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FEATURE ARTICLES

[Organic metamaterial flows like a liquid, remembers its shape](#)

[Nanowerk, 04DEC2012](#)

Rather than liquid metal, it is a hydrogel, a mesh of organic molecules with many small empty spaces that can absorb water like a sponge. It qualifies as a “meta-material” with properties not found in nature and may be the first organic metamaterial with mechanical meta-properties. [TECHNICAL ARTICLE](#)

Tags: Advanced materials, Featured Article

[Georgia Tech Robots Learn Deceptive Behaviors from Squirrels \(w/video\)](#)

[IEEE Spectrum, 03DEC2012](#)

In a study robots used algorithms to determine whether deception is a good idea in a given situation, and then executed a deceptive act by providing a false communication to another robot. Researchers were able to model squirrel-type deceptive cache protection behaviors in a small mobile robot, teaching it to forage for and cache virtual food. When a pilfering robot appeared, the squirrel robot starts visiting empty caches instead.



Since all the pilferer knows is that squirrel robots like to visit caches, it gets fooled by the deception.

Tags: Autonomous systems & robotics, Featured Article

S&T NEWS ARTICLES

ADVANCED MANUFACTURING

[3-D Printed Satellite Aims for Orbit](#)

[Wired, 04DEC2012](#)

Researchers at the University of Bologna, and Rome used a 3-D printer to make the base for a CubeSat, the cheap, 4-inch, cube-shaped satellites that hitch a ride on space-bound rockets. The 3-D printed version is lighter, which means it is possible to pack more payload including maneuvering subsystems, telecommunications, a camera, and photovoltaics. CubeSat developers have run experiments to measure low Earth orbit radiation, see how microorganisms survive in space, and to experiment with designs for bigger satellites.

Tags: Advanced manufacturing

[Harvard's Wyss Institute team creates versatile 3d nanostructures using DNA 'bricks'](#)

[EurekaAlert, 02DEC2012](#)

Researchers at Harvard University have created more than 100 three-dimensional nanostructures using DNA building blocks that function like Lego bricks—a major advance from the two-dimensional structures the same team built a few months ago. The advance means researchers just went from being able to build a flat wall of Legos®, to building a house. [VIDEO](#)

Tags: Advanced manufacturing

ADVANCED MATERIALS

[Scientists develop indium-free organic light-emitting diodes](#)

[Science Daily, 03DEC2012](#)

Scientists have discovered new ways of using a well-known polymer in organic light emitting diodes, which

could eliminate the need for an increasingly problematic and breakable metal-oxide used in screen displays in computers, televisions, and cell phones.

Tags: Advanced materials

AUTONOMOUS SYSTEMS & ROBOTICS

[Communication channel between cells and machines paves way toward bio-hybrid robots](#)

[PhysOrg.com](#), 04DEC2012

Researchers at Newcastle University in the UK are working on integrating living cells and other biological components with electronic components in an attempt to create bio-hybrid robots. These robots could act autonomously, imitate some animal behaviors, and have the ability to self-replicate some of their parts. [TECHNICAL ARTICLE](#)

Tags: Autonomous systems & robotics

[Video Friday: Catapulting Roboplanes, Swimming Roboturtles, and Mini Tofu](#)

[IEEE Spectrum](#), 02DEC2012

HyTAQ is a novel mobile robot capable of both aerial and terrestrial locomotion. Flight is achieved through a quadrotor configuration; four actuators provide the required thrust. Adding a rolling cage to the quadrotor makes terrestrial locomotion possible using the same actuator set and control system. Thus, neither the mass nor the system complexity is increased by inclusion of separate actuators for terrestrial and aerial locomotion.

Tags: Autonomous systems & robotics

BREAKTHROUGH TECHNOLOGY

[Watch the World's Most Promising Young Technologists Pitch their Big Ideas](#)

[MIT Technology Review](#), 03DEC2012

A few weeks ago, at MIT Technology Review's annual EmTech conference, 24 of our 35 innovators under 35 award winners presented on stage, in three minutes or less, their big ideas for advancing technology across a spectrum of disciplines. If you missed the event, now you can catch all of these presentations on video.

Tags: Breakthrough technology

[British company claims biggest engine advance since the jet](#)

[Reuters](#), 30NOV2012

A small British company believes its Sabre engine, which would operate like a jet engine in the atmosphere and a rocket in space, could displace rockets for space access and transform air travel by bringing any destination on Earth to no more than four hours away.

Tags: Breakthrough technology, S&T UK

[A Step Toward a Universal Cancer Blood Test](#) [Science NOW](#), 28NOV2012

By sequencing the abnormal DNA that a tumor releases into a person's bloodstream, researchers in the UK are now one step closer to a universal cancer test. Although the technique is now only sensitive enough to detect advanced cancers, that may be a matter of money. As sequencing costs decrease the test could eventually pick up early tumors as well.

