



S&T NEWS BULLETIN

THE LATEST IN SCIENCE AND TECHNOLOGY RESEARCH NEWS

Advanced manufacturing (1)
Advanced materials (8)
Autonomous systems and robotics (5)
Communications technology (2)

Cyber security (2)
Energy (3)
Government S&T (1)
Information technology (2)

Materials science (4)
Medical sciences (1)
Microelectronics (1)
Quantum science (2)

S&T policy (2)
Science without borders (4)
Sensors (1)
STEM (1)

FEATURE ARTICLES

Robots get a feel for the world at USC Viterbi

e! Science News, 19JUN2012

The robot was equipped with a new type of tactile sensor built to mimic the human fingertip. It also used a newly designed algorithm to make decisions about how to explore the outside world by imitating human strategies. Capable of other human sensations, the sensor can also tell where and in which direction forces are applied to the fingertip and even the thermal properties of an object being touched. A specially designed robot can outperform humans in identifying a wide range of natural materials according to their textures.

Tags: Autonomous systems & robotics, Featured Article

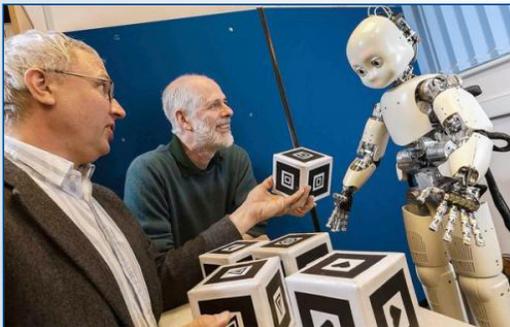
British researchers create robot that can learn simple words by conversing with humans (w/ Video)

PhysOrg.com, 18JUN2012

DeeChee was designed to recognize words of encouragement, like “good” and “well done,” from its human conversation partner. That feedback helped transform the robot’s babble into coherent words, sometimes in as little as two minutes.

TECHNICAL ARTICLE

Tags: Autonomous systems & robotics, Robotics, Featured Article



The iCub robot named DeeChee learning basic language with Professor Chrystopher Nehaniv and Dr Joe Saunders

Optical displays from water and air

Science Daily, 18JUN2012

Researchers from Finland and UK fabricated a super-hydrophobic surface with structures in two size scales: microposts that have a size of ten micrometers and tiny nanofilaments that are grown on the posts. On such a two-level surface the air layer can exist in two different shapes (wetting states) that correspond to the two size scales. The researchers found that one can easily switch between the two states locally using a nozzle to create over- or underpressure in the water, in order to change the air layer to either state. [VIDEO](#)

Tags: Materials science, Featured Article

S&T NEWS ARTICLES

ADVANCED MANUFACTURING

Tallest Building in the World—Sky City to be assembled on site in 90 days in Changsha, China from Nov, 2012 to Jan, 2013

Next Big Future, 14JUN2012

Broad Sustainable Building (BSB), a construction company based in Hunan plans, to capture 30% of the world’s construction industry by dominating construction in China alone. They have factories and franchisees in India and are talking to companies in many other countries. This shift will transform the skylines of the cities of the world, which is projected to increase urbanization to 60% by 2020.

Tags: Advanced manufacturing, China

ADVANCED MATERIALS

Applied Nanotech Receives U.S. Army Research Contract for Self-Healing Ballistic Shields

Nanowerk, 19JUN2012

The \$275,642 contract is to develop glass fiber-reinforced composite panels (GFRP) to improve the protection of facilities from ballistic and blast threats, as well as from

continued...

[BACK TO TOP](#)

electromagnetic interference, seismic events and degradation. Applied Nanotech is also developing the supplemental functionalities of surface self-decontamination, to protect against bio-chemical attacks.

Tags: Advanced materials, Military technology

European Nanoelectronics Forum, 20-21 November 2012, Munich, Germany

EU FET Research News, 18JUN2012

This yearly Forum brings together key players from industry, academia and public authorities. The topics range from research and technology developments in nanoelectronics, innovation in Europe and the semiconductor market to what lies ahead for the European nanoelectronics industry. Participation in the event is restricted, but a request for an invitation can be sent to the organisers. [Invitation request](#)

Tags: Advanced materials, Emerging technology

Scientists synthesize first genetically evolved semiconductor material

Nanowerk, 18JUN2012

Polystyrene microbeads coated with specific silicateins were put through a mineralization reaction by incubating the beads in a water-in-oil emulsion that contained chemical precursors for mineralization: metals of either silicon or titanium dissolved in the oil or water phase of the emulsion. As the silicateins reacted with the dissolved metals, precipitated them, integrating the metals into the resulting structure and forming nanoparticles of silicon dioxide or titanium dioxide.

