



S&T NEWS BULLETIN

THE LATEST IN SCIENCE AND TECHNOLOGY RESEARCH NEWS

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FEATURE ARTICLES

[Physicists create the smallest drops of liquid ever made in the lab](#)

[Nanowerk, 17MAY2013](#)

Scientists at the Large Hadron Collider extracted evidence of the minuscule droplets from the results of colliding protons with lead ions at velocities approaching the speed of light. These short-lived droplets are the size of three to five protons. To provide a sense of scale, that is about one-100,000th the size of a hydrogen atom or one-100,000,000th the size of a virus.

Tags: Materials science, Featured Article

[Beautiful “flowers” self-assemble in a beaker](#)



These false-color SEM images reveal microscopic flower structures created by manipulating a chemical gradient to control crystalline self-assembly. (Image courtesy of Wim L. Noorduin.)

[Harvard University, 16MAY2013](#)

By simply manipulating chemical gradients in a beaker of fluid, researchers at Harvard University

have found that they can control the growth behavior of these crystals to create precisely tailored structures. These minuscule sculptures, curved and delicate, don't resemble the cubic or jagged forms normally associated with crystals, though that's what they are. [TECHNICAL ARTICLE](#)

Tags: Advanced materials, Materials science, Featured Article

S&T NEWS ARTICLES

ADVANCED MANUFACTURING

[Obama Administration Announces 3 Advanced-Manufacturing Innovation Institutes](#)

[Scientific American, 16MAY2013](#)

The institutes will mesh industry, universities and community colleges with federal agencies to design and implement innovations in manufacturing. Funding will come from the defence, energy and commerce departments, NASA and NSF. Industry partners and local governments will provide matching funds. The institutes will focus on digital manufacturing, lightweight composites and next-generation power sources.

Tags: Advanced manufacturing, S&T Policy

[Electronics comes to paper: Paper, being light and foldable, works well for electrically conducting structures](#)

[Science Daily, 15MAY2013](#)

Researchers in Germany have created targeted conductive structures on paper using a method that is quite simple: with a conventional inkjet printer, they printed a catalyst on a sheet of paper and then heated it. The printed areas on the paper were thereby converted into conductive graphite. [TECHNICAL ARTICLE](#)

Tags: Advanced manufacturing, Flexible electronics, S&T Germany

ADVANCED MATERIALS

[Non-wetting fabric drains sweat \(w/video\)](#)

[Nanowerk, 20MAY2013](#)

Waterproof fabrics that whisk away sweat could be the latest application of microfluidic technology developed by bioengineers at the University of California, Davis.

[TECHNICAL ARTICLE](#)*Tags: Advanced materials, Nanomaterials*

[Novel Material Shows Promise for Extracting Uranium from Seawater](#)

[MIT Technology Review, 17MAY2013](#)

The world's oceans contain nearly a thousand times as much uranium as conventional reserves. Researchers

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

at the University of North Carolina at Chapel Hill, have designed a metal-organic framework (MOF) to collect common uranium-containing ions dissolved in seawater. The material was at least four times better than the conventional plastic adsorbent at drawing the potential nuclear fuel.

Tags: Advanced materials

Carbon in a twirl: The science behind a self-assembled nano-carbon helix

[Nanowerk, 16MAY2013](#)

An international team of researchers from Austria, the UK and Germany have now achieved a bilateral formation of inorganic nanomaterials in a controlled environment by implementing a new method. Their method might lead the way to the formation of more complex nano-networks.

TECHNICAL ARTICLE

Tags: Advanced materials, Nanomaterials

Catching Graphene Butterflies: Dramatically Changing Electronic Properties of World's Thinnest Material

[Science Daily, 15MAY2013](#)

An international team of researchers (UK, France, Spain) has found that when graphene is placed on top of insulating boron nitride, or 'white graphene', the electronic properties of graphene change dramatically revealing a pattern resembling a butterfly, referred to as the elusive Hofstadter butterfly. Combining graphene with other materials in multiple-layered structures could lead to novel applications not yet explored by science or industry. TECHNICAL ARTICLE

Tags: Advanced materials, Materials science

AUTONOMOUS SYSTEMS & ROBOTICS

Video Friday: Droneapult Launch, Robot Rope Ascender, and Spock vs. Spock

[IEEE Spectrum, 17MAY2013](#)

Northrop Grumman X-47B UCAV (Unmanned Combat Air Vehicle) launching from an aircraft carrier.

