect quantities of less than 1 mg of explosives from up to 20 metres away. [VIDEO](#)

Tags: [Explosives](#), [S&T EU](#), [Featured Article](#)

## S&T NEWS ARTICLES

### ADVANCED MANUFACTURING

#### [Opening doors to foldable electronics with inkjet-printed graphene](#)

[Science Daily, 25MAY2013](#)

Northwestern University researchers have recently developed a graphene-based ink that is highly conductive and tolerant to bending, and they have used it to inkjet-print graphene patterns that could be used for extremely detailed, conductive electrodes. [TECHNICAL ARTICLE](#)

Tags: [Advanced manufacturing](#)

#### [Baby's life saved with 3D printed device to restore breathing](#)

[KurzweilAI, 24MAY2013](#)

Researchers at the University of Michigan were able to make the custom-designed, custom-fabricated device using high-resolution imaging and computer-aided design. The device was created directly from a CT scan of the baby's trachea/bronchus, integrating an image-based computer model with laser-based 3D printing to produce the splint.

Tags: [Advanced manufacturing](#), [Biotechnology](#), [Medical technology](#)

### AUTONOMOUS SYSTEMS & ROBOTICS

#### [Video Friday: AR Drone Stunt, Real Transformer, and Futurama Justice](#)

[IEEE Spectrum, 24MAY2013](#)

Parrot's AR Drone is, as far as robots go, nearly indestructible. To highlight this fact, Parrot spent more than four months preparing and filming a super slow-mo video of a drone flying through fire, water, and dust.

Tags: [Autonomous systems & robotics](#)

#### [Russia developing anti-terrorist robots](#)

[KurzweilAI, 23MAY2013](#)

Russian experts are developing robots designed to minimize casualties in terrorist attacks and neutralize terrorists. Other anti-terror equipment Russia is developing includes systems that can see terrorists through

obstacles and effectively engage them in a standoff mode at a long distance without injuring their hostages.

*Tags: Autonomous systems & robotics, S&T Russia*

### **Robots Learn to Take a Proper Handoff by Following Digitized Human Examples**

[Science Newline, 20MAY2013](#)

Researchers from Disney and KIT used motion capture data with two people to create a database of human motion, so that a robot can realize what a human is doing and make a reasonable estimate of where he is likely to extend his hand.

*Tags: Autonomous systems & robotics*

## BIG DATA

### **Big Data—for better or worse**

[PhysOrg.com, 23MAY2013](#)

A full 90% of all the data in the world has been generated over the last two years. The internet companies are awash with data that can be grouped and utilised. Is this a good thing?

*Tags: Big data*

## BIOTECHNOLOGY

### **New One-Step Process for Designer Bacteria**

[Newswise, 27MAY2013](#)

Researchers in Australia in collaboration with Stanford University have developed a new one-step bacterial genetic engineering process called ‘clonetegration’, where bacteria are produced by integrating extra pieces of genetic material into the DNA of bacteria, in this case E. coli, so that the bacteria will make a desired product.

*Tags: Biotechnology, Biology, S&T Australia*

### **New Wireless Electronics Could Heal Wounds and Then Dissolve**

[Wired, 24MAY2013](#)

The biocompatible remote-controlled circuit, built by researchers at Illinois University, is an important step toward building dissolvable electronics that could function as “electroceuticals,” devices that perform therapeutic roles and then disappear. Such roles could include stimulating nerve and bone growth, helping heal wounds, delivering drugs, or acting as antibiotics.

*Tags: Biotechnology*

## COMMUNICATIONS TECHNOLOGY

### **Plasmonics: A wave without diffraction**

[Science Daily, 24MAY2013](#)

Researchers in Singapore helped to develop the electromagnetic wave, which can travel some 80 micrometers in a straight line without diffracting.

*Tags: Communications Technology*

### **New method for tailoring optical processors**

[Science Daily, 23MAY2013](#)

Rice University scientists have unveiled a robust new method for arranging metal nanoparticles in geometric patterns that can act as optical processors that transform incoming light signals into output of a different color.

[TECHNICAL ARTICLE](#)

*Tags: Communications Technology*

## ENVIRONMENTAL SCIENCE

### **Tropical upper atmosphere ‘fingerprint’ of global warming**

[Science Daily, 24MAY2013](#)

The winds of the quasi-biennial oscillation in the tropical upper atmosphere have greatly weakened at some altitudes over the last six decades, according to a new study by researchers at the University of Hawaii. The finding is consistent with computer model projections of how the upper atmosphere responds to global warming induced by increased greenhouse gas concentrations.

[TECHNICAL ARTICLE](#)

*Tags: Environmental science, Climatology*

### **China Conducts Scientific Probe in High-altitude Atmosphere**

[Chinese Academy of Science, 22MAY2013](#)

Chinese scientists conducted an experiment in the high-altitude atmosphere and near-Earth space with the launch of a sounding rocket. The experiment was designed to investigate energetic particles and magnetic fields in the ionized stratum and near-Earth space.

