



# S&T NEWS BULLETIN

THE LATEST IN SCIENCE AND TECHNOLOGY RESEARCH NEWS

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## FEATURE ARTICLES

### [Higgs triumph opens up field of dreams](#)

[Nature News, 10JUL2012](#)

Experimentalists now hope to pin down the properties of the fabled particle. For the most part, the new particle matches the standard model's predictions of how it should decay into other particles. But there are some intriguing hints that this Higgs may not be entirely standard in character.

*Tags: Breakthrough technology, Featured Article*

### [Researchers Develop Technique to Help Pollution Forecasters See Past Clouds](#)

[Science Daily, 10JUL2012](#)

University of Iowa scientists have created a technique to help satellites "see" through the clouds and better estimate the concentration of pollutants, such as soot.

**TECHNICAL ARTICLE**

*Tags: Environmental science, Featured Article*

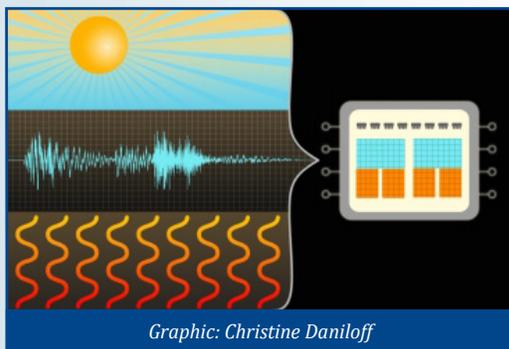
### [New chip captures power from multiple sources](#)

[MIT Technology Review, 09JUL2012](#)

Previous work from MIT focused on the development of computer and wireless-

communication chips that can operate at extremely low power levels that can harness power from natural light, heat and vibrations in the environment. The latest development is a chip that could harness all three of these ambient power sources at once, optimizing power delivery.

*Tags: Energy, Featured Article*



## S&T NEWS ARTICLES

### ADVANCED MATERIALS

#### [Graphene Repairs Holes By Knitting Itself Back Together, Say Physicists](#)

[MIT Technology Review, 10JUL2012](#)

Nobody has yet worked out how to make graphene in large, reliable quantities or how to carve and grow it into the shapes necessary for the next generation of devices. Researchers in UK observed that if you make a hole in graphene, the material automatically knits itself back together again. **TECHNICAL ARTICLE**

*Tags: Advanced materials*

#### [New advanced electronics? Unprecedented subatomic details of exotic ferroelectric nanomaterials](#)

[Science Daily, 10JUL2012](#)

Brookhaven scientists used electron holography to capture images of the electric fields created by the materials' atomic displacement with picometer precision. Properly used, ferroelectrics could ramp up memory density and store an unparalleled multiple terabytes of information on just one square inch of electronics. **TECHNICAL ARTICLE**

*Tags: Advanced materials*

#### ['Fingerprinting' nanoscale objects and viruses](#)

[Nanowerk, 09JUL2012](#)

Scientists in Spain have perfected a new technique that uses an electrostatic force microscope (EFM) to unambiguously identify nano-objects with no need for labels. The new technique promises to shed light on questions about the dielectric properties of newly developed nanocomposites and hybrid nanodevices, and can tell us at how small a scale a dielectric object can retain its properties—in other words, how small we can go.

*Tags: Advanced materials, Materials science*

#### [Interpretation and implications of the European Commission's definition on nanomaterials](#)

[Nanowerk, 09JUL2012](#)

An unequivocal definition of the term 'nanomaterial' is essential in EU legislation and regulations, particularly

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with regard to the management of potential risks of nanomaterials to humans and the environment. The National Institute of Public Health and the Environment (RIVM) of the Netherlands has published a report that examines the European Commission's recommended definition of 'nanomaterial.'

*Tags: Advanced materials, Nanomaterials*

### **Nanotechnology device builds electricity from tiny pieces**

[Nanowerk](#), 09JUL2012

A team of scientists in the UK have made significant advances in using nano-devices to create accurate electrical currents. They have developed an electron pump—a nano-device—which picks up these electrons one at a time and moves them across a barrier, creating a very well-defined electrical current.

