



S&T NEWS BULLETIN

THE LATEST IN SCIENCE AND TECHNOLOGY RESEARCH NEWS

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FEATURE ARTICLES

[Controlling behavior, remotely \(w/video\)](#)

[Harvard University, 25SEP2012](#)

Harvard University researchers have been able to take over a tiny animal's brain, instruct it to turn in any direction they wish, and even implant false sensory information, fooling the animal into thinking food was nearby. This gives us a framework to think about neural circuits, how to manipulate them, which circuit to manipulate, and what activity patterns to produce in them. [TECHNICAL ARTICLE](#)

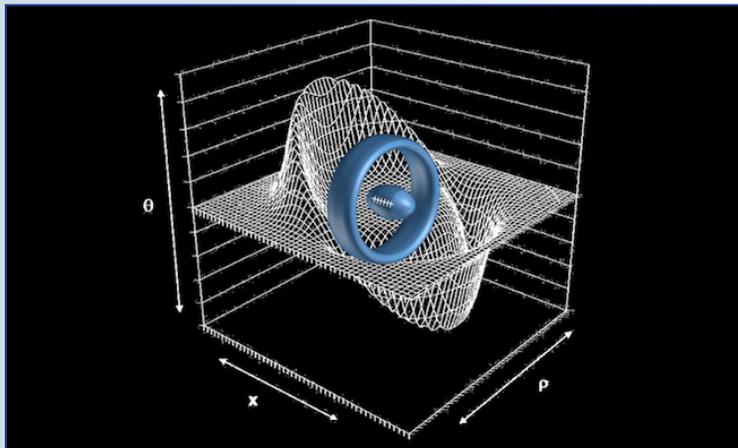
Tags: [Neuroscience](#), [Featured Article](#)

[Warp Drives Might Be More Realistic Than Thought](#)

[Wired UK, 20SEP2012](#)

A warp drive would work by "warping" spacetime around any spaceship, which physicist Miguel Alcubierre showed was theoretically possible in 1994. NASA scientists believe that those requirements might not be so vast, making warp travel a tangible possibility. Space.com reports that a NASA team has calculated that the amount of energy required to create an Alcubierre drive may be smaller than first thought. [RELATED ARTICLES](#)

Tags: [Science without borders](#), [Featured Article](#)



A ring-shaped warp drive device could transport a football-shaped starship (center) to effective speeds faster than light. Image: Harold White/NASA

[Researchers develop a new laser material which improves the use of light in biophotonics](#)

[Nanowerk, 19SEP2012](#)

Scientists in Spain have obtained efficient long lasting emissions of red laser light for the first time thanks to the incorporation of two dye molecules which are confined in latex nanoparticles dispersed in water. The wavelength of red light is key in photodynamic therapy, with uses in ophthalmology and dermatology, for example.

Tags: [Advanced materials](#), [Featured Article](#)

S&T NEWS ARTICLES

ADVANCED MANUFACTURING

[Researchers develop printable lasers](#)

[University of Cambridge, 24SEP2012](#)

Using a custom inkjet printing system, the researchers printed hundreds of small dots of LC (Liquid Crystal) materials on to a substrate covered with a wet polymer solution layer. As the polymer solution dries, the chemical interaction and mechanical stress cause the LC molecules to align and turn the printed dots into individual lasers.

[TECHNICAL ARTICLE](#)

Tags: [Advanced manufacturing](#)

ADVANCED MATERIALS

[Nanotechnology researchers develop 'bed of nails' material for clean surfaces](#)

[Nanowerk, 23SEP2012](#)

Scientists in the Netherlands have developed a new material that is not only extremely water-repellent but also extremely oil-repellent. It contains minuscule pillars which retain droplets. What makes the material unique is that the droplets stay on top even when they evaporate (slowly getting smaller). [TECHNICAL ARTICLE](#)

Tags: [Advanced materials](#)

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Revolutionary ultrathin, flat lens: Smartphones as thin as a credit card?

Nanowerk, 23SEP2012

Scientists are reporting development of a revolutionary new lens—flat, distortion-free, so small that more than 1,500 would fit across the width of a human hair—capable in the future of replacing lenses in applications ranging from cell phones to cameras to fiber-optic communication systems. [TECHNICAL ARTICLE](#)

Tags: *Advanced materials*

AUTONOMOUS SYSTEMS & ROBOTICS

Intuitive visual control provides faster robot operation

Science Daily, 25SEP2012

Known as Uncalibrated Visual Servoing for Intuitive Human Guidance of Robots, the new method uses a special implementation of an existing vision-guided control method called visual servoing (VS). By applying visual-servoing technology in innovative ways, researchers at Georgia Tech have constructed a robotic system that responds to human commands more directly and intuitively than older techniques.

Tags: *Autonomous systems & robotics*

Video Friday: Roomba Turns 10!