Tags: Advanced materials

Self-assembling nanocubes for next generation antennas and lenses

Nanowerk, 18JUN2012

Researchers at the University of California, San Diego, are developing materials that can manipulate light using structures that are smaller than the wavelength of light itself. The nanocubes used in this study were less than 0.1 microns; by comparison, the breadth of a human hair is 100 microns. Precise orientation is necessary so that the cubes can confine light (for a nanoscale antenna) or focus light (for a nanoscale lens) at different wavelengths.

TECHNICAL ARTICLE

Tags: Advanced materials

Medical textiles: Nanofiber-based 'smart' dressings for burn wounds

Nanowerk Spotlight, 16JUN2012

Conventional dressings are not efficient enough to induce haemostasis, adherence and in holding a moist environment around wound. Due to the advances in the field of nanotechnology, it is now possible to design nanofiber-based wound

dressings where an electrospun-nanofibrous layer is applied to a basic support fabric material.

Tags: Advanced materials, Medical technology

Nature inspires new submarine design

EurekAlert, 16JUN2012

Superhydrophobicity is one of most important interfacial properties between solids and liquids. Researchers in China have shown that the superhydrophobicity of the water boatman's (water-dwelling insect) hind wings plays a crucial role in its swimming, breathing, and balance, as well as its ability to escape from the water surface under unfavorable conditions. This research may provide a new strategy for submarine design and the fabrication of a water boatman robots.

Tags: Advanced materials, Biomimetics, S&T China

Electrified graphene a shutter for light

Nanowerk, 15JUN2012

Rice University researchers tune material to control terahertz, infrared waves. Changing the voltage alters the Fermi energy of the graphene, which controls the transmission or absorption of the beam. The Fermi energy divides the conduction band, which contains electrons that absorb the waves, and the valance band, which contains the holes to which the electrons flow.

Tags: Advanced materials, Terahertz technology

Nanotechnology Used to Harness Power of Fireflies

Science Daily, 15JUN2012

Fireflies produce light through a chemical reaction between luciferin and it's counterpart, the enzyme luciferase. Scientists at Syracuse University designed a way to chemically attach, genetically manipulated luciferase enzymes directly to the surface of the nanorod. Their breakthrough produces a system that is 20 to 30 times more efficient than those produced during previous experiments. The system holds the most promise for future technologies that that will convert chemical energy directly to light.

Tags: Advanced materials, Biomimetics

AUTONOMOUS SYSTEMS & ROBOTICS

EPFL Developing Connectors for Modular Floating Robots

IEEE Spectrum, 19JUN2012

Researchers in France are working on a robot made up of soft, floating modules that connect to each other through electroadhesion. The nice thing about electroadhesion, besides the fact that it works even on non-conductive surfaces, is that it's flexible, making it an ideal dynamic connector for soft, modular robots. [VIDEO](#)

Tags: Autonomous systems & robotics, S&T France

“There is no harm in doubt and skepticism, for it is through these that new discoveries are made.” RICHARD FEYNMAN

AirBurr MAV Can Now Self-Right, Is Utterly Unstoppable

IEEE Spectrum, 15JUN2012

The AirBurr Samurai developed by French researchers was able to autonomously right itself within 25 seconds in 100% of the time after being manually knocked over on a flat surface. The robot had a little bit of trouble trying to get back up after landing on slopes greater than 10 degrees, and gravel and rocks proved tricky as well. Part of the problem is the autonomous controller, and EPFL researchers are already working on the AirBurr V9.

VIDEO

Tags: Autonomous systems & robotics

Video Friday: UAVs Delivering Packages, More Sushi Than You Can Possibly Eat, and RoboCup Outtakes

IEEE Spectrum, 15JUN2012

It's not quite a Tacocopter (not yet), but researchers from UMass Lowell have built themselves a little autonomous airplane that can drop off packages at GPS waypoints.

