ever-smaller photonic chips. A tiny device designed by Xiang Zhang's group at the University of California, Berkeley, has overcome this diffraction limit.

The device consists of a specially designed semiconductor strip suspended above a metal surface, with a thin gap in between. In this gap, light is converted to an electron wave that can beat the diffraction limit. The electron wave then re-emits the light at the far end of the strip. This gap allows infrared light to travel at 20 times its wavelength, and visible light at 10 times its wavelength.

The team believes that the device could allow optics to be integrated into nanoelectronic devices.

Nature Commun. **doi:10.1038/ncomms1315 (2011)**

MATERIALS SCIENCE

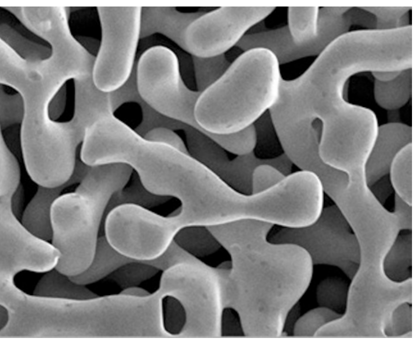
Switching strength on or off

A material has been designed to switch back and forth between a strong, brittle state and a weak, ductile one.

Hai-Jun Jin at the Chinese Academy of Sciences in Shenyang and Jörg Weissmüller at the Technical University of Hamburg in Germany made their composite by imbibing nanoporous gold (**pictured**) with an electrolyte. When the applied electrical potential shifted, the material showed distinct and reversible changes in strength, flow stress and ductility.

Although the exact mechanism remains unknown, the authors think that the adsorbed anions may be slowing down the movement of inherent defects at the surface of the nanoporous gold, enhancing the material's strength. They anticipate the development of a material that can be made ductile during moulding or fabrication, and tuned to the strong state when desired.

SCIENCE/AAAS



GEOSCIENCE

Permafrost thaws, wetlands shrink

As the world warms, wetlands in the Northern Hemisphere may shrink because of thawing permafrost. This finding complicates predictions that wetlands, which harbour methane-producing bacteria, will release more greenhouse gases as temperatures rise.

Permafrost and wetlands are often found together in the Northern Hemisphere. Using a climate model, Christopher Avis at the University of Victoria in British Columbia, Canada, and his colleagues show that, at first, permafrost degradation does increase upper-soil moisture. But as frozen subsurface soil layers continue to melt, water usually trapped near the surface drains to deeper layers, and wetland extent declines.

Nature Geosci. **doi:10.1038/ngeo1160 (2011)**

IMMUNOLOGY

Cells sense house dust

Household dust may be more allergenic than previously thought — it can activate an innate immune defence.

Anthony Horner at the University of California, San Diego, Mitchell Kronenberg at the La Jolla Institute for Allergy and Immunology in California and their colleagues collected dust samples by vacuuming carpet in various homes. They added the dust to cultures of mouse and human immune cells called invariant natural killer T cells, which quickly recognize and respond to antigens. The researchers found that, in response to the dust, the cells churned out immune-signalling molecules called cytokines.

In a mouse model of allergy, exposing the rodents to house dust and an allergen resulted in more lung inflammation and a stronger immune response than did exposure to the allergen alone.

J. Exp. Med. **doi:10.1084/jem.20102229 (2011)**

COMMUNITY CHOICE

The most viewed papers in science

CANCER

How cancer cells survive stress

HIGHLY READ on genesdev.cshlp.org 27–31 May

Tumours subject to stressors such as starvation survive by altering their metabolic activities — and they do so by boosting the expression of an enzyme that normally functions in the brain.

Tak Mak at the University of Toronto in Ontario, Canada, and his colleagues found increased expression of *CPT1C* in human lung tumours, and that this elevated expression boosts fatty-acid metabolism and leads to drug resistance. Silencing *CPT1C* renders cancer cells vulnerable to drugs such as rapamycin, low nutrient levels and low oxygen levels.

When human breast cancer cells with silenced *CPT1C* were implanted into mice, they grew at a slower rate than those expressing *CPT1C*. The results suggest that CPT1C mediates tumour-cell survival and could be a useful therapeutic target.

Genes Dev. 25, **1041–1051 (2011)**

EVOLUTIONARY BIOLOGY

Stinky, stocky and stripy for a reason

Mammals such as skunks (**pictured**) bear stripes and spots to warn predators of their noxious anal secretions — and these animals have other similarities. Researchers have found that these creatures also tend to be short and stocky, and to live in exposed habitats, suggesting that their bold coloration is a key antipredator defence.

Theodore Stankowich at the University of Massachusetts at Amherst and his colleagues scored dozens of terrestrial mammalian species according to boldness of coloration, body size, habitat openness and ability to use anal secretions in defence. They found that lineages of bolder, more contrasting coloration are better able to aim and spray their anal secretions at predators.

The authors suggest that the bold colours and enhanced defences evolved as a result of either the mammals moving to a more open environment, which has fewer hiding places, or an increase in predation in their initial habitats.

Evolution **doi:10.1111/j.1558-5646.2011.01334.x (2011)**

PHOTOLIBRARY

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