

# RESEARCH HIGHLIGHTS

Selections from the  
scientific literature

## BIODIVERSITY

### More creatures under the sea

Between one- and two-thirds of marine species remain to be discovered, researchers estimate.

Ward Appeltans of UNESCO's Intergovernmental Oceanographic Commission in Oostende, Belgium, headed up a group of 270 taxonomists from around the world to build the World Register of Marine Species. The researchers report between 222,000 and 230,000 known marine eukaryotes — species with complex cells containing membrane-bound organelles. On the basis of past rates of species discovery, statistical modelling suggests that the total number of eukaryotic species in the world's oceans comes to between 320,000 and 760,000.

The team also asked 120 of the taxonomists to estimate how many species were likely to be discovered in their areas of expertise. This yielded totals of 704,000 to 972,000.

*Curr. Biol.* <http://dx.doi.org/10.1016/j.cub.2012.09.036> (2012)

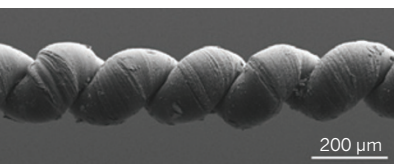
For a longer story on this research, see [go.nature.com/qew2qq](http://go.nature.com/qew2qq)

## MATERIALS

### Catapult from nanotube yarns

Artificial muscle consisting of yarns spun from carbon nanotubes and soaked in paraffin wax can lift 200 times the weight that natural muscles the same size can carry.

The 'muscle' (pictured),



designed by Ray Baughman of the University of Texas at Dallas and his colleagues, produces torque by twisting and untwisting. Heating the yarn's wax component with a flash of light or by passing an electric current through the yarn causes it to expand, twist and shorten. The muscle rapidly contracted and relaxed over more than one million cycles.

The authors used a 100-micrometre-wide yarn to power a miniature catapult and launch a piece of foil, demonstrating a torque slightly

higher than that of large electric motors. The muscles could be used as sensors and actuators in a variety of systems, the authors say. *Science* 338, 928–932 (2012)  
For a longer story on this research, see [go.nature.com/ygkxbr](http://go.nature.com/ygkxbr)

## ASTRONOMY

### Encounter with a rogue planet

Astronomers have discovered the closest and most convincing known example of a planet wandering through

space without a parent star.

Candidate orphan planets have been found since the 1990s, but because no one knew their ages, researchers could not determine whether the objects were truly planets or were heavier, star-like bodies called brown dwarfs. But Philippe Delorme of the Institute of Planetology and Astrophysics in Grenoble, France, and his colleagues say that the newfound body, dubbed CFBDSIR2149, is the first orphan that seems to be associated with a stream of young stars, the AB Doradus



## EARTH SCIENCE

### Volcanoes swell before blasting

Pronounced uplift of volcano centres seems to be a reliable sign of imminent eruption along Indonesia's west Sunda arc, one of the most active volcanic regions on Earth.

Estelle Chaussard and Falk Amelung of the University of Miami in Florida conducted a radar remote-sensing survey of volcanic inflation in 76 historically active volcanoes on the islands of Sumatra, Java and Bali between 2006 and 2009. Of six volcanoes that showed a clear uplift signal

during this period, three — Sinabung (pictured), Kerinci and Slamet — erupted soon after.

The authors conclude that measurable inflation is a frequent precursor to volcanic eruptions in regions where magma reservoirs are typically located at relatively shallow depths, as in Indonesia. The findings could improve forecasts of volcanic activity.

*Geophys. Res. Lett.* <http://dx.doi.org/10.1029/2012GL053817> (2012)

BAY/SMOYO/AFP/GETTY