



S&T NEWS BULLETIN

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FEATURE ARTICLES

[How brainless slime molds redefine intelligence](#)

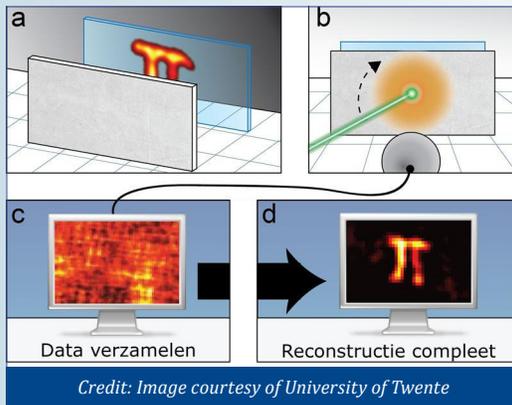
[Nature News, 13NOV2012](#)

Single-celled amoebae can remember, make decisions and anticipate change, urging scientists to rethink intelligent behavior. Navigating a maze is a pretty impressive feat for a slime mold, but the protist is in fact capable of solving more complex spatial problems: Inside laboratories slime molds have effectively re-created Tokyo's railway network in miniature as well as the highways of Canada, the U.K. and Spain.

[VIDEO, TECHNICAL ARTICLE](#)

Tags: Neuroscience, Featured Article

[Looking through an opaque material: Sharp pictures taken of objects hidden behind an opaque screen](#)



[Science Daily, 09NOV2012](#)

The researchers in the Netherlands and Italy scanned the angle of a laser beam that

illuminated an opaque diffuser. At the same time, a computer recorded the amount of fluorescent light that was returned by a tiny object hidden behind the diffuser. While the measured intensity of the light cannot be used to form an image of the object directly, the information needed to do so is in there, but in a scrambled form. [TECHNICAL ARTICLE](#)

Tags: Breakthrough technology, Featured Article

[Lung-on-a-Chip Passes a Crucial Test](#)

[MIT Technology Review, 07NOV2012](#)

Researchers at the Wyss Institute for Biologically Inspired Engineering at Harvard University have shown that their "lung-on-a-chip" technology can mimic a life-threatening lung condition. They also report that scientists can uncover new aspects of the disease using the lung chip that would not be found with animal experiments.

Tags: Biotechnology, Biology, Featured Article

S&T NEWS ARTICLES

ADVANCED MANUFACTURING

[Scientists reveal new insights on nano 3D printing](#)

[R&D Magazine, 12NOV2012](#)

A team of physicists in Australia has unveiled new physics behind the nanofabrication technique known as electron beam induced deposition (EBID), essentially 3D printing at the molecular level. Using an advanced research grade electron microscope the scientists have been able to explain the nature of chemical reactions on hot, solid surfaces and to "write" highly pure nanostructures.

Tags: Advanced manufacturing, S&T Australia

[3D-printed rocket parts](#)

[KurzweilAI, 11NOV2012](#)

NASA's Marshall Space Flight Center is using "selective laser melting" (SLM) to create intricate metal parts for America's Space Launch System (SLS) heavy-lift rocket, saving millions in manufacturing costs. This machine takes metal powder and uses a high-energy laser to melt it in a designed pattern. The laser will layer the melted dust to fuse whatever part we need from the ground up, creating intricate designs.

Tags: Advanced manufacturing, Government S&T

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A new way of making glass

Nanowerk, 09NOV2012

Researchers in EU created a new type of glass in a computer through encouraging atoms in a nickel-phosphorous alloy to form the pictured polyhedron. When these polyhedra formed, the liquid no longer flowed – it had become a solid. In other words, they found that instead of cooling, a liquid can turn into a glass by changing its structure. [TECHNICAL ARTICLE](#)

Tags: *Advanced manufacturing, Materials science*

ADVANCED MATERIALS**Transforming noise into mechanical energy at nanometric level**

Nanowerk, 12NOV2012

A team of researchers has developed a method that enables efficiently using the random movement of a molecule in order to make a macroscopic-scale lever oscillate. The underlying principle is Stochastic Resonance, which describes how random movements of energy are channelled into periodic movements and, thus, can be harnessed. With this research, it has been shown that this principle is fulfilled at a nanometric scale. [TECHNICAL ARTICLE](#)

Tags: *Advanced materials*

AUTONOMOUS SYSTEMS & ROBOTICS**Video Friday: Quadcopter Slalom, RoboBrrds, and Acrobat Robot Sticks the Dismount**

IEEE Spectrum, 09NOV2012

Thanks to a GoPro, we get on board a quadrotor while it flies through an obstacle course.