Tags: Autonomous systems & robotics

COMMUNICATIONS TECHNOLOGY

Please leave a message: insect's voicemail strategies

EU R&D News, 19JUN2012

In a new study, Dutch scientists show that herbivorous insects use plants as 'green phones' when it comes to communicating with other bugs by leaving messages in the soil. The team uncovered this original communication method in the ragwort plant, where they found that the effects the insects have on soil fungi is a means of letting other insects know certain things.

Tags: Communications Technology, Biology

Harris unveils new high-frequency tactical radio

Harris Corporation, 11JUN2012

Lightweight and portable, the Falcon III® RF-7800M-HH provides unprecedented access to information by allowing warfighters to communicate by voice, video and data anywhere on the battlefield. The 7800M wideband handheld supports network-enabled missions through applications such as video, collaborative chat and situational awareness.

Tags: Communications Technology

CYBER SECURITY

Japanese researchers achieve world record cryptanalysis of next-generation cryptography

PhysOrg.com, 19JUN2012

Researchers in Japan broke a world cryptography record with the successful cryptanalysis of a 278-digit (923-bit), long pairing-based cryptography. This result is used as the basis of selecting secure encryption technology, and is proving useful in the standardization of next-generation cryptography in electronic government systems in Japan and international standardization organizations.

Tags: Cyber security, Cryptology, S&T Japan

Sandia opens new facility dedicated to cybersecurity research

Defense Systems, 18JUN2012

The new Cybersecurity Technologies Research Laboratory (CTRL) will provide a setting for assisting cybersecurity professionals locally and across the nation as they work on critical cyber research issues. It will promote stronger relationships between industry, academia and national laboratories in the research and development of cybersecurity solutions through technology, practices and policy.

Tags: Cyber security, Government S&T

ENERGY

Solar nanowire array may increase percentage of sun's frequencies available for energy conversion

Nanowerk, 19JUN2012

Researchers at Sandia Laboratory report that if the indium mixture is grown on a phalanx of nanowires rather than on a flat surface, the small surface areas of the nanowires allow the indium shell layer to partially "relax" along each wire, easing strain. This relaxation allowed the team to create a nanowire solar cell with roughly 33 percent of indium, higher than any other reported attempt at creating III-nitride solar cells.

Tags: Energy, DOE, Government S&T, Solar energy

Power-generating knee strap hints at end for batteries

EurekAlert, 14JUN2012

Researchers in UK have developed an energy harvesting device, which is designed to fit onto the outside of the knee, that is circular and consists of an outer ring and central hub. The outer ring rotates as the knee joint goes through

a walking motion. The outer ring is fitted with 72 plectra which “pluck” four energy-generating arms attached to the inner hub. Soldiers may find this device particularly useful as they often have to carry up to 10kg of power equipment when on foot patrol. [TECHNICAL ARTICLE](#)

Tags: Energy

[‘Seabed carpet’ could harness wave energy](#)

[Physics World](#), 14JUN2012

A synthetic “seabed carpet” that mimics the wave-damping effect of a muddy seafloor could be used to extract energy from waves passing over it. Modelling the interaction of ocean waves with the proposed carpet, researchers at UC Berkeley were able to show that the system can easily absorb 50% of incident wave energy over short distances of about 10 m. For typical North Sea waves, the simulation suggested energy absorption rates of up to 6.5 kW m⁻², which is more than double the maximum possible with wind turbines and at least 20 times greater than currently achieved by solar-power convertors.

Tags: Energy, Ocean science

INFORMATION TECHNOLOGY

[Panasonic’s Android-based ‘toughpad’ unveiled in Asia](#)

[PhysOrg.com](#), 19JUN2012

The device weighs 0.97 kilogrammes and its 10.1-inch LCD display allows the user to read even under the sun while it is tough enough to withstand being dropped from a height of four feet (1.21 metres). It also has a nine-hour battery life. It was designed for tough environments such as battlefields. It has already previewed in the United States and production will start later this year.

Tags: Information Technology, Military technology

[Phones gain ability to learn by touching](#)

[PhysOrg.com](#), 14JUN2012

There’s a form of extra-sensory perception called psychometry, whose practitioners claim to learn things about objects by touching them. Smartphones set to be released this month by Samsung and Sony will have some of that ability: they’ll learn things when you touch them to pre-programmed “tags.”

