



S&T NEWS BULLETIN

THE LATEST IN SCIENCE AND TECHNOLOGY RESEARCH NEWS

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FEATURE ARTICLES

[The Nobel Prize in Chemistry 2012](#)

[Nobelprize.org](#), 10OCT2012

The Royal Swedish Academy of Sciences has decided to award the Nobel Prize in Chemistry for 2012 to Robert J. Lefkowitz, Howard Hughes Medical Institute and Duke University Medical Center, Durham, NC, USA, and Brian K. Kobilka, Stanford University School of Medicine, Stanford, CA, USA “for studies of G-protein-coupled receptors.” [SCIENTIFIC BACKGROUND](#)

Tags: [Breakthrough technology](#), [Biology](#), [Featured Article](#)

[Nobel Prize in Physics 2012](#)

[Nobelprize.org](#), 09OCT2012

The Royal Swedish Academy of Sciences has decided to award the Nobel Prize in Physics for 2012 to Serge Haroche, Collège de France and Ecole Normale Supérieure, Paris, France, and David J. Wineland, National Institute of Standards and Technology (NIST) and University of Colorado Boulder, CO, USA “for ground-breaking experimental methods that enable measuring and manipulation of individual quantum systems.”

[SCIENTIFIC BACKGROUND](#)

Tags: [Quantum science](#), [Featured Article](#)

[The Nobel Prize in Physiology or Medicine 2012](#)

[Nobelprize.org](#), 08OCT2012

The Nobel Assembly at Karolinska Institutet has decided to award The Nobel Prize in Physiology or Medicine 2012 jointly to John B. Gurdon and Shinya Yamanaka for the discovery that mature cells can be reprogrammed to become pluripotent. [SCIENTIFIC BACKGROUND](#)

Tags: [Breakthrough technology](#), [Featured Article](#)

[Nobel Prizes: Is there a secret formula to winning one?](#)

[BBC News](#), 08OCT2012

Genius, passion, hard work, and a little bit of luck—that’s what we are told sets Nobel prize recipients apart from us mere mortals. But could there be any secret, hidden factors that come into play?

Tags: [S&T policy](#), [Featured Article](#)

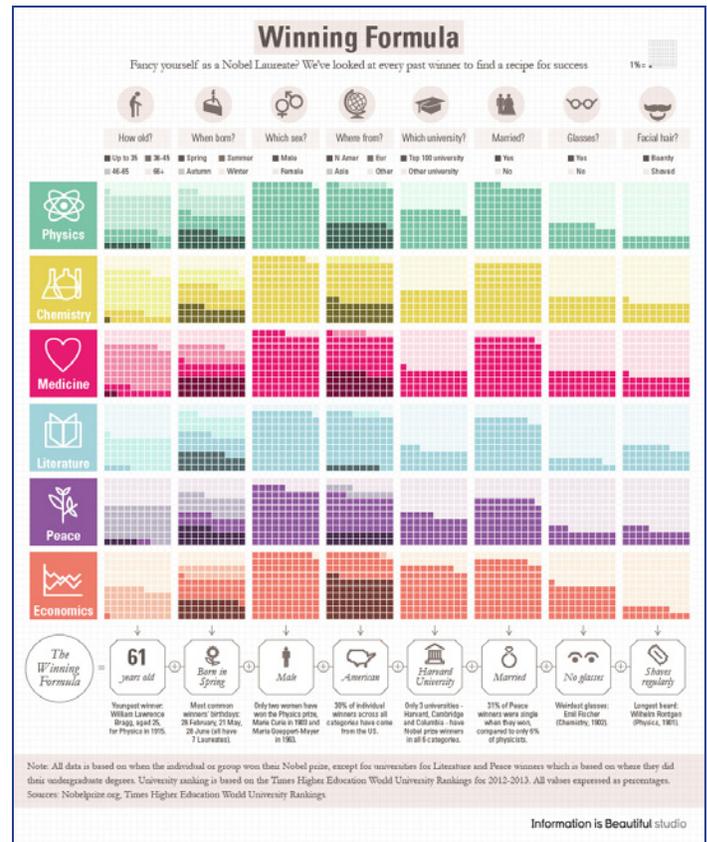


Image courtesy of www.BBC.com. Data used to construct the infographic can be found at <http://www.bbc.com/future/story/20121008-winning-formula-for-nobel-prizes>

