

RESEARCH HIGHLIGHTS

Selections from the scientific literature

ECOLOGY

Roadkill yields panther numbers

By counting the number of endangered panthers hit and killed by cars in Florida, researchers have estimated the population size of this rare cat. They say that it is the first statistically robust population estimate for the animals across their breeding range.

Brett McClintock of the National Marine Mammal Laboratory in Seattle, Washington, and his team used data on reported collisions with *Puma concolor coryi* (fewer than 20 per year) and traffic densities, as well as information from a small number of radio-collared panthers to estimate the total population across the state. They show that panther numbers seem to be slowly increasing, but may never have exceeded 150 individuals between 2000 and 2012.

This method could be applicable to other rare animals, the researchers say. *J. Appl. Ecol.* <http://doi.org/5sg> (2015)

MARINE BIOLOGY

Corals inherit love for heat

Heat tolerance in corals can be passed down the generations, suggesting that corals can adapt as the climate warms.



Researchers have suggested that corals physiologically acclimatize to higher temperatures rather than inherit heat tolerance. To test this idea, Line Bay at the Australian Institute of Marine Science in Townsville, Australia, Mikhail Matz at the University of Texas at Austin and their team bred corals (*Acropora millepora*; pictured) from two locations in Australia separated by 5° of latitude. Offspring produced by parents from the warmer area had an up to 10 times greater chance of

survival when exposed to heat, compared with the larvae of parents from the cooler region. Larvae generated by crossing corals from the warm area with those from the cool region inherited key genetic differences associated with heat tolerance.

Corals that thrive in the heat could be moved to other latitudes so that they reproduce with local corals and introduce heat tolerant adaptations to the population. *Science* 348, 1460–1462 (2015)

NEUROBIOLOGY

Target neurons to relieve asthma

Silencing signals from pain-sensing nerve cells in the lungs reduces the symptoms of asthma in mice.

When stimulated by allergens, these neurons cause airways to constrict and trigger symptoms such as coughing and wheezing. Bruce Levy and Clifford Woolf of Harvard Medical School in Boston, Massachusetts,



ATMOSPHERIC SCIENCE

Air pollution triggers floods

A catastrophic 2013 flood in China was probably caused, in part, by air pollution.

In July 2013, heavy rainfall resulted in a devastating flood in the mountains northwest of the Sichuan Basin in China (pictured). The basin has seen increasing industrial activity in the past few decades. Jiwen Fan at the Pacific Northwest National Laboratory in Richland, Washington, and her team modelled the region's atmospheric processes during the storm using different levels of aerosol emissions. By setting the modelled emissions

at a level similar to that before China's economic boom, the team found that the rate of rainfall in the storm would have been up to 60% lower than under current emissions levels. Aerosols trapped in the basin warm the air and suppress convection, allowing excess moisture to build up and condense into rain as it rises up over the mountains.

The authors suggest that future severe floods in the region could be mitigated by reducing air pollution, particularly black carbon. *Geophys. Res. Lett.* <http://doi.org/5q9> (2015)

IMAGINECHINA/CORBIS

M. MATZ

and their colleagues blocked the activity of these cells and found that this reduced airway inflammation by reducing the production of immune-signalling molecules such as IL-5. The team reports that IL-5 triggers pain-sensing neurons to release a peptide called VIP that stimulates immune cells, creating a feedback loop that sustains allergies.

The results reveal a potential way to treat asthma and respiratory allergies.

Neuron <http://doi.org/5rf> (2015)

MATERIALS

DNA glues particles together

Researchers have assembled micrometre-sized particles into a variety of crystals using DNA as 'glue'.

DNA has been used to control the assembly of DNA-coated nanoparticles, but doing this with larger particles leads to the formation of random clumps that do not crystallize. To solve this, Marcus Weck, David Pine and their colleagues at New York University attached many short DNA strands to the surface of polymer particles. The high density of DNA strands — 5 to 25 times higher than in previous work — along with their short 'sticky' ends and the smooth particle surface resulted in the particles self-assembling into various crystalline designs.