*Tags: Advanced materials, Materials science*

### **Tiny bubbles snap carbon nanotubes like twigs**

[e! Science News](#), 09JUL2012

For well over a decade, scientists have used ultrasonic vibrations to separate and prepare nanotubes in the lab. A new study by Rice University scientists details exactly how the much-studied nanomaterials snap when subjected to ultrasonic vibrations in a liquid, how this process works—and why it's a detriment to long nanotubes.

*Tags: Advanced materials, Materials science*

### **Researchers devise scalable method for fabricating high-quality graphene transistors**

[PhysOrg.com](#), 08JUL2012

Researchers in California have developed a successful, scalable method for fabricating self-aligned graphene transistors with transferred gate stacks. With a damage-free transfer process and a self-aligned device structure, this method has enabled self-aligned graphene transistors with the highest cutoff frequency to date—greater than 400 GHz.

*Tags: Advanced materials*

## **AUTONOMOUS SYSTEMS & ROBOTICS**

### **Bio-Inspired Robot Legs Walk With Rhythm**

[IEEE Spectrum](#), 10JUL2012

Researchers from the University of Arizona say that the legs are "the first to fully model walking in a biologically accurate manner" based on a bio-inspired combination of neural architecture, musculoskeletal architecture, and sensory feedback. [VIDEO](#)

*Tags: Autonomous systems & robotics*

### **fMRI Reads Thoughts In Real Time to Remotely Control Robot**

[IEEE Spectrum](#), 09JUL2012

An fMRI machine detects changes in blood flow to measure brain activity in real time with a very fine degree

of spatial resolution. It can detect changes so subtle that it's possible to differentiate between the activity patterns created when you think about turning left versus when you think about turning right. Israeli researchers have managed to get a robot to move around a room just by thinking about it. [VIDEO](#)

*Tags: Autonomous systems & robotics*

### **Robot vision: Muscle-like action allows camera to mimic human eye movement**

[EurekAlert](#), 07JUL2012

Using piezoelectric materials, researchers have replicated the muscle motion of the human eye to control camera systems in a way designed to improve the operation of robots. This new muscle-like action could help make robotic tools safer and more effective for MRI-guided surgery and robotic rehabilitation.

*Tags: Autonomous systems & robotics*

### **Giddyup, Robot Doggies! Autonomous Soldiers Square Off at Army Robotics Rodeo (w/video)**

[Wired Danger Room](#), 06JUL2012

In mid June the U.S. Army sponsored the third Robotic Rodeo which was held in Ft. Benning. Forty-four companies and five universities brought 74 technologies to the Rodeo, as it is called. The final results of 10 days of competition are still being tallied.

*Tags: Autonomous systems & robotics*

### **Video Friday: Dubstep Robots, Supersonic Drones, and Autonomous Aquatics**

[IEEE Spectrum](#), 06JUL2012

Since drones don't have to carry people, they can be made small and fast. Very small, and very fast, and you don't have to be a giant military contractor to do it, either. Here's what you can do for between \$50,000 and \$100,000...

*Tags: Autonomous systems & robotics*

### **'Driverless driving' envisioned for Japan in early 2020s**

[PhysOrg.com](#), 05JUL2012

With a view to making an autopilot system a reality in the early 2020s, the Transport Ministry will launch a study panel of experts this year, to start full-scale discussions about a self-steering vehicle control project.

*Tags: Autonomous systems & robotics*

## **BREAKTHROUGH TECHNOLOGY**

### **A brief history of a boson: Timeline of Higgs**

[New Scientist](#), 03JUL2012

Tomorrow [July 4, 2012], physicists at CERN near Geneva in Switzerland are expected to announce the discovery of the Higgs boson, the culmination of a 50-year quest to find the elusive particle that gives others their mass. Here's how they got there.

*Tags: Breakthrough technology*

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“If you thought that science was certain—well, that is just an error on your part.”

RICHARD FEYNMAN

## CYBER SECURITY

### [Cyber incident reports skyrocket over three-year period](#)

Federal Computer Week, 09JUL2012

Cyber incidents reported by critical infrastructure managers jumped by more than 2,000 percent between 2009 and 2011, according to a new report. The next steps for ICS-CERT are to glean all the information from an attack to build better situational awareness and provide alerts to the critical infrastructure community. [REPORT](#)

Tags: Cyber security

## ENERGY

### [Triboelectric generator produces electricity by harnessing friction between surfaces](#)

e! Science News, 09JUL2012

Researchers have discovered yet another way to harvest small amounts of electricity from motion in the world around us -- this time by capturing the electrical charge produced when two different kinds of plastic materials rub against one another. Based on flexible polymer materials, this “triboelectric” generator could provide alternating current from activities such as walking.

