



S&T NEWS BULLETIN

THE LATEST IN SCIENCE AND TECHNOLOGY RESEARCH NEWS

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FEATURE ARTICLES

[Quantum Temperature: Scientists Study the Physics That Connects the Classical to the Quantum World](#)

[Science Daily, 09SEP2013](#)

Researchers in Austria have directly observed the emergence and the spreading of a temperature in a quantum system. Remarkably, the quantum properties are lost, even though the quantum system is completely isolated and not connected to the outside world. [TECHNICAL ARTICLE](#)

Tags: Quantum science, Featured Article

[Recording and replaying human touch: the next user-interface revolution?](#)

[KurzweilAI, 09SEP2013](#)

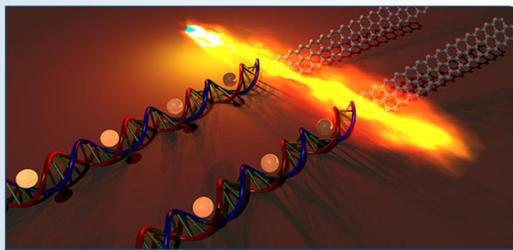
Researchers at the University of California, San Diego, have demonstrated a new user interface technology: electronic recording and replay of human touch. In addition to simply playing back touch, the touch data can be stored in memory and replayed at a later time or sent to other users. It is also possible to change the feeling of touch, or even produce synthesized touch by varying temporal or spatial resolutions. [TECHNICAL ARTICLE](#)

Tags: Sensors, Featured Article

[Scientists Use DNA to Assemble a Transistor from Graphene](#)

[Science Daily, 06SEP2013](#)

Given the material's tiny dimensions and favorable electrical properties, graphene nano ribbons create very fast chips that run on very low power. To create one atom thick and 20



To the right is a honeycomb of graphene atoms. To the left is a double strand of DNA. The white spheres represent copper ions integral to the chemical assembly process. The fire represents the heat that is an essential ingredient in the technique. (Credit: Anatoliy Sokolov)

to 50 atoms wide graphene ribbons, Stanford University researchers came up with the idea of using DNA as an assembly mechanism. [TECHNICAL ARTICLE](#)

Tags: Microelectronics, Featured Article

S&T NEWS ARTICLES

ADVANCED MANUFACTURING

[Chinese Bio-3D-Printer succeeds in printing parts of organs](#)

[China NOST News, 05SEP2013](#)

Using a 3D printing process based on biological materials, such as medical polymer, inorganic materials, water gel and viable cells, researchers in China have successfully printed out small scale human ear cartilage and liver units. China plans to open 10 new 3D printing innovation centers.

Tags: Advanced manufacturing, S&T China

ADVANCED MATERIALS

[Accidental Nanoparticle Discovery Could Hail Revolution in Manufacturing](#)

[Science Daily, 09SEP2013](#)

The particles discovered by researchers in the UK consist of nanotubes filled with iron, with equal lengths pointing outwards in all directions from a central particle. The presence of iron and the unusual nanoparticle shape could have potential for a number of applications, such as batteries that can be charged from waste heat, or as particles for cancer therapies that use heat to kill cancerous cells. [TECHNICAL ARTICLE](#)

Tags: Advanced materials, S&T UK

[Penn scientists demonstrate new method for harvesting energy from light](#)

[EurekAlert, 09SEP2013](#)

The work by researchers at the University of Pennsylvania centers on plasmonic nanostructures, specifically, materials fabricated from gold particles and light-sensitive

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molecules of porphyrin, of precise sizes and arranged in specific patterns. Because these materials can enhance the scattering of light, they have the potential to be used to advantage in a range of technological applications, such as increasing absorption in solar cells.

Tags: Advanced materials, Materials science

Engineers Make Golden Breakthrough to Improve Electronic Devices

[Science Daily, 05SEP2013](#)

Researchers at Kansas State University studied a new three-atom-thick material—molybdenum disulfide—and found that manipulating it with gold atoms improves its electrical characteristics. The research may advance transistors, photodetectors, sensors and thermally conductive coatings. It could also produce ultrafast, ultrathin logic and plasmonics devices. [TECHNICAL ARTICLE](#)

Tags: Advanced materials, Microelectronics

Made-To-Order Materials: Engineers Focus On the Nano to Create Strong, Lightweight Materials

[Science Daily, 05SEP2013](#)

