



S&T NEWS BULLETIN

THE LATEST IN SCIENCE AND TECHNOLOGY RESEARCH NEWS

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

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

[Autonomous systems
& robotics \(1\)](#)

[Big data \(2\)](#)

[Biotechnology \(4\)](#)

[Communications technology \(4\)](#)

[Cyber security \(2\)](#)

[Energy \(2\)](#)

[Environmental science \(1\)](#)

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

[Materials science \(1\)](#)

[Microelectronics \(2\)](#)

[Neuroscience \(4\)](#)

[Quantum science \(1\)](#)

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

[Science without borders \(2\)](#)

[Sensors \(1\)](#)

FEATURE ARTICLES

[New material gives visible light an infinite wavelength](#)

[PhysOrg.com](#), 13OCT2013

Researchers from the University of Pennsylvania and the Netherlands have fabricated a material which gives visible light a nearly infinite wavelength. The new metamaterial is made by stacking silver and silicon nitride nanolayers. It may find applications in novel optical components or circuits and the design of more efficient leds. [TECHNICAL ARTICLE](#)

Tags: Advanced materials, Featured Article

[Compact Optical Chips? Photons On Demand Now Possible](#)

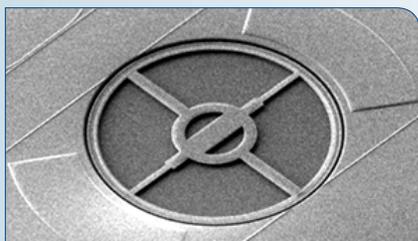
[Science Daily](#), 11OCT2013

Researchers in Australia report breakthrough in photonics that will help create extremely compact optical chips, a hair's width in size and delivering a photon at a time. [TECHNICAL ARTICLE](#)

Tags: Microelectronics, S&T Australia, Featured Article

[Specialized switch that controls light can regulate flow of optical data at speed suitable to accelerate computers](#)

[PhysOrg.com](#), 09OCT2013



*The silicon ring is a fast and effective switch for a beam of light skimming close to its edge.
Credit: 2013 A*STAR Institute of Microelectronics*

Researchers in Singapore have developed a device that could help computers reach the speed of light. Their tiny mechanical system can switch a light signal on or off extremely quickly, potentially

enabling all-optical computing and simplifying the interface between electronic and optical networks.

[TECHNICAL ARTICLE](#)

Tags: Communications Technology, Featured Article

S&T NEWS ARTICLES

ADVANCED MANUFACTURING

[New 3-D Method Used to Grow Miniature Pancreas](#)

[Science Daily](#), 15OCT2013

An international team of researchers (Switzerland, Denmark) has successfully developed an innovative 3D method to grow miniature pancreas from progenitor cells. The future goal is to use this model to help in the fight against diabetes. [TECHNICAL ARTICLE](#)

Tags: Advanced manufacturing, S&T Switzerland

[Nanoimprinting technique makes it possible to fabricate visible-light-bending metamaterials at unprecedented scales](#)

[Nanowerk](#), 11OCT2013

Researchers in Japan have demonstrated a scalable fabrication method that greatly eases the production of metamaterials that can interact with light at visible wavelengths.

[TECHNICAL ARTICLE](#)

Tags: Advanced manufacturing, S&T Japan

ADVANCED MATERIALS

[Nanotechnology lab fabricates all-carbon nanotube electronic devices](#)

[Nanowerk](#), 11OCT2013

Researchers in China fabricated single-wall carbon nanotube thin films with different nanotube densities and transferred them to flexible substrates serving as electrodes and channel materials, respectively. Using this method they obtained all-carbon nanotube thin-film transistors.

[TECHNICAL ARTICLE](#)

Tags: Advanced materials, S&T China

[Turning Vapors Into Foam-Like Polymer Coatings](#)

[Science Daily](#), 11OCT2013

Researchers at the University of Rochester have developed a process which can grow polymer coatings in which the density and pore structure varies in space. They hope that the research leads to applications in a wide variety of fields, including medical, manufacturing, and high-tech research.

[TECHNICAL ARTICLE](#)

Tags: Advanced materials

continued...