Tags: Autonomous systems & robotics

BIG DATA

Computational tool translates complex data into simplified 2-dimensional images

[Science Daily, 20MAY2013](#)

Researchers at Columbia University and Stanford University have developed a computational method that enables scientists to visualize and interpret "high-dimensional" data produced by single-cell measurement technologies such as mass cytometry. TECHNICAL ARTICLE

Tags: Big data

BIOTECHNOLOGY

Engineered Microbes Grow in the Dark

[Science Daily, 20MAY2013](#)

Scientists at the University of California, Davis used synthetic biology approaches to probe and rewire photoautotrophic (exclusively relying on carbon dioxide and light energy for growth) cyanobacterial metabolism for the ability to grow without light energy.

Tags: Biotechnology, Biology

Cells as living calculators

[MIT News, 15MAY2013](#)

Using analog computation circuits, MIT engineers design cells that can compute logarithms, divide and take square roots by exploiting natural biochemical functions that are already present in the cell rather than by reinventing them with digital logic, thus making them more efficient than the digital circuits pursued by most synthetic biologists.

TECHNICAL ARTICLE

Tags: Biotechnology

Novel brain training device to reconnect brain and paralyzed limb after stroke

[Science Daily, 15MAY2013](#)

According to researchers in Hong Kong, the Brain Training Device is able to guide stroke patients to relearn the reconnection between the brain and the limb, with a new design on the EEG headset and the EMG forearm brace to transmit data for controlling a hand robotic system interfaced by a telecare software platform using iPad app.

Tags: Biotechnology, Neuroscience

BREAKTHROUGH TECHNOLOGY

Friction in the nano-world: Physicists discover a new kind of friction

[Science Daily, 15MAY2013](#)

Researchers in Germany examined how and why single polymer molecules in various solvents slide over or stick to certain surfaces. Their goal was to understand the basic laws of physics at the molecular scale in order to develop targeted anti-friction surfaces and suitable lubricants.

TECHNICAL ARTICLE

Tags: Breakthrough technology

Nanoscavengers could usher in next generation water purification

[Science Daily, 15MAY2013](#)

Stanford University reported that it has developed a new type of nanoscavenger with a synthetic core that is ultra-responsive to magnetism, allowing the easy and efficient recovery of virtually every one of the nanoscale purifiers.

TECHNICAL ARTICLE

Tags: Breakthrough technology

“Science can amuse and fascinate us all, but it is engineering that changes the world.” ISAAC ASIMOV

COMMUNICATIONS TECHNOLOGY

All-optical broadband ... cheaper, faster and greener

EU R&D News, 17MAY2013

A European team of researchers is exploring new ways of using fibre-optic technology to deliver ultra-high-speed internet access to even the remotest locations in Europe, at less cost and with less impact on the environment.

Tags: Communications Technology, S&T EU

New record in wireless data transmission

Science Daily, 17MAY2013

Researchers in Germany have achieved the wireless transmission of 40 Gbit/s at 240 GHz over a distance of one kilometer. Their most recent demonstration sets a new world record and ties in seamlessly with the capacity of optical fiber transmission.

Tags: Communications Technology, S&T Germany

Can Math Models of Gaming Strategies Be Used to Detect Terrorism Networks?

Science Newline, 16MAY2013

Researchers utilize the similarities in the previous terrorist cell model to "Seepage" (a two-player outdoor game), where "greens" try to prevent the sludge from moving to the sinks by blocking nodes. A number of different winning strategies employed by both players are explored when played on a DAG. The Seepage and green number for disrupting a given hierarchical social network are analyzed. TECHNICAL ARTICLE

Tags: Communications Technology, Mathematics

Making frequency-hopping radios practical

MIT News, 15MAY2013

Researchers at MIT have developed a new method for manufacturing filters that can isolate any frequency in a wide band that should improve their performance while enabling 14 times as many of them to be crammed on a single chip.