Researchers at Caltech have constructed architectures out of materials with nanometer dimensions which enabled them to decouple the materials' strength from their density and to fabricate so-called structural metamaterials which are very stiff yet extremely lightweight. They have shown that at nanoscale, some metals are about 50 times stronger than usual, and some amorphous materials become ductile rather than brittle. [TECHNICAL ARTICLE](#)

Tags: Advanced materials

AUTONOMOUS SYSTEMS & ROBOTICS

Video Friday: Crossing the Alps, DRC Robots, and Kirobo Goes to Space

[IEEE Spectrum, 06SEP2013](#)

In June, Microdrones GmbH sent one of their md4-1000 autonomous drones all the way across the Alps, from Switzerland to Italy. The flight covered over 12 kilometers with a 0.7 kilometer elevation change, and took 22 minutes. [The raw footage](#) from the on-board camera runs long, but it's worth watching, both for the lovely alpine scenery and to see the drone desperately fighting against high, gusting winds.

Tags: Autonomous systems & robotics

BIG DATA

Frontiers in Massive Data Analysis

[National Academies, 10SEP2013](#)

Overall, this report illustrates the cross-disciplinary knowledge—from computer science, statistics, machine learning, and application disciplines—that must be brought to bear to make useful inferences from massive data.

Tags: Big data

COMMUNICATIONS TECHNOLOGY

Disney develops 'magical' device to make fingertips sing

[BBC News, 10SEP2013](#)

When they touch someone's earlobe, an organic speaker is formed and the sound becomes audible, effectively whispering a message into that person's ear. The sound can be passed from person to person using any physical contact. [More information.](#)

Tags: Communications Technology

Synthetic Speech System Puts a Dampener On Noisy Announcements

[Science Daily, 09SEP2013](#)

Researchers in the UK have developed software that can alter speech before it is broadcast over speakers, making it more audible amid background noise. They say that in loud situations, listeners pay most attention to the parts of speech that are easiest to hear, and use those to decipher what is being said.

Tags: Communications Technology, S&T UK

New Approach Enhances Quantum-Based Secure Communication

[Science Daily, 04SEP2013](#)

Researchers in Canada implemented a recently discovered new QKD protocol, which involves the two communicating parties sending their photons to a "middle man," who does a joint measurement on the two photons. This tells him only if the two parties have the same key, but provides no information about the key itself. [TECHNICAL ARTICLE](#)

Tags: Communications Technology, Quantum science, S&T Canada

CYBER SECURITY

Breakthrough in cryptography could result in more secure computing

[PhysOrg.com, 09SEP2013](#)

The SPDZ protocol developed by researchers in the UK and Denmark provides the fastest protocol known to implement a theoretical idea called "Multi-Party Computation." SPDZ protocol has possible applications in the finance, drugs and chemical industries where computation often needs to be performed on secret data.

Tags: Cyber security, Communications Technology, S&T UK

ENERGY

Wiring Microbes to Conduct and Produce Electricity Faster

[Science Daily, 04SEP2013](#)

A team of researchers in Ireland have found evidence that altering the chemistry of an electrode surface can help microbial communities to connect to the electrode to produce more electricity more rapidly compared to unmodified electrodes. [TECHNICAL ARTICLE](#)

Tags: Energy, Biotechnology

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“Science is merely an extremely powerful method of winnowing what’s true from what feels good.” CARL SAGAN

ENVIRONMENTAL SCIENCE

[Device Gives Scientists Front-Row Seat to Lightning Strikes](#)

Science Daily, 10SEP2013

The lightning induced change in the electric field is converted to a voltage reading by the Huntsville Alabama Marx Meter Array (HAMMA). An array of HAMMAs transmits the data to a computer which generates maps showing the intensity and distribution of lightning. [TECHNICAL ARTICLE](#)

Tags: *Environmental science*

[Scientists Confirm Existence of Largest Single Volcano On Earth](#)

Science Daily, 05SEP2013

Researchers at the University of Houston have uncovered the largest single volcano yet documented on Earth. Dubbed the Tamu Massif, it is nearly as big as the giant volcanoes of Mars placing it among the largest in the Solar System covering an area of about 120,000 square miles. [TECHNICAL ARTICLE](#)

Tags: *Environmental science*

[Danish experiment suggests unexpected magic by cosmic rays in cloud formation](#)

PhysOrg.com, 04SEP2013

Current research by scientists in Denmark, of which the reported SKY2 experiment forms just one part, contradicts the conventional view. Now they want to close in on the details of the unexpected chemistry occurring in the air, at the end of the long journey that brought the cosmic rays here from exploded stars. [TECHNICAL ARTICLE](#)

