RESEARCH HIGHLIGHTS

Selections from the scientific literature

PHOTONICS

Light goes one way on a chip

A device that controls light so that it travels in just one direction could be used in high-speed computers that carry signals using light, rather than electric charges.

A team led by Lan Yang and Şahin Kaya Özdemir at Washington University in St. Louis created a diode using two doughnut-shaped rings on a silicon chip. While one ring absorbs an incoming light signal, the other amplifies it. When the rings are close together, light travels through the device both ways. When the rings are farther apart, the signal can be amplified in one direction but blocked in the other.

The device is smaller and uses less power than existing optical diodes.

Nature Phys. **http://doi.org/r8n (2014)**

CRAIG MCCLAIN

ECOLOGY

Fallen trees form a sea-floor feast

Dead trees at the bottom of the ocean host a diverse range of bacteria, fungi and molluscs (pictured; a cent is included for scale).

Craig McClain of the National Evolutionary Synthesis Center in Durham, North Carolina, and James Barry of the Monterey Bay Aquarium Research Institute in Moss Landing, California, left 18 *Acacia* hardwood logs at a depth of more than 3,000 metres in the northeast Pacific Ocean and retrieved them after five years.

The duo found thriving ecosystems that varied dramatically between logs, even though the wood was within an area 500 metres square: on average, the logs were only about 25% similar in terms of species composition. Key colonizers were wood-boring bivalves, which create holes for other organisms to shelter in and provide food in the form of wood chips and faeces.

Changing patterns of deforestation, river flow and hurricanes might affect the frequency and size of such 'wood falls', which could have a significant impact on deep-sea diversity, the authors say.

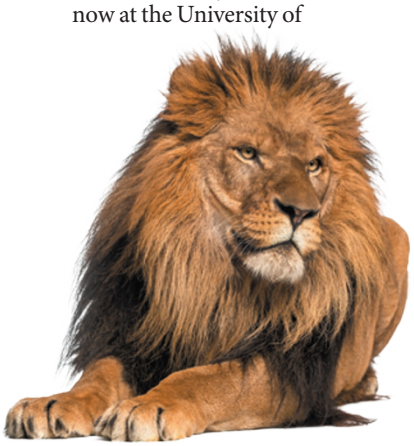
Biol. Lett. 10, **20140129 (2014)**

EVOLUTION

Ancient lion DNA yields family tree

Five genetically distinct lion populations roam in Africa and Asia — a finding that hints at greater diversity in these animals than previously thought.

A team led by Ross Barnett, now at the University of Copenhagen, analysed mitochondrial DNA (mtDNA) from the remains of 14 lions (*Panthera leo*) in museums, including extinct individuals from North Africa and Iran. Comparisons with mtDNA from other ancient and modern lions (**pictured**) suggested that the different populations are descended from an ancestral one living in southeastern Africa around 124,000 years ago. Habitat changes led to the expansion of the lions' range throughout Africa and, beginning around 21,000 years ago, into Asia and the Middle East.



Lion conservation and restoration efforts — which currently recognize only two populations in Africa and Asia — ought to account for this extra diversity, the authors say.

BMC Evol. Biol. 14, **70 (2014)**

CONSERVATION BIOLOGY

Unique birds top conservation list

An analysis of evolutionary relationships between all of the world's known birds prioritizes some of them for conservation on the basis of their genetic uniqueness.

Walter Jetz of Yale University in New Haven, Connecticut, Arne Mooers of Simon Fraser University in Burnaby, Canada, and their colleagues examined the family tree of almost 10,000 bird species. They calculated the birds' evolutionary distinctness — a measure of a species' separation from others on the family tree. Birds that ranked high in distinctness and that occupy small ranges or are threatened with extinction include the giant ibis (*Thaumatibis gigantea*) and the kakapo, a flightless parrot (*Strigops habroptilus*).

Many of these birds live outside well-known

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