Volume 3, Issue 5 ■ 01FEB2013

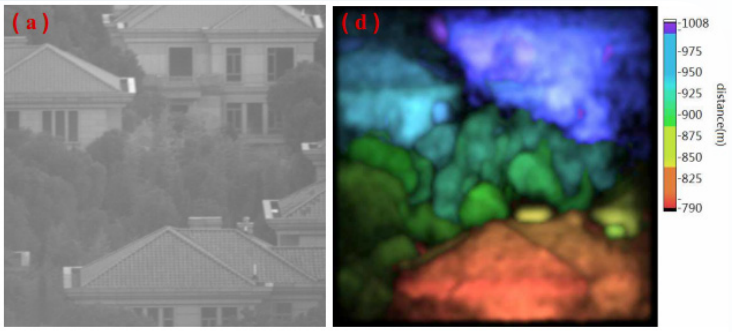
S&T NEWS BULLETIN

THE LATEST IN SCIENCE AND TECHNOLOGY RESEARCH NEWS

Feature Articles

First 3D Ghost Images From A Single Pixel

MIT Technology Review, 29JAN2013



Ghost imaging is the technique of bouncing a laser beam off an object and making high quality images from the reflected light using a single pixel. The single pixel records many data points which must be stitched together to create the image. Any correlations between the original and reflected beam reveal information about the object in the image. TECHNICAL ARTICLE

Tags: Imaging technology, Featured Article

Of Einstein and entanglement: Quantum erasure deconstructs wave-particle duality

PhysOrg.com, 29JAN2013

Quantum physics presents several counterintuitive features, including entanglement, tunneling and wave-particle duality. However through recent experiments researchers at the University of Vienna concluded that the world view that a photon always behaves either definitely as a wave or definitely as a particle would require faster-than-light communication, and should therefore be abandoned as a description of quantum behavior. TECHNICAL ARTICLE

Tags: Quantum science, Featured Article

Toward 2-D devices: Single-atom-thick patterns combine conductor and insulator

Science Daily, 27JAN2013

Researchers at Rice University have created a process to make patterns in atom-thick layers that combine a conductor—graphene—and an insulator—hexagonal boron nitride. The process may lead to new possibilities for two-dimensional electronics. TECHNICAL ARTICLE

Tags: Advanced manufacturing, Featured Article

S&T News Articles

ADVANCED MANUFACTURING

Ants' behavior leads to research method for optimizing product development time, costs

Science Daily, 29JAN2013

Using computer simulations derived from the characteristics of ants seeking food, Wayne State University researchers have developed a mathematical model-based methodology to estimate the optimal amount of time spent to develop a product, as well as the cost, in overlapped product development. TECHNICAL ARTICLE

Tags: Advanced manufacturing, Biomimetics

Printable photonic devices with resolution below 10 nanometers

Nanowerk Spotlight, 29JAN2013

Researchers at the Lawrence Berkeley National Laboratory developed a titanium-based inorganic-organic hybrid material for imprinting TiO2 crack-free films over a large area. Their novel process allows the patterning of TiO2 films with feature sizes down to 5 nm. Potential applications of this material are printable integrated devices—waveguide, resonator, planar holograms; antireflective coating with applications in solar cells; and light extraction for LEDs. TECHNICAL ARTICLE

Tags: Advanced manufacturing

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ADVANCED MATERIALS

Bioinspired fibers change color when stretched

EurekAlert, 28JAN2013

Inspired by nature, researchers at Harvard University and the University of Exeter, UK, identified and replicated the unique structural elements that create the bright iridescent blue color of a tropical plant's fruit. The fibers' superior mechanical properties, combined with their demonstrated color brilliance and tunability, make them very versatile.