S&T NEWS ARTICLES

ADVANCED MANUFACTURING

[New Methods for Modeling Physical Systems](#) R&D Magazine, 10OCT2012

The main goal was to develop the theory and computer algorithms necessary to automatically create engineering models in a mathematical form, which in return would speed up the system-level modeling approach for new products. A research team in Canada successfully created a number of multidomain system models comprising mechanical, electrical, hydraulic, and other components for hybrid electric vehicle.

Tags: Advanced manufacturing, Mathematics, S&T Canada, Simulation and modeling

[Pentagon's Plans For 3-D Printers: Mobile Labs, Bomb Sniffers and Prototype Limbs](#) Wired, 08OCT2012

The wider adoption of the machines is driven mainly by practicality. Time is money in manufacturing, and being able to build a prototype within hours as opposed to days—or a piece of equipment in days as opposed to weeks—saves on both. But if the Army is now printing components for bomb detectors, which could conceivably be printed in battlefield laboratories as well, it may only be a matter of time before the military's forward bases start resembling mini-factories. [VIDEO](#)

Tags: Advanced manufacturing, Government S&T

ADVANCED MATERIALS

[Drawing a line, with carbon nanotubes](#) MIT News, 09OCT2012

Researchers at MIT have designed a new type of pencil lead in which graphite is replaced with a compressed powder of carbon nanotubes. The lead, which can be used with a regular mechanical pencil, can inscribe sensors on any paper surface. [VIDEO](#), [TECHNICAL ARTICLE](#)

Tags: Advanced materials

[Shape memory polymers for making security labels](#)

China NOST News, 09OCT2012

The Guangzhou based company Manborui Material Technology is focused on the development and application of new polymer materials, such as Shape Memory Polymers (SMP); especially those which activate at low/medium temperature. SMPs are smart materials that have the ability to return from a temporary shape to their original (permanent) shape induced by an external stimulus, often a temperature change.

Tags: Advanced materials

[New technique reveals lithium in action](#) Nanowerk, 08OCT2012

This new method for studying reactions in detail could help researchers in their quest to design better batteries. Such improvements to lithium-air batteries could potentially enhance round-trip efficiency (energy retention between charge and discharge) and cycle life (the ability to charge and discharge a battery many times).

Tags: Advanced materials, Materials science

AUTONOMOUS SYSTEMS & ROBOTICS

[Robots using tools: With new grant, researchers aim to create 'MacGyver' robot](#) EurekAlert, 09OCT2012

To create a robot capable of using objects in its environment to accomplish a task researchers at Georgia Tech plan to develop an algorithm that will allow a robot to identify an arbitrary object in a room, determine the object's potential function, and turn that object into a simple machine that can be used to complete an action. Actions could include using a chair to reach something high, bracing a ladder against a bookshelf, stacking boxes to climb over something, and building levers or bridges from random debris.

Tags: Autonomous systems & robotics

[Harvard RoboBee Learn to Steer, Mostly](#) IEEE Spectrum, 08OCT2012

With the addition of two small control actuators underneath the wings, RoboBee has been endowed with the ability to pitch and roll, which is two thirds of what it needs to be able to do to be a fully controllable robotic insect. These maneuvers are currently open-loop, which means that the RoboBee isn't getting any sensor feedback: it's just been instructed to steer itself in one particular way, which it obediently does until it violently crashes into something. [VIDEO](#)

Tags: Autonomous systems & robotics

[Video Friday: Self-Parking Car, Curiosity Scoop, and Robot Circus](#)

IEEE Spectrum, 06OCT2012

This week the JPL engineers started preparing their robot for a new task: the first scoop of Martian soil! The engineers are programming Curiosity to collect a sample of soil using its robotic arm and then place the sample into one of its science instruments, housed within the rover's body. Watch to see how the robot geologist will carry out this task.

Tags: Autonomous systems & robotics

continued...