IEEE Spectrum, 21SEP2012

Congratulations to iRobot for proving for the last 10 years that you can make good robots, and we're looking forward to another Roomba retrospective in 2022.

Tags: *Autonomous systems & robotics*

BIG DATA

Where Sentiment Analysis Heads Next

Information Week, 24SEP2012

Adoption of sentiment analysis is growing in a spectrum of business domains and applications. The anti-automation backlash continues, but it should fade as sentiment analysis providers and users move toward semantically infused analysis with feature-level, business-need-aligned sentiment resolution and away from simplistic, keyword-based solutions. [Sentiment Analysis Symposium](#), October 30 in San Francisco.

Tags: *Big data*

BIOTECHNOLOGY

Oscillating microscopic beads could be key to biolab on a chip

MIT News, 25SEP2012

MIT team finds a way to manipulate and measure magnetic particles without contact, potentially enabling multiple medical tests on a tiny device. [VIDEO](#), [TECHNICAL ARTICLE](#)

Tags: *Biotechnology*

BREAKTHROUGH TECHNOLOGY

Squeeze light 'till it hurts' on a quantum scale: Researchers push the boundaries on ultra-precise measurement

Science Daily, 24SEP2012

An international team of physicists has pushed the boundaries on ultra-precise measurement by harnessing quantum light waves in a new way. It is one thing to be able to measure spectacularly small distances using "squeezed" light, but it is now possible to do this even while the target is moving around. "Because the phase of a light beam changes whenever it passes through or bounces off an object, being able to measure that change is a very powerful tool." [TECHNICAL ARTICLE](#)

Tags: *Breakthrough technology*

COMMUNICATIONS TECHNOLOGY

Bridging the mid-infrared-to-telecom gap with silicon nanophotonic spectral translation

Nature Photonics, 24SEP2012

If the mid-infrared signals were spectrally translated to shorter wavelengths, wide-bandgap photodetectors could be used to eliminate prohibitive cooling requirements. Researchers at Columbia University use efficient four-wave mixing in silicon nanophotonic wires to facilitate spectral translation of a signal at 2,440 nm to the telecom band at 1,620 nm, across a span of 62 THz.

Tags: *Communications Technology, Terahertz technology*

CYBER SECURITY

New tools will make sharing research data safer in cyberspace

Harvard University, 26SEP2012

The "Privacy Tools for Sharing Research Data" project will develop methods, tools and policies to further the tremendous value that can come from collecting, analyzing, and sharing data while more fully protecting individual privacy.

Tags: *Cyber security*

Computers get a better way to detect threats

Science Daily, 24SEP2012

UT Dallas computer scientists have developed a technique to automatically allow one computer in a virtual network to monitor another for intrusions, viruses or anything else that could cause a computer to malfunction.

Tags: *Cyber security*

“The test of a first rate intelligence is the ability to hold two opposing ideas in the mind at the same time, and still retain the ability to function.” F. SCOTT FITZGERALD

ENVIRONMENTAL SCIENCE

[Geoengineering: Clouds over troubled waters](#)

[The Economist](#), 24SEP2012

Instead of using aircraft-borne chemicals as seeds, researchers in the UK propose spraying seawater from unmanned, wind-powered, satellite-controlled vessels that would cruise the latitudes where hurricanes form—since droplets of brine have a similar effect to dry ice and silver iodide. They report that brightening virtual clouds around the world in this way caused ocean temperature in regions where hurricanes form to drop by as much as 4°C. If that happened in the real world, it would heavily suppress the intensity of these storms.

Tags: Environmental science

[How the bomb could help us predict next month's weather](#)

[PhysOrg.com](#), 24SEP2012

European-funded ARISE project (Atmospheric dynamics Research and Infrastructure in Europe) aims to improve measurements in the Earth's stratosphere and mesosphere. The project follows recent studies that show the upper layers of the earth's atmosphere could provide crucial information to provide more accurate longer-term weather forecasts, on timescales up to four weeks ahead.

Tags: Environmental science, Climatology

[Stratosphere targets deep sea to shape climate: North Atlantic 'Achilles heel' lets upper atmosphere affect the abyss](#)

[Science Daily](#), 24SEP2012

A University of Utah study suggests that periodic changes in winds 15 to 30 miles high in the stratosphere influence the seas by striking a vulnerable “Achilles heel” in the North Atlantic and changing mile-deep ocean circulation patterns, which in turn affect Earth's climate. [TECHNICAL ARTICLE](#)

Tags: Environmental science, Climatology

[Decadal Report on Solar and Space Physics](#)

[American Institute of Physics](#), 17SEP2012

The report presents a program of basic and applied research for the period 2013-2022 that will improve scientific understanding of the mechanisms that drive the Sun's activity and the fundamental physical processes underlying near-Earth plasma dynamics, determine the physical interactions of Earth's atmospheric layers in the context of the connected Sun-Earth system, and enhance greatly the capability to provide realistic and specific forecasts of Earth's space environment that will better serve the needs of society. [REPORT](#)

Tags: Environmental science, Climatology

EXPLOSIVES

[Sandia shows why common explosive sometimes fails](#)

[Sandia Laboratory News](#), 24SEP2012

By developing a novel technique based on physical vapor deposition to create samples with varying thickness, the researchers were able to study detonation behavior at the sub-millimeter scale and to determine that PETN detonation fails at a thickness roughly the width of human hair.