Tags: Breakthrough technology, S&T UK

COMMUNICATIONS TECHNOLOGY

[Advancing next generation of high-speed optical communication networks](#)

[Science Daily](#), 03DEC2012

Researchers in Hong Kong proposed the use of "coherent detection," in which optical signal is first converted into electrical signal so that the data information can be preserved. This is followed by the use of more mature electronic signal processing technologies extensively used in all computers, smartphones and the like.

Tags: Communications Technology, Optical communication

[Spectrum sharing using cognitive radio system capabilities](#)

[Alpha Galileo Foundation](#), 30NOV2012

A researcher from Finland presents novel directional and distributed spectrum occupancy measurements for the 2.4 GHz industrial, scientific and medical (ISM) band to characterise the current spectrum use and the potential availability of spectrum for CRSs, taking into account the spatial dimension. [THESIS](#)

Tags: Communications Technology

CYBER SECURITY

[Instead of a Password, Security Software Just Checks Your Eyes](#)

[MIT Technology Review](#), 03DEC2012

A startup company in Kansas has developed a software which identifies you by your "eyeprints," the pattern of veins in the whites of your eyes. Everybody has four eyeprints, two in each eye on either side of the iris. The company claims that its method is as accurate as a fingerprint or iris scan, without requiring any special hardware.

Tags: Cyber security

[Improving cyber attack detection through computer modeling](#)

[PhysOrg.com](#), 30NOV2012

Researchers have developed a computer model that presented 500 simulated cyber attack scenarios to gauge simulated network security analysts' ability to detect attacks characterized as either "impatient" (the threat

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

CARL SAGAN

occurs early in the attack) or “patient” (the threat comes later in the attack and is not detected promptly). Their model was able to predict the detection rates of security analysts by varying the analysts’ degree of experience and risk tolerance as well as an attacker’s strategy (impatient or patient attack).

Tags: Cyber security

ENERGY

Ducted Wind Turbines: An Energy Game Changer?

[MIT Technology Review, 03DEC2012](#)

A company in Minnesota added a new design, INVELOX, short for “increasing the velocity of wind. It is a ducted turbine that looks a bit like a giant funnel sitting on top of an equally large periscope. The ductwork is designed to capture wind from any direction, increase its speed and concentrate the moving airflow before passing it through a relatively small turbine at ground level.

Tags: Energy, Wind energy

A new breed of micro fuel cells

[R&D Magazine, 30NOV2012](#)

Engineers at Yale University have developed a new breed of micro fuel cell that could serve as a long-lasting, low-cost, and eco-friendly power source for portable electronic devices, such as tablet computers, smartphones, and remote sensors.

Tags: Energy

GOVERNMENT S&T

The self-improvement of lithium-ion batteries

[Nanowerk, 04DEC2012](#)

A team of researchers from Argonne National Laboratory and the University of Chicago has taken a bottom up approach by developing titanium dioxide (TiO₂) electrodes that can actually improve their own electrochemical performance as they are used.

Tags: Government S&T, Energy

IMAGING TECHNOLOGY

Physicists claim microwave-imaging ‘breakthrough’

[Physics World, 04DEC2012](#)

Physicists in China say they have made a breakthrough in thermoacoustic imaging that could enable it to be used in hospitals within five years. “One obstacle in this area has been the difficulty getting access to cutting-edge pulsed-microwave technology, which has either been very expensive or highly classified in the US for many years.”

Tags: Imaging technology, S&T China

\$6.5 million grant to develop nanocoated infrared night-vision glasses

[Nanowerk, 02DEC2012](#)

A team led by Ben-Gurion University in Israel will use a smart layer based on nano-photonics technologies to change invisible light to visible. The nano glasses will consist of multiple layers of nano-colloid material that absorb the infrared light (using advanced nano-photonics techniques) and convert it to visible light using highly-efficient OLEDs.

Tags: Imaging technology

New radio telescope could save world billions

[Alpha Galileo Foundation, 30NOV2012](#)

Murchison Widefield Array telescope, in Australia, is complete after eight years. The MWA will aim to identify the trajectory of solar storms, quadrupling the warning period currently provided by near-Earth satellites. This is timely as the Sun is due to re-enter peak activity in 2013, with a dramatic increase in the number and severity of solar storms expected, with the potential to disrupt global communications and ground commercial airlines.

Tags: Imaging technology, Astronomy, Space technology

INFORMATION TECHNOLOGY

Taiwan engineers defeat limits of flash memory

[PhysOrg.com, 04DEC2012](#)

A limitation of flash memory is simply that eventually it cannot be used; the more cells in the memory chips are erased, the less useful to store data. The write-erase cycles degrade insulation; eventually the cell fails. Researchers in Taiwan have a solution that moves flash memory over to a new life. They propose a “self-healing” NAND flash memory solution that can survive over 100 million cycles.

Tags: Information Technology

MATERIALS SCIENCE

How ‘transparent’ is graphene?

