

## RESEARCH HIGHLIGHTS

## PALAEOLOGY

**Burrow builders***Geology* **38**, 711–714 (2010)

Fossil burrows in ocean sediments from the Precambrian–Cambrian period about 540 million years ago are ubiquitous in the fossil record, but the creatures that created these *Treptichnus* burrows (pictured, left) remained a mystery. Now Jean Vannier at the University of Lyon, France, and his colleagues propose that the burrowers were priapulid worms, examples of which still exist today.

They collected modern priapulid worms (right) off the Swedish coast and watched them move about in sediment-filled trays in the lab. The traces made by these animals were similar to patterns of the fossil burrows. These included segmented branching structures, with alternating straight, curved and looped sections.

Priapulids seem to have been one of the earliest animal colonizers of the ocean bottom sediment, the authors say.



J. VANNIER

## PHYSICS

**Mini mass***Phys. Rev. Lett.* doi:10.1103/PhysRevLett.105.031301 (2010)

The mass of the elusive neutrino is less than 0.28 electronvolts — the lowest upper limit predicted so far — according to Shaun Thomas and his colleagues at University College London.

Neutrinos are abundant in the Universe but are difficult to detect and measure directly as they rarely interact with matter. To predict the particle's mass, the researchers constructed a map of the density distribution of 700,000 galaxies using data from the Sloan Digital Sky Survey. Neutrinos can suppress the growth of galaxies, and that suppression is greater for larger neutrinos. Using this correlation, the researchers could infer an upper bound for neutrino mass.

## GEOSCIENCE

**When sea ice melts***Geophys. Res. Lett.* doi:10.1029/2010GL042496 (2010)

Rapid loss of floating sea ice is contributing a tiny amount, 50 micrometres, to the current annual global sea-level rise of around 3 millimetres.

Andrew Shepherd of the University of Leeds, UK, and his colleagues combined satellite observations with an ice–ocean model to estimate the floating ice lost between 1994 and 2004. They found that about 750 cubic kilometres of ice melted each year in the Arctic Ocean and off Antarctica. The melting and freezing of sea ice do

have small effects on sea level, the authors say, because fresh water is about 2.6% less dense than sea water.

## MATERIALS SCIENCE

**Shape shifts heat tolerance***J. Am. Chem. Soc.* doi:10.1021/ja104691j (2010)

Poorly soluble drugs and other chemicals can be dissolved in liquid by packaging them inside micelles — soluble molecular assemblies that often assume hollow spherical or floral shapes. Heat can rattle these structures apart, but attaching additional molecules to boost the micelles' heat resistance can change their size, shape or chemical properties.

Now Satoshi Honda, Takuya Yamamoto and Yasuyuki Tezuka at the Tokyo Institute of Technology show that a topological tweak improves the thermal stability of a micelle without affecting its other properties. Circular polymers formed micelles (pictured, left) that resisted fragmentation at temperatures some 40 °C higher than did physically and chemically identical micelles made from straight-chain polymers. The latter (right) have loose ends, which are

more easily dislodged with heat. The authors showed that they could tune the thermal stability of micelles by creating them from varying ratios of the two polymers.

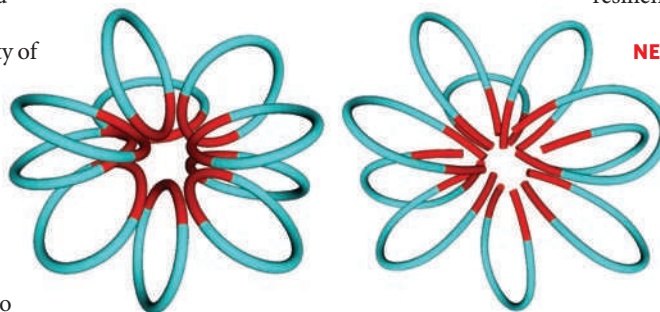
## ECOLOGY

**Shrubs survive warming***J. Ecol.* doi:10.1111/j.1365-2745.2010.01690.x (2010)

Unlike most tundra plant species, Arctic evergreen shrubs seem to be resilient to climate change. James Hudson and Greg Henry at the University of British Columbia in Vancouver were surprised to find that increases of 1–1.3 °C did not affect the height or abundance of shrub species, including the Arctic white heather *Cassiope tetragona*, during a 15-year Arctic study.

But warming did increase the abundance of non-vascular plants such as mosses by 6.3%, and decreased lichen cover by 3.5%. The researchers followed 36 plots in northern Canada, half of which were warmed by open-top fibreglass chambers placed over them. The other half were left as controls.

The authors suggest that the shrubs' slow growth rate and long life contribute to their resilience.



## NEUROSCIENCE

**Movement decoded***J. Neurosci.* **30**, 9659–9669 (2010)

Brain signals in monkeys have been decoded and used to reconstruct three-dimensional arm movements, raising the possibility of future neuroprosthetic devices that people who are paralysed could use to

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