Tags: *Environmental science, Climatology*

MATERIALS SCIENCE

[Genome of Elastomeric Materials Creates Novel Materials](#)

Science Daily, 09SEP2013

A wide range of biologically inspired materials may now be possible by combining protein studies, materials science and RNA sequencing, according to an international team of researchers. [TECHNICAL ARTICLE](#)

Tags: *Materials science, Biotechnology*

[New Kind of Ultraviolet LED Could Lead to Portable, Low-Cost Devices](#)

Science Daily, 09SEP2013

The LED developed by researchers at Ohio State University creates a more precise wavelength of UV light, runs at much lower voltages and is more compact. It could lend itself to applications for chemical detection, disinfection, and UV curing. [TECHNICAL ARTICLE](#)

Tags: *Materials science*

[Ultra-Thin Saw Wire Made of Carbon for Precision Work](#)

Science Daily, 09SEP2013

German and Australian scientists have developed a saw wire that is set to effect dramatic reductions in kerf loss: in place of diamond-impregnated steel wires, the researchers use ultra-thin and extremely stable threads made of carbon nanotubes coated with diamond. In principle, this diamond-coated yarn is the ideal material on which to base a new generation of saws, which could be used in the solar industry for example.

Tags: *Materials science, S&T Australia, S&T Germany*

[Breaking nature’s superfluid symmetry](#)

RIKEN Research, 06SEP2013

Researchers in Japan have observed another remarkable property of superfluids—the breaking of a fundamental natural symmetry in superfluid helium-3 (^3He). One of the important consequences of symmetry breaking is the formation of topological defects such as magnetic domain walls in ferromagnets and cosmic strings in the Universe.

Tags: *Materials science, S&T Japan*

[New Connection Between Stacked Solar Cells Can Handle Energy of 70,000 Suns](#)

Science Daily, 06SEP2013

Researchers at North Carolina State University have discovered that by inserting a very thin film of gallium arsenide into the connecting junction of stacked cells they can virtually eliminate voltage loss without blocking any of the solar energy. [TECHNICAL ARTICLE](#)

Tags: *Materials science, Energy*

[Shining a Little Light Changes Metal Into Semiconductor](#)

Science Daily, 06SEP2013

Researchers at Washington University in St. Louis took the gold nanorods and put a very thin blanket of zinc oxide, a common ingredient in sunscreen, on top to create a composite. When they turned on light, they noticed that the composite had changed from one with metallic properties into a semiconductor. [TECHNICAL ARTICLE](#)

Tags: *Materials science, Advanced materials*

[Nanostructures With Potential to Advance Energy Devices Produced](#)

Science Daily, 04SEP2013

Arizona State University researchers have been experimenting with dealloying lithium-tin alloys, and seeing the potential for the nanostructures they are producing to spark advances in lithium-ion batteries, as well as

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in expanding the range of methods for creating new nanoporous materials using the dealloying process.

[TECHNICAL ARTICLE](#)

Tags: Materials science

[New Breakthrough for Structural Characterization of Metal Nanoparticles](#)

[Science Daily, 04SEP2013](#)

Researchers in China and Finland have characterized a series of stable 1.5 nm metal nanoclusters containing 44 metal atoms, stabilized by 30 organic thiol molecules on the surface. The special electronic structure of the clusters leads to peaked absorption of radiation in a wide region of ultraviolet and visible parts of the electromagnetic spectrum. This material is expected to be widely studied for optical, sensing and electron-transfer applications in the future. [TECHNICAL ARTICLE](#)

Tags: Materials science, S&T China, S&T Finland

[New computer model will help design flexible touchscreens](#)

[Science Daily, 03SEP2013](#)

Researchers at the University of Pennsylvania and Duke University have shown a new way to design transparent conductors using metal nanowires that could enable less expensive—and flexible—touchscreens. [TECHNICAL ARTICLE](#)

Tags: Materials science

FEATURED RESOURCE

[MIT TECHNOLOGY REVIEW](#)

Identifies emerging technologies and analyzes their impact for leaders, R&D sponsors, developers, and researchers in government, academia, industry and business. [RSS](#)

MICROELECTRONICS

[Breakthrough Could Make Electronics Smaller and Better: Surprising Low-Tech Tool—Scotch Tape—Was Key](#)

[Science Daily, 03SEP2013](#)