[MIT News, 04DEC2012](#)

New research at MIT shows that for materials with intermediate wettability, graphene does preserve the properties of the underlying material. But for more extreme cases—superhydrophobic surfaces, which intensely repel water, or superhydrophilic ones, which cause water to spread out—an added layer of graphene does significantly change the way coated materials behave. [TECHNICAL ARTICLE](#)

Tags: Materials science, Advanced materials

Nature Materials study: Boosting heat transfer with nanoglue

EurekAlert, 04DEC2012

A team of interdisciplinary researchers at Rensselaer has developed a new method for significantly increasing the heat transfer rate across two different materials. Results of the team's study could enable new advances in cooling computer chips and lighting-emitting diode devices, collecting solar power, harvesting waste heat, and other applications.

Tags: *Materials science*

FEATURED RESOURCE**TECHNOLOGY REVIEW**

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

Layered plasmonic cloaks to tailor the optical scattering at the nanoscale

Nature Scientific Reports, 03DEC2012

We discuss the rich scattering features offered by thin and thick plasmonic layers covering dielectric nanoparticles and their potential optical applications. The frequency position of scattering dips and peaks may be controlled to a large degree using plasmonic layers, which may dramatically vary the total scattering signature in the frequency range of interest. Exciting applications of these nanostructures are envisioned, such as efficient and tunable sensors, all-optical switches and memories, optical tagging and biomolecular imaging.

Tags: *Materials science*

Predicting material fatigue: Polymer composites: luminescent zinc oxide tetrapod filler makes inner damage visible

Science Daily, 03DEC2012

A research team has now developed a new concept to design so-called self-reporting composite materials. The concept utilizes zinc oxide tetrapod crystals as a filler material for composites which at the same time reveals material failure by a visual signal under UV light. The new concept may solve many engineering problems as numerous fields from vehicle construction to medical engineering are actively seeking new composite materials for high-strain applications. [TECHNICAL ARTICLE](#)

Tags: *Materials science, S&T Germany*

MICROELECTRONICS**Research Discovery Could Revolutionize Semiconductor Manufacture**

Science Newsline, 03DEC2012

Instead of starting from a silicon wafer or other substrate, as is usual today, researchers in Sweden have made it possible for the structures to grow from freely suspended nanoparticles of gold in a flowing gas. In addition, the process is not only extremely quick, it is also continuous. Traditional manufacture of substrates is batch-based and is therefore much more time-consuming.

Tags: *Microelectronics, S&T Sweden, Semiconductors*

QUANTUM SCIENCE**A bridge to the quantum world: Dirac electrons found in unique material**

PhysOrg.com, 04DEC2012

In a discovery that helps clear a new path toward quantum computers, University of Michigan physicists have found elusive Dirac electrons in a superconducting material.

[TECHNICAL ARTICLE](#)

Tags: *Quantum science, Breakthrough technology*

S&T POLICY**DFG to fund 11 new Collaborative Research Centers**

EurekAlert, 04DEC2012

The newly established Collaborative Research Centres in Germany will explore a variety of complex topics, ranging from the development of pioneering internet-based communication models to new imagery processes in biology to a cultural history of leisure. Other Collaborative Research Centres will more precisely determine the control of immune responses or investigate the role of proper timing in the life of insects. The CRCs will be funded initially for a period of four years with a total of 101.5 million euros, including a 20% programme allowance for indirect project costs.

Tags: *S&T policy, S&T Germany*

Geoscientists cite 'critical need' for basic research to unleash promising energy resources

Science Daily, 03DEC2012

Developers of renewable energy and shale gas must overcome fundamental geological and environmental challenges if these promising energy sources are to reach their full potential, according to a trio of leading geoscientists.

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

SCIENCE WITHOUT BORDERS

China prepares to grow vegetables on Mars**PhysOrg.com, 04DEC2012**

Chinese astronauts are preparing to grow fresh vegetables on Mars and the moon after researchers successfully completed a preliminary test in Beijing, state media reported. Four kinds of vegetables were grown in an “ecological life support system”, a 300 cubic metre cabin which will allow astronauts to develop their own stocks of air, water and food while on space missions. The system, which relies on plants and algae, is “expected to be used in extra-terrestrial bases on the moon or Mars”, the report said.

Tags: Science without borders, S&T China

Scientists print out human genome (w/video)**BBC News, 30NOV2012**

Scientists at the University of Leicester have printed the whole of the human genome to show just how much information it takes to make up one human body. They say it has taken 130 book volumes, which would take 95 years to read.

Tags: Science without borders

New Insights Into Mosquitoes' Role as Involuntary Bioterrorists**e! Science News, 29NOV2012**

Recent research has revealed that mosquitoes have surprisingly sophisticated immune systems. Unlike humans and most other animals, mosquitoes do not generate antibodies that identify and attack specific infectious agents. However, they have developed alternative methods for destroying various pathogens, including parasites that cause malaria.

Tags: Science without borders, Biology

SENSORS

Smartphones might soon develop emotional intelligence: Algorithm for speech-based emotion classification developed**Science Daily, 04DEC2012**

Researchers at the University of Rochester have developed a new computer program that gauges human feelings through speech. The program analyzes 12 features of speech, such as pitch and volume, to identify one of six emotions from a sound recording. And it achieves 81 percent accuracy—a significant improvement on earlier studies that achieved only about 55 percent accuracy.

Tags: Sensors, Information technology

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