

top, resulting in a large-enough flow of ions to generate electric power.

The material was sandwiched between two aluminium electrodes studded with holes to let moisture pass through. The resulting power illuminated a light-emitting diode lightbulb.

Energy Environ. Sci. <http://doi.org/bcg2> (2016)

TISSUE ENGINEERING

Polymers bolster printed tissue

A 3D printer can generate tissues using cells and polymers that are larger and more robust than previously printed biological structures.

Bioprinted 3D organs could one day help people who need transplants, but existing methods tend to produce only small, simple structures. Larger ones lose their shape, or die because nutrients cannot reach their centres. To build larger, stronger tissues, Anthony Atala and his colleagues at Wake Forest Institute for Regenerative Medicine in Winston-Salem, North Carolina, devised a 3D-printing system that adds biodegradable polymers for structural support. By combining polymer-based frames with hydrogels containing cells, the researchers printed a human-sized ear (pictured), a human jawbone fragment, a segment of mouse muscle and a piece of rat skull. Microchannels printed in the structures helped nutrients to flow into the tissues.



PROC. NATL. ACAD. SCI. USA

NATURE BIOTECH.

The team implanted some of the structures into rodents and found that the tissues survived over weeks and months.

Nature Biotech. <http://dx.doi.org/10.1038/nbt.3413> (2016)

HYDROLOGY

Stored water slows rising seas

Changes in water storage on land may have slowed sea-level rise during the past decade.

John Reager of NASA's Jet Propulsion Laboratory in Pasadena, California, and his team investigated the shifting volumes of water stored on land using global data from NASA's Gravity Recovery and Climate Experiment (GRACE) satellite, which calculates water and ice mass on the basis of changes in Earth's gravity field. They found that between 2002 and 2014, 3,200 gigatons more water than expected was stored on land as snow, soil moisture, surface water and groundwater, thanks to climate-driven changes in hydrology. This offset sea-level rise caused by melting glaciers and ice sheets by about 20% over the same period.

These results show that climate-driven land water storage is significant enough to be included in future estimates of sea-level rise, the authors say. *Science* 351, 699–703 (2016)

CANCER BIOLOGY

Metabolism varies within tumours

Human lung-tumour cells break down sugars in different ways in different patients and even in the same tumour.

Cells in the same tumour are known to vary genetically. To study tumour metabolism, Ralph DeBerardinis at the University of Texas Southwestern Medical Center in Dallas and his colleagues infused a harmless carbon isotope into nine people who had lung cancer, and combined clinical-imaging techniques

SOCIAL SELECTION

Popular topics on social media

Do female programmers face bias?

Female software developers see their contributions of code accepted more frequently by the open-source software repository GitHub than do men, according to a preprint that attracted much attention last week on social media. But this happened only when the contributor's gender was not obvious from their GitHub profile page. When gender was made clear, the acceptance rate for women fell to slightly less than that for men, say researchers who analysed data on the activity of more than 1.4 million users of GitHub. Morgan Ernest, an ecologist at the University of Florida in Gainesville, tweeted a link to the paper: "Well that's horrifying. Is that suggested programming change by a woman? Reject. Don't know it's a woman? Accept." But

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other researchers questioned whether the study, posted at PeerJ PrePrints on 9 February, definitively demonstrates gender bias. Preprint at <http://doi.org/bchz> (2016)



with mass spectrometry to track how the carbon was biochemically processed by the tumours. Cancer cells are thought to feed on glucose and release a by-product called lactate, but the team found that some tumour cells consumed both lactate and glucose. Blood-flow patterns showed that different parts of a single tumour had varying metabolic patterns.

Understanding these patterns could help to improve metabolic therapy for cancer, the authors suggest.

Cell 164, 681–694 (2016)

BIOMECHANICS

Cockroaches inspire robot

Researchers have discovered how cockroaches can speed through gaps just millimetres high — and have used their findings to build a compressible robot.

Kaushik Jayaram and Robert Full at the University of

California, Berkeley, observed American cockroaches (*Periplaneta americana*) as they squeezed through a series of crevices that decreased in height. The insects could maintain speeds of up to 60 centimetres per second after entering these tight areas, and only slowed when the ceiling height reached 4 millimetres — about one-third of the insects' free-standing height. They achieved their speed by using their legs and feet to push against friction between their bodies, the ceiling and the ground.

The cockroaches' mode of locomotion inspired the development of a soft-bodied robot (pictured left) that can compress its height by half (pictured right), allowing it to move through a tight space.

Proc. Natl. Acad. Sci. USA <http://doi.org/bch5> (2016)

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