Tags: Communications Technology

CYBER SECURITY

New software spots, isolates cyber-attacks to protect networked control systems

Science Daily, 16MAY2013

Researchers from North Carolina State University have developed a software algorithm that detects and isolates cyber-attacks on networked control systems—which are used to coordinate transportation, power and other infrastructure across the United States.

Tags: Cyber security

ELECTRONIC WARFARE

New payload brings jamming capability to an Army UAS for the first time

Defense Systems, 15MAY2013

Raytheon has delivered two electronic attack payloads for use on the Army's MQ-1C Gray Eagle unmanned aircraft system, which will mark the first time the Army will have jamming capability on a UAS.

Tags: Electronic Warfare, Military technology

ENERGY

Exxon Takes Algae Fuel Back to the Drawing Board

MIT Technology Review, 20MAY2013

The idea behind the Exxon-Synthetic Genomics project was to sort through large numbers of algae strains, looking for ones that might produce fuel economically—or that could be easily modified with “conventional” approaches, such as making a few changes to algae’s genetic material. A \$300 million project seems to have failed to produce a cheap way to make fuel from algae.

Tags: Energy

ENVIRONMENTAL SCIENCE

Reading rock to understand how climate change unfolds

Science Daily, 19MAY2013

Geologists are studying rocks to understand the natural rules that govern the Earth’s climate in the absence of human activity. New work by researchers at the University of Wisconsin is challenging many assumptions about the ways drastic climate change unfolds—and what to expect next.

Tags: Environmental science, Climatology

INFORMATION TECHNOLOGY

Iron-platinum alloys could be new-generation hard drives

EurekAlert, 20MAY2013

UC Davis researchers have found a convenient way to make layered iron-platinum alloys and tailor their properties, a promising material for a potential new generation of data storage media.

Tags: Information Technology, Advanced materials

MATERIALS SCIENCE

[New insights into how materials transfer heat could lead to improved electronics](#)

Science Daily, 16MAY2013

Researchers from the University of Toronto and Carnegie Mellon University have published new insights into how materials transfer heat, which could lead eventually to smaller, more powerful electronic devices. [TECHNICAL ARTICLE](#)

Tags: *Materials science*

MEDICAL SCIENCES

[Wireless signals could transform brain-trauma diagnostics](#)

KurzweilAI, 16MAY2013

University of California, Berkeley researchers have developed a device that uses wireless signals to provide real-time, non-invasive diagnoses of brain swelling or bleeding. The device analyzes data from low energy, electromagnetic waves, similar to the kind used to transmit radio and mobile signals. It could potentially become a cost-effective tool for medical diagnostics and to triage injuries.

Tags: *Medical Sciences, Biotechnology*

FEATURED RESOURCE

[CSO](#)

Provides news, analysis and research on a broad range of security and risk management topics. Areas of focus include information security, physical security, business continuity, identity and access management, loss prevention and more. [RSS](#)

NEUROSCIENCE

[Complex brain function depends on flexibility](#)

MIT News, 20MAY2013

There are many neurons, especially in brain regions, that perform sophisticated functions such as thinking and planning. Instead of responding exclusively to one stimulus or task, these neurons react in different ways to a wide variety of things. Researchers from MIT and Columbia University report that these neurons are essential for complex cognitive tasks, such as learning new behavior. [TECHNICAL ARTICLE](#)

Tags: *Neuroscience*

[Does thinking about professors make your more intelligent?](#)

The Conversation, 17MAY2013

I ask you to think about the word “professor.” I get you to write down all of the characteristics and qualities of a professor that you can think of in a five minute period. Then I ask you—in an ostensibly unrelated task—to do a general knowledge quiz. Some research suggests you would get a better score on this general knowledge test if you’d just been thinking about professors than if I’d asked you to list the characteristics and qualities of soccer hooligans.

