

# RESEARCH HIGHLIGHTS

## Flights of fancy

*Proc. R. Soc. B.* doi:10.1098/rspb.2009.0182 (2009)

Biologists believe that some butterflies send mixed signals. Wings with brightly coloured topsides attract mates, for example, whereas camouflaged undersides protect against predators.

Jeffrey Oliver of Yale University and his colleagues compared the rates of wing-pattern evolution in 54 species of the genus *Bicyclus* (pictured, *Bicyclus anynana*). Because eyespots are evolving at different rates on the upper and lower surfaces of *Bicyclus* wings, the team concludes that markings on different parts of the wings are probably used for different purposes and suggest this separation of signals allows butterflies to be simultaneously attractive to mates and safe from predators.



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## ECOLOGY

### Equality in dirt

*Glob. Biogeochem. Cycles*

doi:10.1029/2008GB003250 (2009)

Soil is the same all around the world — at least in terms of its capacity to break down certain nutrients. Davey Jones of Bangor University in Gwynedd, UK, and his colleagues reached this conclusion after analysing soil samples collected at 40 locations around the globe, from the Arctic to the equatorial zone to Antarctica.

The researchers found that all of the soil samples contained similar concentrations of amino acids. And, when maintained at the same conditions, microbes resident in the different samples all broke down amino acids at roughly the same rate. The results suggest that even though global ecosystems are complex and distinct, soil microbes are similar in their ability to convert amino acids into smaller molecules.

## QUANTUM DOTS

### Pillars progress

*Appl. Phys. Lett.* **94**, 121102 (2009)

The interplay between a photon and a quantum dot — a semiconducting blob of atoms — held inside a small cavity creates a device that can act as a qubit, the data-carrying building block of quantum computing.

Materials scientists would like to study information transfer between many such solid-state qubits. However, current construction techniques can create only a few unpredictable cavities and dots, thwarting attempts to build regular arrays.

Adrien Dousse and his colleagues at the Laboratory for Photonics and Nanostructures

in Marcoussis, France, have now used laser-guided etching to create, in one process, a dozen pillar-shaped cavities less than 3 micrometres wide, each containing an accurately tuned and positioned quantum dot. The technique could be scaled to create an assembly of identical qubits.

## ATMOSPHERIC SCIENCE

### Bolt from the storm

*Nature Geosci.* doi:10.1038/ngeo477 (2009)

Although forecasters can anticipate hurricane trajectories fairly well, successful prediction of storm intensification lags behind. Lightning may provide the warning needed to predict that a tropical cyclone is about to become more powerful.

Colin Price of Tel Aviv University and his colleagues compared data from the World Wide Lightning Location Network with data on all 58 category-4 and category-5 tropical

cyclones that occurred between 2005 and 2007. In all but two storms, peak lightning activity preceded peak hurricane intensity by roughly one day.

The researchers say that they don't know the exact mechanism, but note that lightning serves as an indicator of the kind of in-storm convection that can lead to vortex intensification.

## ASTRONOMY

### Slow and steady

*Astrophys. J.* **694**, 1171-1199 (2009)

Most nearby galaxies in the Universe are massive and filled with middle-aged stars, but how and when the galaxies formed is a topic of hot debate.

To estimate galactic ages, Edward Taylor of Leiden University in the Netherlands and his colleagues studied 7,840 galaxies using the Multiwavelength Survey by Yale-Chile (MUSYC), which in total covers one square degree of the southern sky. They looked at the age of stars in galaxies as far away as 10 billion light years, and discerned that about one-fifth of large galaxies formed within the Universe's first 4 billion years; 50% of the galaxies had formed by the time the Universe was 7 billion years old, about half its current age.

The new survey data suggest that massive galaxies develop at a slower, steadier rate than previously believed.

## BIOPHYSICS

### DNA made for walking

*Science* **324**, 67-71 (2009)

Researchers have designed a DNA molecule that can 'walk' for two-and-a-half steps in a predetermined direction along a DNA track.



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