Tags: *Autonomous systems & robotics*

BIG DATA**Big Data poses big questions, so how do we answer them?**

The Conversation, 13NOV2012

While the amount of data collected at a consumer level is staggering, there is a greater imperative to understand and make use of Big Data in the industrial world. In big industries – such as mining and energy – better use of available information could lead to greater efficiencies.

Tags: *Big data*

Speeding algorithms by shrinking data

MIT News, 13NOV2012

MIT researchers describe a novel way to represent data so that it takes up much less space in memory but can still be processed in conventional ways. While promising significant computational speedups, the approach could be more generally applicable than other big-data techniques, since it can work with existing algorithms. [TECHNICAL ARTICLE](#)

Tags: *Big data*

BIOTECHNOLOGY**Touch-sensitive plastic skin heals itself**

Stanford University, 11NOV2012

Researchers at Stanford have created the first synthetic material that is both sensitive to touch and capable of healing itself quickly and repeatedly at room temperature. The advance could lead to smarter prosthetics or more resilient personal electronics that repair themselves.

Tags: *Biotechnology, Materials science, Medical technology*

New approach to combat viral infections identified

Science Daily, 09NOV2012

When a virus such as influenza invades our bodies, interferon proteins are among the first immune molecules produced to fight off the attack. University of Pennsylvania research suggests that, by targeting a particular molecule in the interferon signaling pathway, specially designed drugs may be able to boost the activity of a person's own interferon, augmenting the immune system's fight against viruses. [TECHNICAL ARTICLE](#)

Tags: *Biotechnology, Biology, Medical Sciences*

New portable device enables RNA detection from ultra-small sample in only 20 minutes

e! Science News, 08NOV2012

A new power-free microfluidic chip developed by researchers at the RIKEN Advanced Science Institute (ASI) enables detection of microRNA from extremely small sample volume in only 20 minutes. By drastically reducing the time and quantity of sample required for detection, the chip lays the groundwork for early-stage point-of-care diagnosis of diseases such as cancer and Alzheimer's.

Tags: *Biotechnology, S&T Japan*

COMMUNICATIONS TECHNOLOGY**Increasing efficiency of wireless networks**

EUROPA research, 13NOV2012

The UC Riverside researchers have found a new solution called "time-domain transmit beamforming," which digitally creates a time-domain cancellation signal, couples it to the radio frequency frontend to allow the radio to hear much weaker incoming signals while transmitting strong outgoing signals at the same frequency and same time. The new solution not only has a sound theoretical proof, but also leads to a lower cost, faster and more accurate channel estimation for robust and effective cancellation.

Tags: *Communications Technology, Information technology*

Optical boomerangs, ultralight fractal materials, and more

EurekAlert, 13NOV2012

Two independent groups have reported experiments on special light waves that can skid around curves. The researchers demonstrated that modified laser beams can

“Most institutions demand unqualified faith; but the institution of science makes skepticism a virtue.” ROBERT K. MERTON

be made to move along parabolic and elliptical paths. Furthermore, if obstacles are in their path, these beams can self-heal, regrouping and continuing on their way. The research shows that such self-bending behavior can be achieved in both two and three dimensions. These sort of “optical boomerangs” could be used to move particles around with laser tweezers, or to manipulate optical data on an optoelectronic chip.

Tags: Communications Technology, Breakthrough technology

Networks Evolving on Two Fronts

[American Physical Society Spotlight, 12NOV2012](#)

To model how networks evolve, researchers tend to focus on the dynamics of either the nodes (cities) or the links (roads). But for a more realistic description, the two aspects should be considered at the same time. Researchers in Japan have developed a framework that accounts for coevolution in both nodes and links. [TECHNICAL ARTICLE](#)

Tags: Communications Technology

COUNTER WMD

U.S. Army develops successful Ebola vaccine

[Biopreview, 09NOV2012](#)

A new Ebola virus study has shown the vaccine candidate, known as MB-003, to be effective in preventing disease in infected nonhuman primates. When administered an hour after infection, all of the animals survived. The antibody cocktail was initially developed using the mouse model, but when it was humanized it was manufactured in a tobacco plant-based production system. The plant-based antibodies have been proven to be just as effective as those produced in a Chinese hamster ovary-based system.