Tags: *Neuroscience*

[A New System Interprets the Brain Signals of People with Disabilities And Helps Them to Interact with Their Environment](#)

Science Newsline, 16MAY2013

A European project called BrainAble has developed a prototype that allows people with severe disabilities to perform actions that they could not otherwise do, simply by reading electrical brain signals, without moving a muscle. The prototype consists of a combination of human-computer interfaces composed of Brain Computer Interface (BCI) sensors with other physiological sensors that measure a person’s physical and emotional state (affective computing) and with virtual reality environments, and the connection of these interfaces with smart homes and online social networks.

Tags: *Neuroscience*

[Shocks to the brain improve mathematical abilities](#)

Nature News, 16MAY2013

According to researchers at Oxford University, random electrical stimulation, a technique that applies a gentle current through the skull, leads to a long-lasting boost in the speed of mental calculations. Benefits of electrical brain stimulation lasted months but critics point to study’s small size as a weakness.

Tags: *Neuroscience, S&T UK*

[Brain Rewires Itself After Damage or Injury, Life Scientists Discover](#)

Science Daily, 15MAY2013

Scientists from UCLA and Australia have pinpointed regions of the brain involved in creating alternate pathways when the brain’s primary “learning center” is damaged. They found that parts of the prefrontal cortex take over when the hippocampus, the brain’s key center of learning and memory formation, is disabled. [TECHNICAL ARTICLE](#)

Tags: *Neuroscience, S&T EU*

QUANTUM SCIENCE

Competition in the quantum world

Nanowerk, 20MAY2013

Austrian scientists have simulated the competition between two rival dynamical processes at a novel type of transition between two quantum mechanical orders. They identified the most important sources of error occurring during the simulation and specifically targeted them. [TECHNICAL](#)

[ARTICLE](#)

Tags: Quantum science

Making quantum encryption practical

MIT News, 20MAY2013

In a series of recent papers, researchers at MIT described a new quantum communication protocol. It is much more resilient to signal loss than QKD, and it sends only one bit for every one received. [TECHNICAL ARTICLE](#)

Tags: Quantum science, Communications Technology

First Quantum Memory That Records The Shape of a Single Photon Unveiled in China

MIT Technology Review, 15MAY2013

Researchers in China have generated a single photon with a complex spatial structure, stored that photon in a cloud of rubidium atoms and then released it up to 400 nanoseconds later. In their experiment, they compare the structure of the photons that come out of storage with the structure of the photons that go in and say they are more or less identical.

[TECHNICAL ARTICLE](#)

Tags: Quantum science, S&T China

S&T POLICY

Math Institute Serves as Bridge for Pure and Applied Mathematics

NSF News, 16MAY2013

Brown University's Institute for Computational and Experimental Research in Mathematics (ICERM), is a NSF funded institute whose goal is to support and broaden the relationship between mathematics and computation. Specifically, it seeks to expand the use of computational and experimental methods in math, and support theoretical advances related to computation.

Tags: S&T policy, Mathematics

SCIENCE WITHOUT BORDERS

M.I.T. Scholar's 1949 Essay on Machine Age Is Found

New York Times, 20MAY2013

Almost 64 years after Wiener wrote it, his essay is still remarkably topical, raising questions about the impact of smart machines on society and of automation on human labor. In the spirit of rectifying an old omission, here are excerpts from "The Machine Age," courtesy of the M.I.T. Libraries.

Tags: Science without borders

New research method aims to unlock academia's biggest problem

Alpha Galileo Foundation, 16MAY2013

Researchers in the UK have found a solution to one of life's great mysteries: Why people often fail to see the answer to a problem when the solution is right in front of them. The researchers have created a new method, called the Verifier approach, which promises to help scientists unlock answers to some of the most complex problems in science.

[TECHNICAL ARTICLE](#)

Tags: Science without borders

Billion-year-old water could hold clues to life on Earth and Mars

e! Science News, 15MAY2013

A UK-Canadian team of scientists has discovered ancient pockets of water, which have been isolated deep underground for billions of years and contain abundant chemicals known to support life.

Tags: Science without borders ■

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