Tags: Energy

## FORECASTING

### [Patent trawler aims to predict next hot technology](#)

KurzweilAI, 09JUL2012

A team of researchers at the Hungarian Academy of Sciences in Budapest has written software that works by analyzing the frequency with which prior-art is cited by other patents and helps predict whether existing technological fields can combine or diverge to create new areas of innovation. [TECHNICAL ARTICLE](#)

Tags: Forecasting, Emerging technology

## GOVERNMENT S&T

### [This Fall, See Yourself as a DARPA Imagery Researcher](#)

DARPA News, 10JUL2012

The Innovation House concept revolves around a collaborative, rather than competitive, environment. The study will run for eight weeks over two four week sessions from Sept. 17, 2012 to Nov. 9, 2012. Researchers will participate in a short-fuse, crucible-style environment to invent new approaches to the identification of people, places, things and activities from still or moving defense and open-source imagery. [Program details](#)

Tags: Government S&T, DARPA

## [Hypersonics—the new stealth](#)

DARPA News, 06JUL2012

The IH (Integrated Hypersonics) program is designed to address technical challenges and improve understanding of long-range hypersonic flight through an initial full-scale baseline test of an existing hypersonic test vehicle, followed by a series of subscale flight tests, innovative ground-based testing, expanded modeling and simulation, and advanced analytic methods, culminating in a test flight of a full-scale hypersonic X-plane (HX) in 2016.

Tags: Government S&T, DARPA, Military technology

## IMAGING TECHNOLOGY

### [Novel equations improve image processing](#)

PhysOrg.com, 08JUL2012

A specific class of mathematical equations is helping to solve major challenges in the field, facilitating advanced modelling in a number of applications from climate change to desertification.

Tags: Imaging technology, Mathematics

## INFORMATION TECHNOLOGY

### [Toward achieving 1 million times increase in computing efficiency](#)

e! Science News, 10JUL2012

Unlike traditional integrated circuits, spin logic circuits utilize the quantum physics phenomenon of spin, which is a fundamental property of the electron. Researchers at Northwestern University have developed a device that can be configured in a logic circuit that is capable of performing all the necessary Boolean logic and can be cascaded to develop sophisticated function units.

Tags: Information Technology

### [Driver cellphone blocking technology could save lives](#)

PhysOrg.com, 08JUL2012

Researchers in India have devised a system that can determine whether a driver is using a cell phone while the vehicle is in motion and “jam” or block the phone signals accordingly using a low-range mobile jammer that ensures the vehicles passengers might use their phones unhindered.

Tags: Information Technology

## MATERIALS SCIENCE

### [Metamolecules that switch handedness at light-speed](#)

e! Science News, 10JUL2012

Researchers in the U. S. have created the first artificial

*continued...*

molecules whose chirality can be rapidly switched from a right-handed to a left-handed orientation with a beam of light. This holds potentially important possibilities for the application of terahertz technologies across a wide range of fields, including reduced energy use for data-processing, homeland security and ultrahigh-speed communications.

*Tags: Materials science*

### [White LEDs lighting directly on paper](#)

[Science Daily](#), 10JUL2012

Researchers in Sweden have shown that it is possible to grow white LEDs directly on paper and also to print them on wallpaper. The active components are nanorods of zinc oxide on a thin layer of polydiethylfluorene (PFO), a conducting polymer. But the paper has first been coated with a thin, water-repellent, protective and levelling layer of cyclotene, a resin.

*Tags: Materials science*

### [DNA type polymer for nanoelectronics](#)

[Nanowerk](#), 09JUL2012

EU-funded researchers successfully induced self-assembly of a novel electrically conductive polymer with the double-helical structure of DNA. The novel material was electro-active and demonstrated self-assembly both on a silicon surface relevant to potential electronic device applications and in solution.