“My own personal belief is that we will, in the end, understand everything about how cells actually work ...” SIR JOHN B. GURDON

BREAKTHROUGH TECHNOLOGY

Extending Einstein's Theory Beyond Light Speed

Science Daily, 10OCT2012

Researchers at the University of Adelaide have developed new formulas that allow for travel beyond this limit. Their formulas extend special relativity to a situation where the relative velocity can be infinite, and can be used to describe motion at speeds faster than light. [TECHNICAL ARTICLE](#)

Tags: Breakthrough technology

COMMUNICATIONS TECHNOLOGY

Probe into sat-nav disruption

BBC News, 10OCT2012

Scientists in the Arctic have launched an urgent investigation into how solar storms can disrupt sat-nav. Scientists are hoping to understand the impact on satellite signals and then to try to develop a system for forecasting the most damaging effects of space weather.

Tags: Communications Technology

New technique to counter the effects of solar activity on GNSS, will be valuable across range of industries

PhysOrg.com, 07OCT2012

Researchers at the NGI have developed a new technique that improves GNSS positioning accuracy under the adverse tracking circumstances that arise during ionospheric disruptions. The technique improves position estimates without using external models to predict the distorting scintillation effects.

Tags: Communications Technology

CYBER SECURITY

Faster Computation Will Damage the Internet's Integrity

MIT Technology Review, 08OCT2012

An Intel researcher, Jesse Walker warns that SHA-1, a commonly used cryptographic algorithm commonly used to protect the integrity of secure Web transactions, stored passwords, and hundreds of other purposes will be easy to crack by 2018. A criminal organization could easily afford the cost of, in essence, forging the signature on critical security documents using commodity computing hardware.

Tags: Cyber security

ENERGY

The potential of thorium as a nuclear fuel

Alpha Galileo Foundation, 09OCT2012

“Conventional uranium-fuelled reactors produce highly radioactive waste which can last for thousands of years. Thorium produces far less of this waste. Even better, our reactors could use radioactive waste from conventional reactors as fuel. That means they could supply us with electricity by recycling existing dangerous waste.”

Tags: Energy, Nuclear energy

INFORMATION TECHNOLOGY

New interactive system detects touch and gestures on any surface

Science Daily, 09OCT2012

The new “extended multitouch” system developed by researchers at Perdue University allows more than one person to use a surface at the same time and also enables people to use both hands, distinguishing between the right and left hand. Research indicates the system is 98 percent accurate in determining hand posture, which is critical to recognizing gestures and carrying out commands. [VIDEO](#)

Tags: Information Technology, Sensors

Use your thumb and pinkie to make a call with Hi-Call phone gloves

Wired UK, 08OCT2012

Hi-Fun has invented phone gloves called Hi-Call, which feature a built in microphone and speaker in the little finger and thumb. The Bluetooth-enabled accessories are “perfect for every sport, from skiing to running” and eliminate the need to pull your phone out of your pocket to make a call. The gloves are compatible with all mobile phones with Bluetooth and they also have capacitive material to allow you to use touchscreens.

Tags: Information Technology

Wireless data at top speed

Science Daily, 08OCT2012

A researcher at the Fraunhofer Institute presented an infrared module the like of which has never been seen before. It transfers data at a rate of 1 gigabit per second (Gbit/s). To put this into context, one e-mail character has a size of eight bits. The infrared module is able to transfer 125 million characters per second.

Tags: Information Technology

[Google Puts Its Virtual Brain Technology to Work](#)

MIT Technology Review, 05OCT2012

Google's learning software is based on simulating groups of connected brain cells that communicate and influence one another. When such a neural network, as it's called, is exposed to data, the relationships between different neurons can change. That causes the network to develop the ability to react in certain ways to incoming data of a particular kind—and the network is said to have learned something.

Tags: *Information Technology, Artificial intelligence*

FEATURED RESOURCE

[Defense Update](#)

Published from Israel, highlights worldwide defense programs; asymmetric, hybrid warfare and net centric operations are also covered. Provides a comprehensive list of professional events and exhibitions.