Tags: Information Technology

MATERIALS SCIENCE

[Researchers ‘heal’ plasma-damaged semiconductor with treatment of hydrogen radicals](#)

[Science Daily](#), 18JUN2012

When researchers in Japan exposed plasma-damaged GaN to higher-level doses of H radicals the photoluminescence was restored to almost the level of un-etched GaN. The H radicals likely terminated the dangling bonds of Ga on the GaN surface, as well as desorbed the surface residues, which both led to the recovered optical performance.

[TECHNICAL ARTICLE](#)

Tags: Materials science, Semiconductors

[Got mass? Princeton scientists observe electrons become both heavy and speedy e!](#)

[Science News](#), 17JUN2012

Princeton University researchers have revealed that quantum entanglement determines the mass of electrons moving in a crystal. Cool the electrons to far below room temperature in certain types of solid materials, and these flighty particles gain mass, acting like much heavier particles. Further cooling close to absolute zero makes these solids become superconducting. Where the electrons make a kind of perfect fluid that can flow without wasting any electrical power despite their heaviness.

Tags: Materials science

FEATURED RESOURCE

[U.S Nano Metro Map](#)

This map shows the locations (by zipcode) of companies, universities, government laboratories, and organizations working in nanotechnology around the United States.

[Map raw data](#)

GOVERNMENT S&T

[US launches three biodefense centres](#)

[Newswise](#), 18JUN2012

Based in Maryland, North Carolina, and Texas, the three centres are comprised of academic and industry consortia whose role it will be to hasten the development and manufacturing of vaccines and medications in the event of an emerging biological threat. The contracts, amounting to roughly \$400 million, represent a range of academic and private partnerships as well as partnerships between large pharmaceutical companies and small biotech firms.

Tags: Government S&T, Government S&T

Neutrons escaping to a parallel world?

Science Daily, 16JUN2012

Researchers in Italy showed that the loss rate of very slow free neutrons appears to depend on the direction and strength of the magnetic field applied. This anomaly could not be explained by known physics. Researchers believe it could be interpreted in the light of a hypothetical parallel world consisting of mirror particles. Each neutron would have the ability to transition into its invisible mirror twin, and back, oscillating from one world to the other.

Tags: *Materials science***MEDICAL SCIENCES****Antibody cocktail cures monkeys of Ebola**

Nature News, 13JUN2012

The antibodies, isolated from mice vaccinated with fragments of the virus, target and neutralize a glycoprotein on the surface of the virus that allows it to enter and infect cells. Although the strategy of using antibodies is not new, unlike many previous treatments, the Canadian group's cocktail contains multiple antibodies that each target different locations of the glycoprotein, making it harder for the virus to resist attack.

Tags: *Medical Sciences***MICROELECTRONICS****IBM Supercomputer in Germany Points the way to Water Cooled 3D chips for Desktop Supercomputers**

Next Big Future, 19JUN2012

IBM is developing energy-efficient run-time thermal control strategies to achieve energy-efficient cooling mechanisms to compress almost 1 Tera nano-sized functional units into one cubic centimeter with a 10 to 100 fold higher connectivity than otherwise possible. This will hopefully enable compact mobile supercomputers with the power of today's room sized systems in a desktop package in the 2017–2025 timeframe.

Tags: *Microelectronics***QUANTUM SCIENCE****Quantum storage system with long-term memory**

Nanowerk, 19JUN2012

A quantum memory must fulfil two conflicting criteria: on the one hand, it must be isolated from the environment as much as possible so that the stored qubits are not destroyed by external magnetic fields. On the other hand, it must be able to exchange information with this very same environment. A team of researchers from Harvard University, the Max Planck Institute, and Caltech has successfully reconciled the conflicting factors to such a degree that a qubit in an artificial diamond crystal can remain stable for more than a second, even at room temperature.

