RESEARCH HIGHLIGHTS

Selections from the scientific literature

ASTROPHYSICS

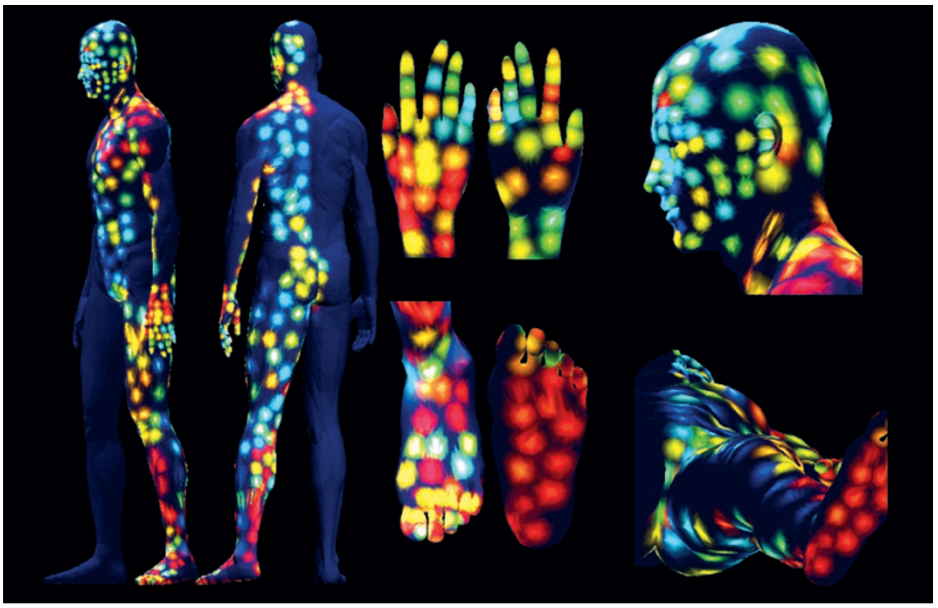
Neutrinos from a galaxy far away

Two of the most energetic neutrinos detected by a telescope in the Antarctic may have come from the cores of distant galaxies.

Neutrinos are stable and can travel far in space, so they could shed light on distant astrophysical and galactic objects. The Antarctic telescope IceCube picked up signs of neutrinos in 2011 and 2012 that were the first ever measured with energies of 1 petaelectronvolt (1×10^{15} electronvolts), suggesting a powerful source such as a blazar — a type of high-energy galaxy.

A team led by Clancy James of the University of Erlangen and Matthias Kadler of the University of Würzburg, both in Germany, studied six years of data from the underwater ANTARES neutrino telescope off the coast of Toulon, France, scanning six blazars for further neutrinos. The two blazars considered to be the best candidates each yielded events that were consistent with the signature of a neutrino, suggesting that they could be the sources of the IceCube neutrinos.

Astron. Astrophys. 576, **L8 (2015)**



THEODORE ALEXANDROV/*PROC. NATL ACAD. SCI. USA*

IMAGING

A 3D map of skin microbes and molecules

Researchers have glimpsed the complexities of human skin by creating a three-dimensional (3D) map of the chemicals and microbes found on the body's largest organ.

Pieter Dorrestein of the University of California in San Diego and his colleagues swabbed 400 locations on the skin of two healthy human volunteers who abstained from bathing for three days before sampling. Using mass spectrometry and DNA sequencing, the researchers identified the chemical compounds and microbes on the skin. They used a supercomputer to combine the data and to build a map covering the whole body (pictured is the chemical map for one volunteer; blue is low molecular diversity, red is high).

The team now plans to characterize more skin chemicals and microbes, and say that their technique could be used in fields from forensics to beauty-product development.

Proc. Natl Acad. Sci. USA **http://doi.org/3h8 (2015)**

NEUROSCIENCE

Brain zap stops electrical fault

Deep-brain stimulation may improve movement in people with Parkinson's disease by reducing abnormally strong coupling of electrical activity in the brain.

Implanted electrodes are used to treat some brain disorders, particularly Parkinson's disease. Coralie de Hemptinne at the University of California, San Francisco, and her colleagues recorded electrical potentials in the motor cortex of 23 people with Parkinson's who were undergoing surgery to implant electrodes into their brains. The researchers found that when they switched the electrodes on, the coupling of electrical activity in the motor cortex was reduced, and that the level of uncoupling correlated with the degree to which the patients' movements improved.

The authors say that the results could inform the design of improved devices for deep-brain stimulation.

Nature Neurosci. **http://dx.doi.org/10.1038/nn.3997 (2015)**

MARINE SCIENCE

Fishing drives population decline

Fishing magnifies natural variations in numbers of fish, increasing the risk of population collapses.

Timothy Essington and his colleagues at the University of Washington in Seattle analysed at least 25 years' worth of data on 55 stocks of small fish such as sardines, herrings and anchovies that are preyed on by others. The population sizes of these species fluctuate naturally and widely over time. But the researchers found that when populations collapsed to less than 25% of their mean size, the stocks were more likely to have experienced exceptionally high fishing rates before the collapse than to have seen large natural variations in size.

Modelling the fish populations suggests that fishery management practices that do not respond quickly to dips in species numbers