[RSS](#)

MATERIALS SCIENCE

[Materials scientists prevent wear in production facilities in the electronics industry](#)

Science Daily, 07OCT2012

Researchers in Germany have developed a process that enables the damaged components to repair themselves while the PCB (Printed Circuit Boards) fabrication process continues. "The new process is similar to the mechanism used to regenerate human skin when wounds heal."

Tags: *Materials science*

[Miniaturization of data storage devices? Origin of ultra-fast manipulation of domain walls discovered](#)

Science Daily, 07OCT2012

Researchers in Germany have found a surprising effect that leads in ferromagnetic materials to a spatially varying magnetization manipulation on an ultrafast timescale. This effect could be the key to further miniaturization and performance increase of magnetic data storage devices.

[TECHNICAL ARTICLE](#)

Tags: *Materials science, Information technology*

NEUROSCIENCE

[Brain Connectivity Predicts Reading Skills](#)

Scientific American, 10OCT2012

The researchers at Stanford University scanned brains to visualize the growth of two major white-matter tracts: the arcuate fasciculus, which connects the brain's language centres, and the inferior longitudinal fasciculus, which

links the language centres with the parts of the brain that process visual information. Differences in the growth of both tracts could predict the variations in reading ability. Strong readers started off with a weak signal in both tracts on the left side of the brain, which got stronger over the three years. Weaker readers exhibited the opposite pattern.

Tags: *Neuroscience*

[Penn researchers create a universal map of vision in the human brain](#)

e! Science News, 06OCT2012

Their results create a map of vision in the brain based upon an individual's brain structure, even for people who cannot see. Their result can, among other things, guide efforts to restore vision using a neural prosthesis that stimulates the surface of the brain.

Tags: *Neuroscience*

[Training Computers to Understand the Human Brain](#)

Science Daily, 05OCT2012

Understanding how the human brain categorizes information through signs and language is a key part of developing computers that can 'think' and 'see' in the same way as humans. An international team of researchers have completed a study using fMRI datasets to train a computer to predict the semantic category of an image originally viewed by five different people. [VIDEO](#)

Tags: *Neuroscience*

QUANTUM SCIENCE

[Topological Superconductors](#)

Science Newsline, 09OCT2012

Researchers at the University of Maryland show, for the first time, that qubits can successfully exist in a so called topological superconductor material even in the presence of impurities in the material and strong interactions among participating electrons. To see how qubits can enter into their special coherence-protection program, courtesy of "Majorana particles," an exotic form of excitation, some groundwork has to be laid. [TECHNICAL ARTICLE](#)

Tags: *Quantum science*

[Mind the \(Quantum\) Context—Viewpoint](#)

American Physical Society Spotlight, 08OCT2012

A new optical experiment provides further proof that quantum mechanics is not hiding some classical framework beneath its veneer of context-dependent observations.

[TECHNICAL ARTICLE](#)

Tags: *Quantum science*

[Multi-photon approach in quantum cryptography implemented](#)

Science Daily, 07OCT2012

Researchers in the US postulated a theory known as the three-stage protocol, which relies on the unpredictability

continued...

of photons to ensure hackers can't locate or replicate the information used to transmit information. The concept has been demonstrated in the laboratory. Quantum cryptography has been used in rare instances, primarily Swiss banks, but is limited by its short transmission distance and slow speed. The new technology demonstration suggests the potential for breaking those barriers.

Tags: Quantum science

[Race is on to make quantum teleportation a reality](#)

[Wired UK, 07OCT2012](#)

This is not a maybe-sort-of-one-day quantum technology. Quantum teleportation has been proven experimentally many times over and researchers are now eyeing the heavens as their next big leap forward. Most of what remains are the nuts and bolts engineering challenges (and some more money) before it becomes a thing of the present.

Tags: Quantum science

S&T POLICY

[Germany, a world leader in technology, engineering and innovation](#)

[Cordis EU, 08OCT2012](#)

Few countries have contributed so much to science and technology as Germany. From physics and chemistry to cars and consumer products, Germany is a world leader in innovation, boasting leading universities and research institutes alongside major engineering, IT and manufacturing industries.