Tags: *Quantum science***Quantum computing? Quantum bar magnets in a transparent salt**

Science Daily, 18JUN2012

Researchers in Switzerland and UK were able to image all the spins in the special salt, finding that the spins are parallel within pairs of layers, while for adjacent layer pairs, they are antiparallel, as large bar magnets placed adjacent to each other would be. The spin arrangement is called “antiferromagnetic.” In contrast, for ferromagnets such as iron, all spins are parallel. Scientists have managed to switch on and off the magnetism of a new material using quantum mechanics, making the material a test bed for future quantum devices. TECHNICAL ARTICLE

Tags: *Quantum science, Advanced materials***S&T POLICY****Billion-euro research race enters closing stage**

Nanowerk, 14JUN2012

EU scientists and member states will decide over the next six months which future high-tech industries—from a choice including robot servants and nano clothing—should receive a 1 billion euro European funding boost. The six programmes have just completed a year-long pilot period and are now producing lengthy proposals in their attempt to win the coveted status of FET flagship initiatives. The competition is intense since each consortium is backed by several university research departments and the private sector.

Tags: *S&T policy, S&T EU***China strives to create its own Silicon Valley**

San Jose Mercury News, 06JUN2012

Chinese government and company delegations frequently take tours up and down California's Highway 101 to wheel and deal with prominent Silicon Valley tech firms. They are looking for commercial and research partnerships, as well as companies to invest in. While the San Francisco area can benefit from these increasing cross-Pacific networks, Richard Suttmeier, a University of Oregon expert on Chinese science policy, worries about whether America is giving away too much.

Tags: *S&T policy, China, China espionage***SCIENCE WITHOUT BORDERS****A Peek Behind China's 'Great Firewall'**

MIT Technology Review, 18JUN2012

A study by researchers at Harvard University offers an intriguing look behind the veil of China's extensive Internet censorship effort, and suggests that censorship behavior around specific topics could serve as a predictor of government action. The group found, for example, that censors began removing a higher-than-normal percentage of comments referring to outspoken artist and political activist Ai Weiwei several days before his surprise arrest in 2011.

Tags: *Science without borders**continued...*

The weight of nations: An estimation of adult human biomass

e! Science News, 18JUN2012

The world population is over seven billion and all of these people need feeding. However, the energy requirement of a species depends not only on numbers but on its average mass. New research has estimated the total mass of the human population, defined its distribution by region, and the proportion of this biomass due to the overweight and obesity. [TECHINCAL ARTICLE](#)

Tags: Science without borders

New professional society launched for nanotechnology and sustainability

Nanowerk, 14JUN2012

The Sustainable Nanotechnology Organization (SNO) promotes research, education, and responsibility to fulfill its mission. The first meeting, November 4-6, 2012, in Washington DC features plenaries by Nobelist Sir Harry Kroto and National Nanotechnology Initiative founding father, Mihail (Mike) Roco and over 100 individual presentations.

Tags: Science without borders, Advanced materials

Elbit Systems Launches the 'Clip-On Coyote', a Modular Un-Cooled Sniper Sight

Defense Update, 13JUN2012

Elbit Systems is launching the Clip-On Coyote, a modular un-cooled sight that easily integrates in front of the sniper's rifle telescope, at [Eurosatory 2012](#). Weighing less than 1.7 kg, the Clip-On Coyote enables shooting ranges on accurate calibers for snipers for more than 1,000m, high quality thermal imaging, detection range of 2.5 km and more than 8 hours of continuous operations.

Tags: Science without borders, Military technology

SENSORS

From Testing Lipstick to Spotting Terrorists

IEEE Spectrum, 14JUN2012

In department stores, a French cosmetics company Vesalis' facial recognition software compares relatively low quality images from store security cameras against a database of existing customers. When the system spots a known customer coming into the store, it sends an alert to an iPad carried by a salesperson. This fast image recognition from low-quality video is just what security companies dream of, to compare people against a database of known "people of concern." The company expects its technology, in the future, to be used in counterterrorism, border control, ATM access, and a variety of security applications.

Tags: Sensors, Pattern recognition

STEM

Research Universities and the Future of America: Ten Breakthrough Actions Vital to Our Nation's Prosperity and Security

National Research Council, 14JUN2012

This report examines trends in university finance, prospects for improving university operations, opportunities for deploying technology, and improvement in the regulation of higher education institutions. It also explores ways to improve pathways to graduate education, take advantage of opportunities to increase student diversity, and realign doctoral education for the careers new doctorates will follow. This report is a follow-up to [Rising Above the Gathering Storm](#)

Tags: STEM

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. Melissa Flagg

Director, Office of
Technical Intelligence (OTI)

Ms. Hema Viswanath

OTI Corporate Librarian