*Tags: Environmental science, S&T China*

## FORECASTING

### **Understanding the past and predicting the future by looking across space and time**

[Science Daily, 25MAY2013](#)

Researchers from the University of Wisconsin-Madison and elsewhere validate, “space-for-time substitution”, a fundamental assumption at the very heart of a popular way to predict relationships between complex variables.

[TECHNICAL ARTICLE](#)

*Tags: Forecasting*

## GOVERNMENT S&T

### **Warrior Web Prototype Takes Its First Steps**

[DARPA News, 22MAY2013](#)

Warrior Web seeks to create a soft, lightweight under-suit that would help reduce injuries and fatigue common for soldiers, who often carry 100-pound loads for extended periods over rough terrain. DARPA envisions Warrior Web augmenting the work of soldiers’ own muscles to significantly boost endurance, carrying capacity and overall

“The whole history of physics proves that a new discovery is quite likely lurking at the next decimal place.” F.K. RICHTMEYER

warfighter effectiveness—all while using no more than 100W of power. [VIDEO](#)

Tags: Government S&T, DARPA

## IMAGING TECHNOLOGY

### [New analysis yields improvements in a classic 3-D imaging technique](#)

Science Daily, 25MAY2013

Researchers in Australia have enabled significant increases in image quality in a widely used 3D printing technique that is more than 100 years old. The technique works by combining the left and right images of a stereoscopic image pair into the red and blue color channels of the output anaglyph image.

Tags: Imaging technology

## INFORMATION TECHNOLOGY

### [Advanced biological computer developed](#)

Science Daily, 24MAY2013

Using only biomolecules, scientists in Israel have constructed an advanced biological transducer, a computing machine capable of manipulating genetic codes, and using the output as new input for subsequent computations.

[TECHNICAL ARTICLE](#)

Tags: Information Technology

## MATERIALS SCIENCE

### [Self assembled nanostructures for hostile environments](#)

Nanowerk, 28MAY2013

Researchers in Japan have developed a new self-assembled nanostructure that can survive very hot or saline environments. They hope that their micelles could provide the basis for many new materials in the field of green chemistry, because their structural robustness is based purely on their shape rather than on complex chemical reactions.

Tags: Materials science, S&T Japan

### [Formula for Turning Cement Into ‘Metal’](#)

Science Daily, 27MAY2013

Scientists at Argonne National Laboratory have found the formula for turning liquid cement into liquid metal. This makes cement a semi-conductor and opens up its use in the profitable consumer electronics marketplace for thin films, protective coatings, and computer chips.

Tags: Materials science, Government S&T

### [Exploring friction at the nanoscale by simulating toy-like systems](#)

Nanowerk, 25MAY2013

Scientists in Italy have studied the conditions in which, at the nanoscopic level, the switch from smooth sliding to stick-slip regime occurs, simulating ‘toy-like’ systems of ‘cold ions.’ Their research advances the understanding of the complex stick-slip phenomenon that occurs at every scale. [TECHNICAL ARTICLE](#)

Tags: Materials science, S&T Italy

### [Solving a semiconductor riddle](#)

MIT News, 25MAY2013

One significant controversy surrounds the reason for the high-intensity light output from a leading LED semiconductor material, indium gallium nitride (InGaN), whether or not indium-rich clusters form within the material and provide the LED’s remarkable efficiency. Now, researchers from MIT and Brookhaven National Laboratory have demonstrated definitively that clustering is not the cause. [TECHNICAL ARTICLE](#)

Tags: Materials science

### [A quantum simulator for magnetic materials](#)

Nanowerk, 23MAY2013

Scientists in Germany have developed a new kind of device that uses laser beams and atoms to emulate magnetic materials. The work might guide researchers towards finding new materials with interesting properties for future technologies and applications. [TECHNICAL ARTICLE](#)

Tags: Materials science, S&T Germany

### [Whirlpools on the nanoscale could multiply magnetic memory](#)

EurekAlert, 22MAY2013

Researchers at Lawrence Berkeley National Laboratory propose multibit storage in which each unit has four states instead of two and can store twice the information. [TECHNICAL ARTICLE](#)

Tags: Materials science, Advanced materials, Government S&T

## MEDICAL SCIENCES

### [Nano-needles for cells](#)

Nanowerk, 25MAY2013

Nano-sized needles developed by researchers in Norway can force medicine into cells, even when the cell membranes offer resistance. The needles will make it easier to study the effects of medicines on cells.