Tags: Explosives, Government S&T

IMAGING TECHNOLOGY

[Automatic building mapping could help emergency responders](#)

[MIT News](#), 24SEP2012

In addition to the rangefinder, the researchers also equipped their sensor platform with a cluster of accelerometers and gyroscopes, a camera. Every few meters, the camera takes a snapshot of its surroundings, and software extracts a couple of hundred visual features from the image—particular patterns of color, contours, or inferred three-dimensional shapes. Each batch of features is associated with a particular location on the map.

Tags: Imaging technology, Sensors

INFORMATION TECHNOLOGY

[Fast algorithm extracts and compares document meaning](#)

[Science Daily](#), 25SEP2012

Researchers in Poland attempted to reduce complexity by merging a computationally efficient statistical approach to text analysis with a semantic component. Tests of the algorithm on English and Polish texts work well. The test set consisted of 4,890 English sentences with 142,116 words and 11,760 Polish sentences with 184,524 words scraped from online services via their newsfeeds over the course of five days. The key virtue of the research is the idea of using the statistical similarity measures to assess semantic similarity. Semantic similarity of words could be inferred from the WordNet database.

Tags: Information Technology

[Laser-etched quartz will store data for hundreds of millions of years](#)

[Wired UK](#), 25SEP2012

Hitachi says it's about to solve our data problems, with the announcement that information could potentially be preserved for hundreds of millions of years if it's laser-encoded onto slabs of quartz glass. The downside—you can't fit all that much on to each piece.

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Tags: Information Technology, Materials science

MATERIALS SCIENCE

[Bursting bubbles drive micromotors](#)

Physics World, 25SEP2012

Researchers in Texas have shown that Janus spheres actually propel themselves because one of the faces—but not the other—blows bubbles. Researchers are interested in such spheres because they are an example of a kind of “micromotor” that can propel itself through chemical media. Studying such motors could not only shed light on how simple living cells propel themselves but also help scientists to create tiny machines that could, for example, deliver drugs to specific parts of the body.

Tags: Materials science

[Researchers Demonstrate ‘Giant’ Forces in Super-Strong Nanomaterials](#)

Newswise, 24SEP2012

In a study that could lead to advances in the emerging fields of optical computing and nanomaterials, researchers at Missouri University of Science and Technology report that a new class of nanoscale slot waveguides pack 100 to 1,000 times more transverse optical force than conventional silicon slot waveguides.

Tags: Materials science

FEATURED RESOURCE

[EurekaAlert \(AAAS\)](#)

Provides timely, excellent global coverage of developments in all branches of science through topical feeds. Separate feeds cover NSF, NIH and DOE. [RSS](#)

[New research uncovers path to defect-free thin films](#)

Nanowerk, 23SEP2012

Oak Ridge National Laboratory scientists have discovered a strain relaxation phenomenon in cobaltites that has eluded researchers for decades and may lead to advances in fuel cells, magnetic sensors and a host of energy-related materials.

Tags: Materials science, Government S&T

MICROELECTRONICS

[Novel materials become multifunctional at ultimate quantum limit](#)

Science Daily, 25SEP2012

Contrary to what we have today in modern microelectronics devices based on silicon, complex oxides not only

conduct electricity, but also develop unusual magnetic properties in a single quantum well, which is just four nanometers thick, we now have several functionalities in one device layer. This allows the semiconductor industry to push the limits of current conventional computers and develop multiple functions for a single device.

Tags: Microelectronics, Advanced materials

[Uh-oh, Intel. Globalfoundries to fast-forward into 14nm](#)

PhysOrg.com, 25SEP2012

Both Globalfoundries and Intel will be racing for a more dominant position with higher performing and power efficient systems for smartphones and other devices. Globalfoundries announced Thursday that it is accelerating its technology roadmap. Its newest design achievement for the mobile market is in the form of 14nm chip technology. The company provided some details about its 14nm-XM (“extreme mobility”) process.