Tags: Advanced materials

Revolutionary type of gel discovered

Science Daily, 25JAN2013

Researchers in Switzerland have developed a gel whose ultra-absorbent properties, flexibility, and grip make it appealing to researchers and manufacturers. They consist of a network of solids that can retain up to 99% of liquid while maintaining their shape. TECHNICAL ARTICLE

Tags: Advanced materials, S&T Switzerland

Self-healing, stretchable wires created using liquid metal

Science Daily, 24JAN2013

Researchers at North Carolina State University created microfluidic channels in a commercially available self-healing polymer using solid wire. By filling those channels with a liquid-metal alloy of indium and gallium, they were able to create a liquid-metal wire in an elastic sheath. Because the wire is liquid, it can be stretched along with the polymer sheath. TECHNICAL ARTICLE

Tags: Advanced materials

Global nanotechnology trends at nano tech 2013

Nanowerk, 22JAN2013

An update on what's happening at nan tech 2013 in Tokyo this week.

Tags: Advanced materials, Nanomaterials

AUTONOMOUS SYSTEMS & ROBOTICS

Video Friday: Bosch and Cars, ROVs and Whales, and Kuka Arms and Chainsaws

IEEE Spectrum, 25JAN2013

Bosch is developing technologies for an intelligent forward thinking vehicle—making the vision of injury and accident free driving a reality.

Tags: Autonomous systems & robotics

BIOTECHNOLOGY

Injectable Foam Expands in the Belly, Stops the Bleeding

MIT Technology Review, 22JAN2013

Two liquids that turn into a solid foam after being injected into the body may one day save the lives of injured soldiers and wounded civilians by slowing internal bleeding so that they can make it to a hospital.

Tags: Biotechnology, Advanced materials

BREAKTHROUGH TECHNOLOGY

An idea that changed the world

Harvard University, 25JAN2013

On Jan. 23, 1913, a century ago this week mathematician Andrey A. Markov delivered a lecture to the Imperial Academy of Sciences in St. Petersburg on a computational technique now called the Markov chain. Harvard celebrates the 100th anniversary of a computational principle that was little noticed in its time, but that underlies all of modern science.

Tags: Breakthrough technology, Mathematics

COMMUNICATIONS TECHNOLOGY

Streaming video over temporary networks

Science Daily, 30JAN2013

For the past ten years technology for mobile ad hoc networks that enable rescue workers to communicate with one another or with a command control centre has been available. These networks configure themselves automatically among mobile devices located within a given geographic area. A research group in Norway is working with what are known as Delay Tolerant Streaming Services (DT-Stream) systems. This is a type of network that tolerates disruptions and delays, in contrast to the Internet, for example.

Tags: Communications Technology

'Nanotubes on a chip' may simplify optical power measurements

Science Daily, 26JAN2013

A miniature version of an instrument called a cryogenic radiometer, built by researchers at NIST is a silicon chip topped with circular mats of carbon nanotubes standing on end. The devise simplifies absolute measurements of laser power, especially the light signals transmitted by optical fibers in telecommunications networks. TECHNICAL ARTICLE

Tags: Communications Technology, Government S&T

continued...

"Science is a way of thinking much more than it is a body of knowledge."

CARL SAGAN

Fundamentals of Free-Space Optical Communications

NASA News, 25JAN2013

This talk will deal primarily with optical communication system design and analysis for JPL's deep-space applications. Free-space optical communication also has extensive application to near-Earth links, to space-space or space-Earth networks, and to terrestrial links and networks, but these will not be covered in this talk. PRESENTATION

Tags: Communications Technology

ENERGY

Next generation nanotechnology solar cells will be 20 times thinner

Nanowerk, 29JAN2013

The thinner the solar cells become, the easier it is to extract the electricity. In principle, there will be a higher voltage and more electricity in thinner cells. But the thinner the plates, the less sunlight trapped. This has to do with the wavelengths of light. Researchers in Norway are working on novel methods to harvest light.