Combining several standard nanofabrication techniques—with the final addition of the Scotch Magic tape—researchers at the University of Minnesota created extremely thin gaps through a layer of metal and patterned these tiny gaps over the entire surface of a four-inch silicon wafer. This work provides the basis for producing new and better nanostructures that are at the core of advanced electronic and optical devices. [TECHNICAL ARTICLE](#)

Tags: Microelectronics

NEUROSCIENCE

[Capturing brain activity with sculpted light](#)

[Nanowerk, 09SEP2013](#)

Applying a new technique, researchers in Austria can record the activity of a worm's brain with high temporal and spatial resolution, ultimately linking brain anatomy to brain function. [TECHNICAL ARTICLE](#)

Tags: Neuroscience

[Look at What I'm Saying: Engineers Show Brain Depends On Vision to Hear](#)

[Science Daily, 04SEP2013](#)

The brain considers both sight and sound when processing speech. However, if the two are slightly different, visual cues dominate sound. This phenomenon is named the McGurk effect. Researchers at the University of Utah pinpointed the source of the McGurk effect by recording and analyzing brain signals in the temporal cortex. [TECHNICAL ARTICLE](#)

Tags: Neuroscience

S&T POLICY

[New center to better understand human intelligence, build smarter machines](#)

[NSF News, 09SEP2013](#)

The National Science Foundation (NSF) recently awarded \$25 million to establish a Center for Brains, Minds and Machines at the Massachusetts Institute of Technology (MIT). The center is one of three new research centers funded this year through NSF's Science and Technology Centers: Integrative Partnerships program.

Tags: S&T policy

[Ground-breaking agreement strengthens United States and United Kingdom research collaboration](#)

[NSF News, 06SEP2013](#)

This new, two-way, lead-agency agreement enables a simplified and flexible process for researchers wishing to apply for U.S.-U.K. collaborative research funding, using the same systems and processes within the respective funding agencies.

Tags: S&T policy

SCIENCE WITHOUT BORDERS

[NASA's Black-Hole-Hunter Catches Its First 10 Supermassive Black Holes](#)

[Science Daily, 09SEP2013](#)

The new black-hole finds are the first of hundreds expected from the mission over the next two years. These gargantuan structures—black holes surrounded by thick disks of gas—lie at the hearts of distant galaxies between 0.3 and 11.4 billion light-years from Earth. [More information, TECHNICAL ARTICLE](#)

Tags: Science without borders, Government S&T, NASA, Space technology

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SENSORS

Bomb-Detecting Lasers Could Improve Security Checkpoints[Science Daily, 09SEP2013](#)

Researchers at Michigan State University developed a laser that can detect micro traces of explosive chemicals on clothing and luggage. It uses a single beam and requires no bulky spectrometers. [TECHNICAL ARTICLE](#)

*Tags: Sensors***Detecting heartbeats in rubble**[EurekaAlert, 09SEP2013](#)

A new radar-based technology named Finding Individuals for Disaster and Emergency Response (FINDER) has been developed by the Department of Homeland Security's Science and Technology Directorate (S&T) and the National Aeronautics Space Administration's Jet Propulsion Laboratory (JPL) to detect a human heartbeat buried beneath 30 feet of crushed materials, hidden behind 20 feet of solid concrete, and from a distance of 100 feet in open spaces.

*Tags: Sensors***How to Trace a Sarin Attack**[MIT Technology Review, 09SEP2013](#)

New research by Pacific Northwest National Laboratory indicates that chemical fingerprints can make positive matches between batches of sarin.

*Tags: Sensors, Government S&T***Researching New Detectors for Chemical, Biological Threats**[Science Daily, 06SEP2013](#)

The prototype of the new detector, a miniature pulsed-discharge ionization detector, or mini-PDID, developed by researchers at Sandia National Laboratory, is about 1 inch by 1 inch by 2 inches, can be coupled with commercially produced micro-GCs and can run for nine hours on a charge of helium. Experiments have shown the mini-PDID can detect explosives-related compounds, pesticides and toxic industrial compounds. [TECHNICAL ARTICLE](#)

*Tags: Sensors, Government S&T***Researchers developing new systems to improve voice recognition**[PhysOrg.com, 04SEP2013](#)

Researchers at UT Dallas created algorithms that more efficiently converted acoustic wave forms into computer processing for pattern analysis. Their process also eliminated silences and background noise to allow computers to spend more resources on the important speech sounds that reveal speaker identity traits.

*Tags: Sensors, Pattern recognition ■***ABOUT THIS PUBLICATION**

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