The method could be used to make more complex structures out of a range of materials including metals and semiconductors, the authors say.

Nature Commun. 6, 7253 (2015)

ASTRONOMY

Bounty of dark galaxies found

Astronomers have discovered more than 850 faint galaxies in a galaxy cluster that could be made mostly of dark matter.

Using archived images from the Subaru Telescope in Hawaii, a team led by Jin Koda at Stony Brook University

in New York searched for observations of the Coma galaxy cluster, which is roughly 101 million parsecs (330 million light years) away. The team found 854 ultra-diffuse galaxies, a class of faint galaxy that can be as large as the Milky Way, but which has only 0.1% the number of stars. For these galaxies to remain gravitationally bound together, the researchers show that more than 99% of their mass must be dark matter.

This suggests that the crowded environment sucks gas away from these galaxies, leaving them largely unable to form stars.

Astrophys. J. Lett. 807, L2 (2015)

NEUROSCIENCE

Male mice process pain differently

Male and female mice use different types of immune cell to process chronic pain.

Studies of male mice have shown that immune cells called microglia in the spinal cord have an important role in chronic pain. To see whether this is the same in female mice, a team led by Jeffrey Mogil at McGill University in Montreal and Michael Salter at the University of Toronto, both in Canada, induced chronic pain in both sexes. The team then used drugs or antibodies to reduce microglia function. Whereas pain responses were reduced in the males, females were unaffected and instead recruited a different type of immune cell, called a T cell. This difference was linked to testosterone, which could make T cells less able to mediate pain in the males, leading to their use of microglia instead.

Nature Neurosci. <http://dx.doi.org/10.1038/nn.4053> (2015)

ASTRONOMY

'Tatooines' may be common

Planets orbiting a binary star system — like Tatooine, the fictional home planet of Luke Skywalker in

SOCIAL SELECTION

Popular topics on social media

A call to fund people not proposals

Laboratory heads today spend too much time struggling to win funding from the US National Institutes of Health (NIH), and this pressure to fund raise is driving young scientists away, according to a much-discussed commentary in *Cell*. To address this problem, Ronald Germain, chief of the laboratory of systems biology at the National Institute of Allergy and Infectious Diseases (NIAID) in Bethesda, Maryland, argues that the NIH should make funding decisions based almost entirely on researchers' past accomplishments, and not on their future plans for specific projects. Irakli Loladze, a quantitative ecologist at the University of Maryland University College in Adelphi, tweeted "person-not-project"-based scheme can be game changer in how science is funded." Sally Rockey, director of the NIH Office of Extramural

Research, says that the agency is already taking steps to streamline the funding process and to support scientists despite an ever-tightening budget.

Cell 161, 1485–1491 (2015)

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Star Wars — could form with surprising ease.

Most known circumbinary planets orbit close to their stars, where the competing gravitational forces from the two stars make the orbits of nearby objects unstable or intersect. This prevents debris from clumping together to form planets. But Benjamin Bromley of the University of Utah in Salt Lake City and Scott Kenyon of the Smithsonian Astrophysical Observatory in Cambridge, Massachusetts, show with simulations that a zone exists near the host stars where the orbits of debris wobble, but do not cross, allowing for planet formation.

This suggests that Earth-sized 'Tatooines' could be common and that more are likely to be discovered soon. *Astrophys. J.* 806, 98 (2015)

FISHERIES

Farming footprint is rapidly growing

Humans are venturing farther across the oceans and harvesting a greater proportion of the ocean's biomass to feed



the world's appetite for seafood.

Reg Watson at the University of Tasmania in Taroona, Australia, and his colleagues analysed global fisheries, and seafood import and export data. They found that the minimum distance between where seafood is sourced and where it is consumed increased nearly sixfold from 1950 to 2011. Humans are now exploiting nearly 40% of the ocean's primary productivity, up from roughly 15% in 1950. The team predicts that the world's growing demand for seafood will be met only until about 2050, unless changes are made in marine farming.

Nature Commun. 6, 7365 (2015)

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