Tags: Energy, Solar energy

Scientists trick iron-eating bacteria into breathing electrons instead

Science Daily, 29JAN2013

Researchers at the University of Minnesota have developed a method, called electrochemical cultivation, which supplies bacteria with a steady supply of electrons that the bacteria use to respire, or "breathe." It opens the possibility that one day electricity generated from renewable sources like wind or solar could be funneled to iron oxidizing bacteria that combine it with carbon dioxide to create biofuels, capturing the energy as a useful, storable substance. TECHNICAL ARTICLE

Tags: Energy

ENVIRONMENTAL SCIENCE

Engineers solve a biological mystery and boost artificial intelligence

Science Daily, 30JAN2013

Researchers at Cornell University discovered that evolution produces modules not because they produce more adaptable designs, but because modular designs have fewer and shorter network connections, which are costly to build and maintain. The new insight will also help evolve artificial intelligence, so robot brains can acquire the grace and cunning of animals. TECHNICAL ARTICLE

Tags: Environmental science, Biology

Bugs in the atmosphere: Significant microorganism populations found in middle and upper troposphere

Science Daily, 29JAN2013

A study by Georgia Tech showed that viable bacterial cells represented, on average, around 20 percent of the total particles detected in the size range of 0.25 to 1 microns in diameter. By at least one order of magnitude, bacteria outnumbered fungi in the samples, and the researchers detected 17 different bacteria taxa—including some that are capable of metabolizing carbon compounds that are ubiquitous in the atmosphere—such as oxalic acid. TECHNICAL ARTICLE

Tags: Environmental science, Climatology

FORECASTING

How to predict the future of technology?

EurekAlert, 26JAN2013

Researchers from USC, Emory and the University of Michigan offer a new model, Step and Wait (SAW), which more accurately tracks the path of technological evolution in six markets that they tested. They found that the performance of most technologies proceeds in steps (or jumps) of big improvements interspersed with waits (or periods of no growth in performance).

Tags: Forecasting

GOVERNMENT S&T

This Web Feature Will Disappear in 5 Seconds

DARPA News, 28JAN2013

DARPA announces the Vanishing Programmable Resources (VAPR) program with the aim of revolutionizing the state of the art in transient electronics or electronics capable of dissolving into the environment around them. Transient electronics developed under VAPR should maintain the current functionality and ruggedness of conventional electronics, but, when triggered, be able to degrade partially or completely into their surroundings.

Tags: Government S&T, DARPA

INFORMATION TECHNOLOGY

Stanford researchers break million-core supercomputer barrier

EurekAlert, 28JAN2013

Stanford University has set a new record in computational science by successfully using a supercomputer with more than one million computing cores to solve a complex fluid

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dynamics problem—the prediction of noise generated by a supersonic jet engine.
Tags: Information Technology

Storing data in individual molecules
MIT News, 26JAN2013

An international team of resesarchers describes a new molecular-memory scheme that works at around the freezing point of water. The scheme would require only one ferromagnetic electrode. That could greatly simplify manufacture, as could the shape of the storage molecules themselves. As they consist of flat sheets of carbon atoms attached to zinc atoms, they can be deposited in very thin layers with very precise arrangements. TECHNICAL ARTICLE
Tags: Information Technology

Featured Resource

Nanotechnology Databases
Comprehensive databases for nanomaterials, events, products, companies, research labs, degree programs and publications.
RSS

MATERIALS SCIENCE

Film or droplets?
Nanowerk, 28JAN2013

Scientists at the Max Planck Institute have developed a general theory that provides an answer to the question of film or droplets for rough surfaces. It is based on amazingly simple mathematical expressions—and could make it possible to predict, for instance, whether (and when) short circuits are likely to occur in transformer substations. TECHNICAL ARTICLE
Tags: Materials science

Mysteries of spider silk strength unraveled
Science Daily, 28JAN2013

Researchers at the University of Arizona have found a way to obtain a wide variety of elastic properties of the silk of several intact spiders' webs using a sophisticated but non–invasive laser light scattering technique. TECHNICAL ARTICLE
Tags: Materials science

Liquid metal makes silicon crystals at record low temperatures
EurekAlert, 26JAN2013