Tags: Counter WMD

CYBER SECURITY

Researchers Show How to Steal Secrets from the Cloud

[MIT Technology Review, 09NOV2012](#)

Cloud computing teaches people not to worry about physical equipment for hosting data and running software. But a study by researchers at computer security company RSA suggests that this could be a costly mistake. The researchers have shown it is possible for software hosted by a cloud-computing provider to steal secrets from software hosted on the same cloud.

Tags: Cyber security

ENERGY

Using rust and water to store solar energy as hydrogen

[Science Daily, 11NOV2012](#)

Scientists in Switzerland are developing a technology that can transform light energy into a clean fuel that has a neutral carbon footprint: hydrogen. The basic ingredients of the recipe are water and metal oxides, such as iron oxide, better known as rust. [TECHNICAL ARTICLE](#)

Tags: Energy, S&T Switzerland

FORECASTING

IBM reveals tech advances of the future (video)

[BBC News, 13NOV2012](#)

Technicians at IBM’s research labs in Switzerland demonstrate their latest technological breakthroughs including adding water to computer components.

Tags: Forecasting, Emerging technology, S&T Switzerland

Predicting presidents, storms and life by computer

[R&D Magazine, 12NOV2012](#)

The key is seeing what happens most often and why. It’s not a dead-on prediction, but breaks down the future into probabilities. It’s essentially solving equations that are too extensive to solve with pencil and paper. It all comes down to collecting data, crunching it and spitting out probabilities. It’s evidence turned into numbers. It’s math. [National Hurricane Center Computer Models](#)

Tags: Forecasting, Simulation and modeling

The big question: What new tech will be significant in ten years’ time?

[Wired UK, 12NOV2012](#)

3D printing is already making custom medical devices, replacement parts, art and buildings. It is still an alternative culture, but it won’t take long for it to become cheap and mainstream. It will allow anyone to be a cutting-edge inventor.

Tags: Forecasting, Emerging technology

Brain-Computer Interface Technologies in the Coming Decades

[Next Big Future, 10NOV2012](#)

In the far-term, we envision a more holistic approach to BCIs that merges critical brain, behavioral, task, and environmental information obtained with advanced pervasive, multi-aspect sensing technologies, sophisticated analytical approaches, and enabled by advances in

computational infrastructure such as extensions of cloud technologies. [TECHNICAL ARTICLE](#)

Tags: *Forecasting, Emerging technology, Neuroscience*

FEATURED RESOURCE

[IOP Asia-Pacific](#)

Research highlights from Korea, India, Pakistan, Thailand, Taiwan, Japan, China, Vietnam, Australia and New Zealand.

INFORMATION TECHNOLOGY

[World's Fastest GPU Accelerators](#)

[R&D Magazine](#), 12NOV2012

Providing the highest computing performance ever available in a single processor, the K20X (Nvidia) provides tenfold application acceleration when paired with leading CPUs. It surpasses all other processors on two common measures of computational performance—3.95 teraflops single-precision and 1.31 teraflops double-precision peak floating point performance.

Tags: *Information Technology*

[Data storage: How magnetic recording heats up](#)

[Science Daily](#), 09NOV2012

Researchers in Singapore showed that the recording density of the medium can be maximized by reducing the number of layers through which heat energy must pass before it can dissipate. This will be of prime importance for achieving the required high-density data storage goals of commercial devices. [TECHNICAL ARTICLE](#)

Tags: *Information Technology*

MATERIALS SCIENCE

[Researchers create gel that displays spontaneous motion \(w/video\)](#)

[PhysOrg.com](#), 12NOV2012

Researchers at Brandeis University have created gel drops by adding protein tubes from cow brains and motor proteins from bacteria to a water solution—adding a polymer to the mix caused spontaneous movement to occur within the solution. [TECHNICAL ARTICLE](#)

Tags: *Materials science*

[Making a better invisibility cloak](#)

[Science Daily](#), 11NOV2012

The first functional “cloaking” device reported by electrical engineers in 2006 worked like a charm, but it wasn’t perfect. Now a member of the same laboratory has developed a new design that ties up one of the major loose ends from the original device. [TECHNICAL ARTICLE](#)

Tags: *Materials science*

MICROELECTRONICS

[Asymmetric light propagation in composition-graded semiconductor nanowires](#)

[Nature Scientific Reports](#), 12NOV2012

Here we report the first design and realization of asymmetric light propagation in single semiconductor nanowires with a composition gradient along the length. We show that the asymmetric nanowire waveguides can be synthesized using a simple thermal evaporation and vapor transport approach without involving complicated and costly fabrication processes.