Tags: S&T policy, S&T Germany

[UK university science projects receive £200 million funding boost](#)

[Wired UK, 08OCT2012](#)

"Partnership between researchers, government and business is key to innovation, so this injection of funding is very welcome. It will be made even more effective if it forms part of a long term, joined up approach linking science and innovation to industrial strategy."

Tags: S&T policy, S&T UK

[Australian Panel Calls for Major Changes in Nation's Biomedical Research](#)

[Science Insider, 03OCT2012](#)

The Australian government created an advisory panel in late 2011 to develop a 10-year health and medical research plan for the nation. The panel is suggesting sweeping changes to the nation's biomedical research programs in order to better link science to health care—along with a hefty spending boost. But the recommendations, released today, come as the Australian government is reportedly considering a freeze on research grants as part of austerity plans. [REPORT](#)

Tags: S&T policy, S&T Australia

[Nobel success: What makes a great lab?](#)

[Nature, 03OCT2012](#)

It is easier to describe success than to explain it, but several of the characteristics that typified earlier exemplars are also part of the core ideology of the Laboratory of Molecular Biology in Cambridge (LMB). New techniques, new disciplines, new ways of tackling old problems and the ethos of collegiality have continued to characterize the lab. So has the key personality of Perutz, whose influence shines even after his death. The achievements of the lab's first half-century have been rewarded by even more new buildings, due to open in 2013. Long may the LMB flourish.

Tags: S&T policy, S&T UK

SCIENCE WITHOUT BORDERS

[Dead stars could be the future of spacecraft navigation](#)

[Science Daily, 09OCT2012](#)

Scientists are investigating the feasibility of using dead stars to navigate spacecraft in deep space. If feasible, this technique may, in the future, revolutionize the way spacecraft navigate in the outer Solar System and beyond.

Tags: Science without borders, Space technology

[What number is halfway between 1 and 9? Is it 5 — or 3?](#)

[MIT News, 06OCT2012](#)

Ask adults from the industrialized world what number is halfway between 1 and 9, and most will say 5. But pose the same question to small children, or people living in some traditional societies, and they're likely to answer 3. Cognitive scientists theorize that that's because it's actually more natural for humans to think logarithmically than linearly: 30 is 1, and 32 is 9, so logarithmically, the number halfway between them is 31, or 3. Neural circuits seem to bear out that theory.

Tags: Science without borders

SENSORS

[Gold nanocluster arrays will improve SERS sensors, researchers say](#)

[PhysOrg.com, 10OCT2012](#)

Researchers in Singapore produced closely packed nanocluster arrays of gold that incorporate the most desirable aspects for fabrication and sensing. In addition to flat surfaces, they also succeeded in coating fiber-optic tips with similarly dense nanocluster arrays, which is a particularly promising development for remote-sensing applications, such as hazardous waste monitoring. [TECHNICAL ARTICLE](#)

Tags: Sensors, Advanced materials

Tactile Glove Provides Subtle Guidance to Objects in Vicinity

Science Daily, 10OCT2012

Researchers at HIIT and Max Planck Institute for Informatics have shown how computer-vision based hand-tracking and vibration feedback on the user's hand can be used to steer the user's hand toward an object of interest. A study shows an almost three-fold advantage in finding objects from complex visual scenes, such as library or supermarket shelves.

Tags: Sensors, S&T Germany

Microsoft's Digits hand-gesture sensor bracelet detailed

BBC News, 09OCT2012

Digits uses a camera-based sensor that detects infrared (IR) light coupled with software that interprets the data produced to construct a model of a "fully articulated hand skeleton". This is then used to interpret what the user's hand is doing. The device could be used with a variety of devices across the day. [VIDEO](#)

Tags: Sensors, Information technology

MIT team builds most complex synthetic biology circuit yet

MIT News, 07OCT2012

Researchers at MIT have developed circuit components that don't interfere with one another, allowing them to produce the most complex synthetic circuit ever built. The circuit, described in the Oct. 7 issue of Nature, integrates four sensors for different molecules. Such circuits could be used in cells to precisely monitor their environments and respond appropriately. [TECHNICAL ARTICLE](#)

Tags: Sensors, Biology, Synthetic biology ■

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