RESEARCH HIGHLIGHTS

Selections from the scientific literature

ENGINEERING

Smartphones sniff gases

A common technology that enables short-range communication in smartphones could be used to detect airborne chemicals.

Near-field communication chips are found in half a billion mobile devices worldwide. They communicate wirelessly with small external tags and are used in contactless payment systems, for instance. A team at the Massachusetts Institute of Technology in Cambridge, led by Timothy Swager, modified the circuitry in the external tags using nanomaterials that are sensitive to certain chemicals. When a particular gas is present, the tag short-circuits and the smartphone can no longer read the tag.

By scanning combinations of tags, each of which was sensitive to a different chemical, the team could distinguish between gases including ammonia, hydrogen-peroxide vapour and water vapour — down to the level of parts per million.

Such a system could be used to detect explosives or pollution and has other applications, the authors say.

Proc. Natl Acad. Sci. USA **http://dx.doi.org/10.1073/pnas.1415403111 (2014)**

MOLECULAR EVOLUTION

Ancient apes digested ethanol

Human ancestors were able to metabolize ethanol 10 million years ago, around the time that they came down from the trees.

Matthew Carrigan at Santa Fe College in Gainesville, Florida, and his co-workers analysed the gene encoding the enzyme ADH4, which is made in the digestive tract to metabolize ethanol. They studied this gene from 28 mammals, including 17 primates, to trace its 70-million-year evolutionary history.

When they synthesized various ancestral forms of the enzyme, they found that ADH4 from ancestors of humans, chimpanzees and gorillas broke down ethanol much more efficiently than the enzyme from more ancient ancestors.

This change might have helped the hominids adapt to life on the forest floor, where there was probably more fermented fruit than in trees.

Proc. Natl Acad. Sci. USA **http://doi.org/xkp (2014)**

ANNA HONKANEN AND ARTO PIIRONEN

ANIMAL BEHAVIOUR

Cockroach night-vision

Cockroaches can see in near-darkness thanks to the many light-sensing cells in their eyes that pool a tiny number of light signals over space and time.

Matti Weckström and his colleagues at the University of Oulu, Finland, tested the behavioural responses of the American cockroach (*Periplaneta americana*) to varying levels of light, using a virtual-reality system that displayed moving patterns (pictured). By recording from individual light-sensitive eye cells, they found that each photoreceptor receives only one photon every 10 seconds when light levels are equivalent to a moonless night, during which the animals could still see. This pooling probably occurs over thousands of photoreceptors in the eye, say the authors.

Further study might improve night-vision devices, they add.

J. Exp. Biol. 217, **4262–4268 (2014)**

GLACIOLOGY

Antarctic ice loss accelerates

Glaciers flowing into Antarctica's Amundsen Sea are some of the fastest melting on the continent — and in recent years have lost ice at an ever-quicker rate.

Different remote-sensing techniques have yielded slightly different estimates for the amount of ice melting from the Amundsen glaciers. Tyler Sutterley of the University of California, Irvine, and his colleagues compared and reconciled four ice-measuring methods. They found that between 2003 and 2009, the disappearance of Amundsen ice accelerated at a rate nearly three times faster than over the whole period between 1992 and 2013.

The findings boost confidence in the various ice-measuring methods and confirm just how quickly these glaciers are funnelling ice into the sea.

Geophys. Res. Lett. **http://doi.org/xms (2014)**

CRYOSPHERE

Melted Antarctic ice may not return

The melting of ice around Antarctica as a result of global warming could be irreversible.

Jeff Ridley and Helene Hewitt of the UK Met Office's Hadley Centre in Exeter used a global climate model to examine how polar sea ice responds to changing climates. They found that Arctic sea ice melts and reforms in response