[BACK TO TOP](#)

Carbon's new champion: Theorists calculate atom-thick carbyne chains may be strongest material ever

PhysOrg.com, 09OCT2013

Researchers at Rice University have theoretically characterized Carbyne, a chain of carbon atoms held together by either double or alternating single and triple atomic bonds. That makes it a true one-dimensional material, unlike atom-thin sheets of graphene that have a top and a bottom or hollow nanotubes that have an inside and outside.

TECHNICAL ARTICLE

Tags: Advanced materials

AUTONOMOUS SYSTEMS & ROBOTICS

Video Friday: Return of the Robot Ape, Anki Drive Battle Mode, and Why We Love Robots

IEEE Spectrum, 11OCT2013

Rodney Brooks talks about how "cars are the epicenter of robotics." Within the next decade, robotic cars have the potential to truly revolutionize our society.

Tags: Autonomous systems & robotics

BIG DATA

Researchers develop algorithm that extracts your life story from your tweets

Digital Trends, 14OCT2013

Researchers at Cornell University have developed a new technique that can read your tweets and accurately create your life history from the masses of 140 characters. The algorithm can tell your story chronologically as well, and does this all without knowing anything else about you.

TECHNICAL ARTICLE

Tags: Big data

Smarter video searching and indexing

PhysOrg.com, 14OCT2013

The new technique developed by researchers in the UK will enable people to search for videos on the internet, using images rather than text. The framework relies upon finding similarities between videos using tiny frames instead of using the full-size video frames. Such tiny frames are easily extracted from a compressed video in real-time and able to fully represent video content, without decompressing the video to perform complex computer algorithms.

Tags: Big data, S&T UK

BIOTECHNOLOGY

A Bacterium Reveals the Crucible of Its Metallurgical Activity

Science Daily, 14OCT2013

The French study reveals part of the process whereby iron is biomineralized and nanomagnets are synthesized in magnetotactic bacteria. The potential applications of these nanomagnets may be as a contrast agent in magnetic resonance imaging, decontamination of water supplies.

TECHNICAL ARTICLE

Tags: Biotechnology, Biology, S&T France

Nanotechnology team writes artificial cell membranes onto graphene

Nanowerk, 14OCT2013

Researchers in the UK and Germany have developed a technique to make biomimetic membranes which allows for the specific investigation of functions of cell membranes and the development of novel applications in medicine and biotechnology, such as biosensors.

TECHNICAL ARTICLE

Tags: Biotechnology, S&T Germany, S&T UK

Pandoravirus: Missing Link Discovered Between Viruses and Cells

Science Daily, 14OCT2013

Pandoravirus salinus, a virus discovered by researchers in France, has just demonstrated that viruses can be more complex than some eukaryotic cells. Another unusual feature of Pandoraviruses is that they have no gene allowing them to build a protein like the capsid protein, which is the basic building block of traditional viruses.

TECHNICAL ARTICLE

Tags: Biotechnology, Biology, S&T France

Printable Biotechnology

Science Daily, 14OCT2013

The "Molecular Interaction Engineering" (MIE) project, funded by the EU, combines methods of biotechnology, structural biology, materials sciences, process engineering, and computer simulation. Work is aimed at developing innovative, flexible, and economically efficient biotechnological production systems for molecules.

Tags: Biotechnology, S&T EU, S&T Policy

COMMUNICATIONS TECHNOLOGY

An optical switch based on a single nanodiamond

Nanowerk, 15OCT2013

Researchers in Spain discovered a novel physical mechanism that enables the control of the way the nanodiamond interacts with light. While excited to its ON state by a green laser, a suitable near infrared illumination was found to act as an efficient and fast way to switch it OFF. Based on this simple concept, they were able to modulate the optical nano-diamond ON and OFF at extremely high speeds, demonstrating its robustness and viability for very fast information processing and quantum computer operations. **TECHNICAL ARTICLE**

Tags: Communications Technology

Wireless sub-THz communication system with high data rate

Nature Photonics, 13OCT2013

For the first time, researchers in Germany present a single-input and single-output wireless communication system at 237.5 GHz for transmitting data over 20 m at a data rate

continued...

