

# RESEARCH HIGHLIGHTS

Selections from the scientific literature

## ASTRONOMY

### On the origin of Ia supernovae

Using a computer model, astronomers in Japan present evidence to support one theory about the origin of type Ia supernovae, which are of predictable luminosity and are therefore useful for estimating distances to remote galaxies. These supernovae are generated when a compact star called a carbon–oxygen white dwarf siphons off a critical amount of matter from a companion star. However, astronomers have yet to directly observe a companion star.

Izumi Hachisu at the University of Tokyo and his team offer a solution to this conundrum. Their model, which accounts for the rotation of white dwarfs, shows that many companion stars have evolved to a state too faint to be seen. The model is consistent with observations of supernova 2011fe.

*Astrophys. J.* 756, L4 (2012)

## MATERIALS

### Hydrogel makes buildings sweat

Just as mammals can reduce their body temperature by sweating, so a coating of heat-sensitive hydrogel could 'sweat' to cool buildings.

Wendelin Stark and his colleagues at the Swiss Federal Institute of Technology in Zurich produced a 3-millimetre-thick layer of



thermo-responsive hydrogel. When heated to roughly 32°C, the gel undergoes a phase transition from a wet state to a dry state, and releases water. With this water could go much of a building's heat.

Miniature model houses (pictured) with roofs coated with the substance were up to 20°C cooler than uncoated models when exposed to simulated tropical midday Sun. The authors estimate that this translates into annual savings of 220 kilowatt-hours of energy for a detached house. A brief 'rain' recharged the hydrogel with water.

*Adv. Mater.* <http://dx.doi.org/10.1002/adma.201202574> (2012)

## ANIMAL BEHAVIOUR

### Seals see glowing prey

Female southern elephant seals are thought to locate their food in deep, dark waters by detecting the bioluminescence of their prey. The seals see best at the wavelength of light produced by bioluminescent organisms.

Jade Vacqu -Garcia at the Chiz  Centre for Biological Studies in Villiers-en-Bois, part of the French National Centre for Scientific Research, and her team tested the idea by studying four

female southern elephant seals (*Mirounga leonina*; pictured) living on the Kerguelen islands in the southern Indian Ocean. The researchers used satellite tracking to follow the animals as they made a total of 3,386 dives, and a light sensor to measure bioluminescence. During the dives, the seals' foraging intensity was positively related to the number of bioluminescence events. *PLoS ONE* 7, e43565 (2012)



## MOLECULAR BIOLOGY

### Red-blood-cell regulator

Human genome-wide association studies have indicated that a common single nucleotide sequence variant influences the size and number of red blood cells. A team led by Harvey Lodish of the Whitehead Institute, and Eric Lander of the Broad Institute, both in Cambridge, Massachusetts, found that this variant in the non-coding sequence reduces the expression of the nearby gene *CCND3*, which is involved in controlling the cell cycle.

Reducing the expression of

the gene in human and mouse red-blood-cell precursors caused the cells to go through fewer divisions, resulting in fewer, but bigger, red blood cells.

*Genes Dev.* <http://dx.doi.org/10.1101/gad.197020.112> (2012)

## MICROBIOLOGY

### Populations cooperate

Populations of naturally co-occurring bacteria work together, an analysis suggests.

To test whether bacteria aggregate for reasons beyond access to resources such as food, Martin Polz at the