Tags: Medical Sciences, Biology

## MICROELECTRONICS

**[Metallic-to-semiconducting nanotube conversion greatly improves transistor performance](#)**[PhysOrg.com](#), 28MAY2013

Scientists at the University of Georgia have demonstrated that simply decorating the m-SWNTs with copper oxide nanoparticles can convert them into s-SWNTs, resulting in a 205-fold increase in a transistor's on/off current ratio.

TECHNICAL ARTICLE

*Tags: Microelectronics, Materials science***[Stitching defects into world's thinnest semiconductor](#)**[Science Daily](#), 25MAY2013

Researchers at Columbia University have grown high-quality crystals of molybdenum disulfide, the world's thinnest semiconductor, and studied how these crystals stitch together at the atomic scale to form continuous sheets, gaining key insights into the optical and electronic properties of this new "wonder" material.

TECHNICAL ARTICLE

*Tags: Microelectronics, Advanced materials, Materials science***[New technique may open up an era of atomic-scale semiconductor devices](#)**[Science Daily](#), 24MAY2013

Researchers at North Carolina State University have developed a new technique for creating high-quality semiconductor thin films at the atomic scale—meaning the films are only one atom thick. The technique can be used to create these thin films on a large scale, sufficient to coat wafers that are two inches wide, or larger.

TECHNICAL ARTICLE

*Tags: Microelectronics*

## FEATURED RESOURCE

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## NEUROSCIENCE

**[Brain can be trained in compassion, study shows](#)**[Science Daily](#), 24MAY2013

A new study by researchers at the University of Wisconsin, Madison, shows that adults can be trained to be more compassionate. The report investigates whether training adults in compassion can result in greater altruistic behavior and related changes in neural systems underlying compassion.

TECHNICAL ARTICLE

*Tags: Neuroscience***[Researchers find potential brain switch for new behavior](#)**[R&D Magazine](#), 22MAY2013

You're standing near an airport luggage carousel and your bag emerges on the conveyor belt, prompting you to spring into action. How does your brain make the shift from passively waiting to taking action when your bag appears? University of Michigan research indicates that an increase in acetylcholine seemed to activate or 'switch on' the response to the signal.

*Tags: Neuroscience*

## QUANTUM SCIENCE

**[Towards quantum-dot arrays of entangled photon emitters](#)**[Nature Photonics](#), 26MAY2013

Researchers in Ireland show that with a new family of (111)-grown pyramidal site-controlled InGaAs<sub>1-δ</sub>N<sub>δ</sub> quantum dots, it is possible to overcome previous hurdles and obtain areas with up to 15% of polarization-entangled photon emitters, with fidelities as high as  $0.721 \pm 0.043$ .

*Tags: Quantum science, Quantum dots***[Experiment investigates how classical physics may emerge from quantum physics](#)**[PhysOrg.com](#), 25MAY2013

Researchers at Stony Brook University, New York, suggest that classical physics may emerge in a very natural way in large quantum systems—in this case, 'large' meaning just two coupled subsystems—without the invocation of an external 'environment' responsible for decoherence.

TECHNICAL ARTICLE

*Tags: Quantum science***[Quest for quantum computing advanced](#)**[Science Daily](#), 25MAY2013

An on-going collaboration between physicists from the UK and USA is focusing on understanding, tailoring and tuning the electronic properties of topological insulators (TI)—new materials with surfaces that host a quantum state of matter—at the nanoscale.

TECHNICAL ARTICLE

*Tags: Quantum science*

## S&amp;T POLICY

**[NSF Invests in Science and Engineering Infrastructure in Key Areas Across the Nation](#)**[NSF News](#), 23MAY2013

Delaware, Idaho, Nevada, New Mexico and Oklahoma will each receive \$20 million for strategically aligned, innovative research. Each award recipient, representing a statewide collaboration of academic, private-sector, and state institutions, will receive \$20 million during a five-year period to bolster its science and engineering academic research infrastructure.

*Tags: S&T policy**continued...*

## **Research at the cutting edge of knowledge**

EurekaAlert, 22MAY2013

Brazil announced an investment estimated in US\$ 680 million to support 17 Research, Innovation and Dissemination Centers (RIDCs). Each selected RIDC must develop opportunities to have its research results contribute to commercially and/or socially relevant high-impact applications, as well as contributing to education and dissemination of knowledge.

*Tags: S&T policy*

## **STEM**

### **DFG establishes 11 new research training groups**

EurekaAlert, 22MAY2013

Germany is establishing 11 new Research Training Groups to further support early career researchers. Funding of approximately 39 million euros has been awarded to the new programs for an initial period of four and a half years. The topics covered by the new Research Training Groups range from labour productivity to conflicts of interpretational power and the dynamics of quantum systems.

*Tags: STEM, S&T Germany, S&T Policy ■*

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This publication is authored and distributed by:

**Dr. Brian Beachkofski**

Director, Office of  
Technical Intelligence (OTI)

**Ms. Hema Viswanath**

OTI Corporate Librarian