Tags: Microelectronics, Information technology

[Out-of-this-world nanoscience: A computer chip that can assemble itself?](#)

Science Daily, 24SEP2012

Researchers at the University of Delaware studied paramagnetic colloids while periodically applying an external magnetic field at different intervals. With just the right frequency and field strength, the team was able to watch the particles transition from a random, solid like material into highly organized crystalline structures or lattices. It provides insight into how researchers can build organized structures, crystals of particles, using directing fields and it may prompt new discoveries into how we can get materials to organize themselves. [TECHNICAL ARTICLE](#)

Tags: Microelectronics, Advanced materials

[Researchers develop novel ‘stamping’ process to pattern biomolecules](#)

R&D Magazine, 24SEP2012

Instead of using a stamp to transfer molecules onto bare surfaces, researchers at UCLA have used chemically treated stamps to remove molecules already in place on gold substrates, essentially peeling away select molecules through chemical bonds to create precise patterns measuring just a few molecules across.

Tags: Microelectronics

[Optical waveguide connects semiconductor chips](#)

Nanowerk, 23SEP2012

Researchers in Germany first fix the chips and then structure a polymer-based optical waveguide in a perfectly fitting manner. To adapt the interconnection to the position and orientation of the chip, the scientists developed a method for the three-dimensional structuring of an optical waveguide. They used two-photon polymerization which reaches a high resolution. A femtosecond laser writes the

continued...

free-form waveguide structure directly into a polymer that is located on the surface of the chip. [TECHNICAL ARTICLE](#)

Tags: Microelectronics, S&T Germany

PHOTONICS

[A first glimpse inside a photonic crystal](#)

[Nanowerk Spotlight](#), 25SEP2012

A team of researchers from the University of Twente (Netherlands) has now demonstrated a new concept to measure the intensity distribution of light inside photonic crystals. This method, for the first time, allows researchers to map the absolute strength of an electromagnetic field component inside a photonic crystal. [TECHNICAL ARTICLE](#)

Tags: Photonics, Breakthrough technology

QUANTUM SCIENCE

[Experiment corrects prediction in quantum theory](#)

[Nanowerk](#), 19SEP2012

An international team of scientists is rewriting a page from the quantum physics rulebook using a University of Florida laboratory once dubbed the coldest spot in the universe. One fundamental state of quantum mechanics that scientists are keen to understand more fully is a fragile, ephemeral phase of matter called a Bose-Einstein Condensate. The experiment monitored the atomic spin of subatomic particles called bosons in the crystal to see when the transition to Bose-Einstein Condensate was achieved, and then further cooled the sample to document the exact point where the condensate properties decayed. They observed the anticipated phenomenon when they took the sample down to 1 millikelvin.

Tags: Quantum science

S&T POLICY

[Lazaridis Quantum Nano Centre creates 21st century 'mind space' \(w/video\)](#)

[Nanowerk](#), 25SEP2012

The state-of-the-art new QNC located on the University of Waterloo's main campus in the Math/Computer/Science district is a five-storey building that houses the Institute for Quantum Computing, the Waterloo Institute for Nanotechnology and the university's undergraduate program in nanotechnology engineering—a total of 400 academics are accommodated.

Tags: S&T policy, S&T Canada

[10 year plan for 10100 talents](#)

[China NOST News](#), 24SEP2012

Today state media reported that the Chinese government has launched a new program to cultivate scientific and technological talent. The "National Plan for the Special Support of High-level Talent" entails a ten-year campaign consisting of financial support for research projects and teams as well as 'favorable policies'.

Tags: S&T policy, S&T China

[Is China's New Stealth Fighter Headed to Sea?](#)

[Wired](#), 22SEP2012

The U.S. knows very little about China's newest stealth fighter prototype, the Shenyang J-21. But the just-released photographs of the Chinese jet reveal it to have a barely noticeable but key detail—one that suggests the jet might be hauled by China's future fleet of aircraft carriers.

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

SCIENCE WITHOUT BORDERS

[Cancer research yields unexpected new way to produce nylon](#)

[Science Daily](#), 24SEP2012

In their quest for a cancer cure, researchers made a serendipitous discovery—a molecule necessary for cheaper and greener ways to produce nylon. The finding arose from an intriguing notion that some of the genetic and chemical changes in cancer tumors might be harnessed for beneficial uses.

Tags: Science without borders

[How bumblebees find efficient routes without a GPS: Bees use trial and error to select optimal route](#)

[Science Daily](#), 24SEP2012

Using mathematical models, researchers in the UK dissected bees' learning process and identified how they may decipher this optimal solution without a map. Initially, their routes were long and complex. As they gained experience the bees gradually refined their routes through trial and error. After an average of 26 times each bee went foraging they were able to select the most efficient path to visit the flowers, without computing all the possibilities.

[TECHNICAL ARTICLE](#)

Tags: Science without borders ■

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This publication is authored and distributed by:

Dr. Melissa Flagg

Director, Office of
Technical Intelligence (OTI)

Ms. Hema Viswanath

OTI Corporate Librarian