Tags: *Microelectronics*

[Challenge facing designers of future computer chips: Surprising findings could influence material choices in nanoelectronics](#)

[Science Daily](#), 09NOV2012

Researchers in Canada have shown that electrical current may be drastically reduced when wires from two dissimilar metals meet. The surprisingly sharp reduction in current reveals a significant challenge that could shape material choices and device design in the emerging field of nanoelectronics.

Tags: *Microelectronics, S&T Canada*

NEUROSCIENCE

[Vegetative man 'speaks' to doctors](#)

[BBC News](#), 13NOV2012

A man thought to have been in a vegetative state for more than 10 years, has been able to let scientists know that he is not in any pain.

Tags: *Neuroscience*

[Human enhancement and the future of work](#)

[The Royal Society](#), 07NOV2012

The Royal Society project explored potential enhancements arising from advances in science and engineering that are likely to impact on the future of work. [REPORT](#)

Tags: *Neuroscience*

QUANTUM SCIENCE

[Powering lasers through heat](#)

[Science Daily](#), 13NOV2012

Physicists in Austria propose the theory that the heating effect in quantum cascade lasers could not only be avoided but, in fact, reversed through a cleverly-devised modification of the thickness of the semiconductor layers. A crucial part is to spatially separate the cold and warm areas in the laser. In such a temperature gradient driven laser, electrons are thermally excited in the warm area and then tunnel into the cooler area where photons are emitted.

[TECHNICAL ARTICLE](#)

Tags: *Quantum science*

First noiseless single photon amplifier

EurekAlert, 12NOV2012

An international team of researchers has demonstrated the first device capable of amplifying the information in a single particle of light without adding noise. The technique works by combining the noisy quantum state with a 'clean' single photon in the amplifier and using quantum teleportation to transfer the information onto the new photon. The most obvious application for this work is in improved quantum cryptography; secret messaging which is guaranteed secure by the laws of physics. [TECHNICAL ARTICLE](#)

Tags: Quantum science, Breakthrough technology, Communications Technology

Entanglement Makes Quantum Batteries Almost Perfect, Say Physicists

MIT Technology Review, 09NOV2012

In theory, quantum batteries such as atoms and molecules can store and release energy on demand almost perfectly, provided they are entangled. Quantum batteries in the form of atoms or molecules may be ubiquitous in nature, in processes such as photosynthesis. Biologists know for example that during photosynthesis, energy is transferred with 100 percent efficiency from one molecular machine to another. How this happens, nobody knows.

Tags: Quantum science

S&T POLICY**Berlin aims to create research powerhouse**

Nature News, 13NOV2012

The new Berlin Institute of Health (BIH) could rival research powerhouses in the United States and Britain. The BIH is the German government's latest attempt to inject national funds into universities, circumventing a highly federalized system in which state governments jealously guard their responsibility for universities.

Tags: S&T policy, R&D Funding, S&T Germany

SCIENCE WITHOUT BORDERS**Humans are slowly but surely losing intellectual and emotional abilities, article suggests**

Science Daily, 12NOV2012

A provocative theory proposed by Stanford University researchers suggests that we are losing our intellectual and emotional capabilities because the intricate web of genes endowing us with our brain power is particularly susceptible to mutations and that these mutations are not being selected against in our modern society. [TECHNICAL ARTICLE Part 1, Part 2](#)

, Tags: Science without borders

New cosmic ray discovered

EU R&D News, 08NOV2012

European astronomers have discovered a new source of cosmic rays emanating from the vicinity of the Arches cluster, near the centre of the Milky Way. These particles are accelerated in the shock wave generated by tens of thousands of young stars moving at a speed of around 700,000 km/h.

Tags: Science without borders

SENSORS**World's first 'smart roads' to debut in the Netherlands**

Digital Trends, 12NOV2012

The smart road will use a special paint which becomes visible only when the weather is cold enough for icing conditions, and warn of potentially icy conditions. A new and very bright form of glow-in-the-dark paint which charges during the day from sunlight and can glow for as much as 10 hours during the night. Small roadside turbines which will harness air from passing cars to power small ground-level street lights. "Induction priority lane" would charge electric cars wirelessly as they drove over it.

Tags: Sensors, Emerging technology ■

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Dr. Melissa Flagg
Director, Office of
Technical Intelligence (OTI)

Ms. Hema Viswanath
OTI Corporate Librarian