“Two things are infinite: the universe and human stupidity; and I’m not sure about the universe.” ALBERT EINSTEIN

of 100 Gbit s⁻¹. This breakthrough results from combining terahertz photonics and electronics.

Tags: Communications Technology, S&T Germany, Terahertz technology

New Technology Can Prevent Cellular Overload, Dropped Calls

Science Daily, 11OCT2013

The solution proposed by researchers in Canada involved changing the shape of the wireless signal so signals can be transmitted on channels that use radio or television frequencies. By manipulating the direction of the cellular signals, they were able to transmit calls and texts to a receiver while avoiding any interference with the original radio and television signals.

Tags: Communications Technology, S&T Canada

CYBER SECURITY

Army launches cyber research alliance

Defense Update, 11OCT2013

The U.S. Army is launching a cybersecurity alliance that will fund academic and industry research to explore the basic foundations of cyber space issues in the context of Army networks.

Tags: Cyber security, S&T Policy

Top Websites Secretly Track Your Device Fingerprint

IEEE Spectrum, 11OCT2013

Researchers at New York University and Belgium counted 95 of the top 10, 000 websites using device fingerprinting targeted at the Flash browser plugin used to play animations, videos, and sound files. They also found 404 of the top 1 million websites used device fingerprinting targeted at the JavaScript programming language used in web applications. Such fingerprinting can identify users on mobile phones and other devices that may not use Flash. REPORT

Tags: Cyber security

ENERGY

Triboelectric nanogenerator extracts energy from ocean waves

Nanowerk, 14OCT2013

Researchers at Georgia Institute of Technology and China have introduced an inexpensive and simple prototype of a triboelectric nanogenerator that could be used to produce energy and as a chemical or temperature sensor.

TECHNICAL ARTICLE

Tags: Energy

Rust Can Power Up Artificial Photosynthesis: Chemists Produce Power Boost Critical to Novel Energy Harvesting Applications

Science Daily, 11OCT2013

Researchers at Boston College have come within two-tenths of the photovoltage required to mimic oxidation and reduction, using unique photoanodes and photocathodes the team developed novel nanowire components and coatings. Narrowing the gap using economical chemical components, the group moves researchers closer to using the human-made reaction for unique applications such as solar energy harvesting and storage.

Tags: Energy

ENVIRONMENTAL SCIENCE

Terraforming Earth: Geoengineering megaplan starts now

New Scientist, 09OCT2013

The Intergovernmental Panel on Climate Change now considers geoengineering to be respectable. The reason is simple; unless our greenhouse gas emissions start falling soon, Earth will probably warm this century by more than 2 °C, at which point things get nasty—because human society might not be able to adapt.

Tags: Environmental science, Climatology

IMAGING TECHNOLOGY

More information from Raman scattering

Nanowerk, 14OCT2013

Cornell University and Purdue University present a new setup which allows for hyperspectral SRS imaging through spectral-transformed excitation. It is based on a time-lens source synchronized to a femtosecond mode-locked Ti : S laser. They expect that the new imaging modality will find wide applications in various fields such as biology, biomedical analysis and diagnosis, and chemical identification. TECHNICAL ARTICLE

Tags: Imaging technology

MATERIALS SCIENCE

Adhesion at 180,000 frames per second

Nanowerk, 14OCT2013

Researchers in Germany and the Ukraine show that mushroom-shaped adhesive structures developed in nature are advantageous for adhesion because of the homogeneous stress distribution between a surface and the adhesive element. TECHNICAL ARTICLE

Tags: Materials science, S&T Germany

MICROELECTRONICS

Qualcomm to Build Neuro-Inspired Chips[MIT Technology Review, 10OCT2013](#)

The approach is emerging as a way to enable machines to perform complex tasks while consuming far less power. IBM has been prototyping similar chips and the area is the focus of intense research around the world.

Tags: Microelectronics

FEATURED RESOURCE

Forecasting Principles

The site summarizes useful knowledge about forecasting so that it can be used by researchers, practitioners, and educators. The site is devoted to improving decision making by furthering scientific forecasting.