*Tags: Materials science*

### [Physics team proposes a way to create an actual space-time crystal](#)

[PhysOrg.com](#), 09JUL2012

An international team of researchers suggest that to create a space-time crystal all that's needed is a better ion trap. They believe that if ions could be forced using such a trap, into a ring at very low temperatures, as a superconductor, all that would be needed would be a little nudge from a tiny bit of a magnetic field to cause the ions to begin rotating as a single ring. [TECHNICAL ARTICLE](#)

*Tags: Materials science*

phthalocyanines" are set to springboard the phthalocyanines into a range of high-tech applications.

*Tags: Materials science*

## MICROELECTRONICS

### [Nanoscale Vacuums Speed Semiconductors](#)

[IEEE Spectrum](#), 07JUL2012

Researchers at the University of Pittsburgh have developed a method for generating a vacuum within a semiconductor device to transport electrons more efficiently through it. The key to the design was the discovery that it was fairly easy to pull electrons out into the air when they are trapped at the interface of an oxide or metal layer inside a semiconductor. These trapped electrons form a two-dimensional electron gas. The researchers exploited the phenomenon known as Coulombic Repulsion--the repulsive force between two positive or negative charges--to emit the electrons from this electron gas layer.

*Tags: Microelectronics, Semiconductors*

## NEUROSCIENCE

### [Road-mapping the Asian brain](#)

[EurekAlert](#), 03JUL2012

There are subtle differences in the size and genetics of the Asian brain compared to its Western cousin. The research will allow for the development of new diagnostic aids specifically tailored to Asian patients, for age-related neuro-degenerative diseases.

*Tags: Neuroscience*

## S&T POLICY

### [The Council of Canadian Academies releases a new expert panel report](#)

[EurekAlert](#), 09JUL2012

An international expert panel has assessed that decisions regarding science funding and performance can't be determined by metrics alone. A combination of performance indicators and expert judgment are the best formula for determining how to allocate science funding. [REPORT](#)

*Tags: S&T policy, R&D Funding, S&T Canada*

### [Release of the Global Innovation Index 2012: Switzerland Retains First-Place Position in Innovation Performance](#)

[WIPO](#), 03JUL2012

The list of overall GII top 10 performers has changed little from last year. Switzerland, Sweden, and Singapore are followed in the top ten by Finland, the United Kingdom, the Netherlands, Denmark, Hong Kong (China), Ireland, and the United States of America. The report shows that the U.S.A. continues to be an innovation leader but also cites relative shortfalls in areas such as education, human resources and innovation outputs as causing a drop in its innovation ranking. [REPORT](#)

*Tags: S&T policy*

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## FEATURED RESOURCE

### [Next Big Future](#)

Carefully selected stories, provides links for further follow-up. [RSS](#)

### [Molecules with rare and valuable light-absorbing abilities finally give up their structural secrets](#)

[PhysOrg.com](#), 08JUL2012

A research team from Japan and Russia recently discovered a new branch of phthalocyanines family. The unusual light-capturing properties of these so-called "expanded

## SCIENCE WITHOUT BORDERS

**Scientific History and the Lessons for Today's Emerging Ideas****MIT Technology Review, 11JUL2012**

Helge Kragh at Aarhus University in Denmark sets the record straight by re-examining the end-of-the-century physics and the ideas that dominated it. There is much to learn from the stories he tells. What's interesting of course is the extent to which it is possible to draw parallels between the trends in science then and now. He clearly shows that only a small fraction of the mainstream scientific debate in the 1890s is relevant today. And there's no reason to think that same won't be true when historians reassess early 21st century science in a hundred year's time. [ARTICLE](#)

*Tags: Science without borders*

**China starts stockpiling rare earths: report****PhysOrg.com, 05JUL2012**

China has started stockpiling rare earths for strategic reserves, a state-backed newspaper said Thursday, in a move that may raise more worries over Beijing's control of the coveted resources. The country produces more than 90 percent of the world's rare earths, which are used in high-tech equipment ranging from iPods to missiles, and it has set production caps and export quotas on them.

*Tags: Science without borders, Information technology*

## STEM

**STEM solutions through college collaborations****Physics Today, 03JUL2012**

The broader impact of the interactions between community colleges and universities is that they create not only a pipeline to higher education but a reservoir of greater knowledge in the community as well.

*Tags: STEM ■*

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