Researchers at the University of Michigan made a solution containing silicon tetrachloride and layered it over a liquid gallium electrode. Electrons from the metal converted silicon tetrachloride into raw silicon, which then dissolved into the liquid metal. Dark films of silicon crystals accumulated on the surface of liquid gallium electrodes. TECHNICAL ARTICLE
Tags: Materials science, Advanced manufacturing

New method of producing nanomagnets for information technology
Science Daily, 26JAN2013

An international team of researchers has found a new method of producing molecular magnets. They pursued a new strategy exploiting the unavoidable interactions between the molecules and their substrate in a targeted manner to produce a hybrid layer that exhibits molecular magnetism and has the desired properties. TECHNICAL ARTICLE
Tags: Materials science

Revolutionary theory of dark matter
Science Daily, 25JAN2013

The universe abounds with dark matter. Nobody knows what it consists of. Physicists in Norway have now come up with a mathematical explanation that could solve the mystery once and for all.
Tags: Materials science

Shrunken proton baffles scientists
Nature News, 25JAN2013

One of the Universe's most common particles has left physicists completely stumped. The proton, a fundamental constituent of the atomic nucleus, seems to be smaller than thought. And despite three years of careful analysis and reanalysis of numerous experiments, nobody can figure out why.
Tags: Materials science

QUANTUM SCIENCE

Quantum communication: Each photon counts
Science Daily, 26JAN2013

An international team of researchers fabricated superconducting nanowires directly on top of a nanophotonic waveguide. The nanometer-sized wire made of niobium nitride absorbs photons that propagate along the waveguide. When a photon is absorbed, superconductivity is lost, which is detected as an electric signal. The longer the tube, the higher the detection probability. The lengths involved are in the micrometer range. TECHNICAL ARTICLE
Tags: Quantum science

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S&T POLICY

Brain-simulation and graphene projects win billion-euro competition

EU R&D News, 29JAN2013

After a two-year contest, the European Commission will fund efforts to model the mind and to develop new materials to the tune of half-a-billion euros each. The Human Brain Project is led by Henry Markram, a neuroscientist from Switzerland. The other project, called Graphene, is led by Jari Kinaret, a theoretical physicist from Sweden.

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

UK invests GBP 600 million in "eight great technologies"

Nanowerk, 25JAN2013

Funding will support big data, space, robotics and autonomous systems, synthetic biology, regenerative medicine, agri-science, advanced materials and energy. EIGHT GREAT TECHNOLOGIES

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

SCIENCE WITHOUT BORDERS

Engineers of the New Millennium: Life in 2030

IEEE Spectrum, 28JAN2013

"Life in 2030," a one-hour special from the radio series Engineers of the New Millennium, explores the latest discoveries to give listeners an idea of how technology will shape our lives in the not-too-distant future. DOWNLOAD THE SHOW

Tags: Science without borders

Smart organizations should also be stupid, according to new theory

Science Daily, 28JAN2013

According to a new theory of 'functional stupidity' proposed by researchers in Sweden, critical reflection and shrewdness can help companies to avoid crises, but sometimes good old-fashioned stupidity can serve an important function in raising the efficiency of an organization. TECHNICAL ARTICLE

Tags: Science without borders

The Job Market of 2045

IEEE Spectrum, 22JAN2013

What will we do when machines do all the work? A podcast with Rice University professor Moshe Vardi who wrote "[Artificial intelligence's] inexorable progress over the past 50 years suggests that Herbert Simon was right when he wrote in 1956, 'Machines will be capable...of doing any work a man can do.'" Professor's article in The Atlantic Monthly.

Tags: Science without borders

SENSORS

Nanotechnology sensors for the detection of trace explosives

Nanowerk Spotlight, 28JAN2013

The unique properties of nanoscale materials, such as increased surface area, confinement effects, etc., make them ideal for sensing. Nanomaterials can be integrated into existing sensing technologies or can be used to develop new devices. In view of tremendous potential for nano-enabled sensors for trace detection of explosives, intense R&D activities have been undertaken throughout the world in various establishments. A few recent R&D activities are described in this article.

Tags: Sensors, Advanced materials, Explosives, Nanotechnology ■

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