NEUROSCIENCE

Method of Recording Brain Activity Could Lead to Mind-Reading Devices, Stanford Scientists Say[Science Daily, 15OCT2013](#)

Using a novel method, researchers at Stanford University collected the first solid evidence that the pattern of brain activity seen in someone performing a mathematical exercise under experimentally controlled conditions is very similar to that observed when the person engages in quantitative thought in the course of daily life. [TECHNICAL ARTICLE](#)

Tags: Neuroscience

A Blueprint for Restoring Touch With a Prosthetic Hand[Science Daily, 14OCT2013](#)

New research at the University of Chicago is laying the groundwork for touch-sensitive prosthetic limbs that one day could convey real-time sensory information to amputees via a direct interface with the brain. [TECHNICAL ARTICLE](#)

Tags: Neuroscience

Molecule Produced During Exercise Boosts Brain Health[Science Daily, 10OCT2013](#)

Researchers at Harvard University have identified a molecule called irisin that is produced in the brain during endurance exercise and has neuroprotective effects. Researchers were able to artificially increase the levels of irisin in the blood to activate genes involved in learning and memory. The findings may be useful for designing drugs that utilize this exercise-induced molecule to guard against neurodegenerative diseases and improve cognition.

[TECHNICAL ARTICLE](#)

Tags: Neuroscience

New Theory of Synapse Formation in the Brain[Science Daily, 10OCT2013](#)

Researchers in the Netherlands have now been able to ascribe the formation of new neural networks in the visual cortex to a simple homeostatic rule. With this explanation, they also provide a new theory on the plasticity of the brain—and a novel approach to understanding learning processes and treating brain injuries and diseases.

[TECHNICAL ARTICLE](#)

Tags: Neuroscience

QUANTUM SCIENCE

Scientists take a quieter step closer to first practical quantum computer[PhysOrg.com, 09OCT2013](#)

Researchers in the UK have come up with an extremely efficient and easy way to shield the quantum computer from external noise, effectively enabling large-scale operation of a microwave quantum computer. [TECHNICAL ARTICLE](#)

Tags: Quantum science, S&T UK

S&T POLICY

Graphene Flagship has set sails[Nanowerk, 11OCT2013](#)

The [Graphene Flagship](#) is one of Europe's first ten-year, 1,000 million Euro flagships in Future and Emerging Technologies. The mission is to take graphene and related layered materials from academic laboratories to society, revolutionise multiple industries and create economic growth and new jobs in Europe.

Tags: S&T policy, S&T EU

SCIENCE WITHOUT BORDERS

Photonic laser propulsion out to 100 kilometer range and eventually to interstellar distances[Next Big Future, 12OCT2013](#)

The big-picture plan starts with using laser propulsion in the coming decades on near-Earth space missions, journeys to the moon, and visits to near-Earth asteroids. Within 50 years, the hope is for phase two: Mars.

Tags: Science without borders

Maxwell's Knots[American Institute of Physics, 10OCT2013](#)

Researchers at the University of Chicago unveil a new class of solutions to Maxwell's equation, venerable formulas that encapsulate all possible knots and links in a toroidal configuration. The findings may hint at new ways to understand magnetic fields in plasmas or the behavior of quantum fluids like Bose condensates. [TECHNICAL ARTICLE](#)

Tags: Science without borders, Mathematics

SENSORS

[Accelerometer in phone has tracking potential, researchers find](#)

[PhysOrg.com](#), 14OCT2013

Researchers at Stanford University report that the code running on the website in the device's mobile browser measured the tiniest defects in the device's accelerometer, producing a unique set of numbers that advertisers could exploit to identify and track most smartphones.

Tags: Sensors, Information technology ■

ABOUT THIS PUBLICATION

The appearance of external hyperlinks in this publication does not constitute endorsement by the United States Department of Defense (DoD) of the linked web sites, nor the information, products or services contained therein. In addition, the content featured does not necessarily reflect DoD's views or priorities.

To subscribe (or unsubscribe), visit <https://tin-ly.sainc.com/ASDRE>. To provide feedback or ask questions, contact us at asdre-st-bulletin-reply@sainc.com.

This publication is authored and distributed by:

Dr. Brian Beachkofski
Director, Office of
Technical Intelligence (OTI)

Ms. Hema Viswanath
OTI Corporate Librarian