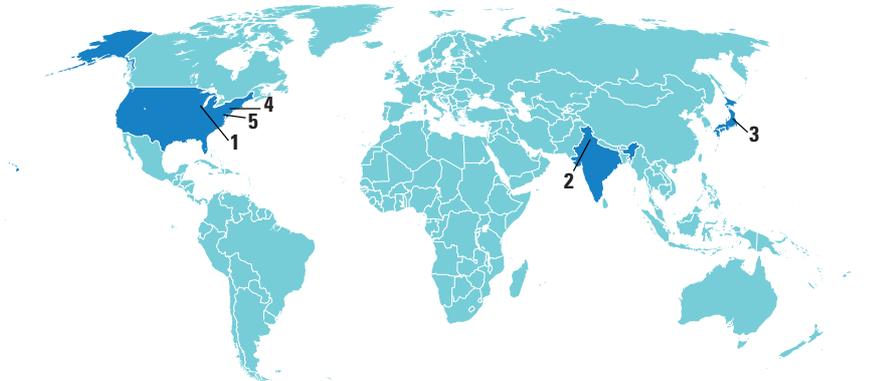


AROUND THE WORLD



Urbana-Champaign, Illinois 1

First Cowpox Case in the U.S.

A student lab worker at the University of Illinois is the first person in the United States to catch cowpox, a less dangerous relative of smallpox. Researchers from the U.S. Centers for Disease Control and Prevention (CDC) traced the infection to a genetically modified cowpox virus strain stored in the lab's freezer. The student had never worked with the virus, which the lab had not studied for 5 years. After she came down with the disease in July 2010, however, tests found DNA from the strain (although no live virus) in various parts of the lab.

Cowpox is endemic in Europe and Asia, where veterinarians and zoo workers often catch it from animals. In the United States, however, it exists only in laboratories. CDC recommends vaccinations for anyone working with cowpox or similar viruses, but the student declined because she did not expect to handle it.

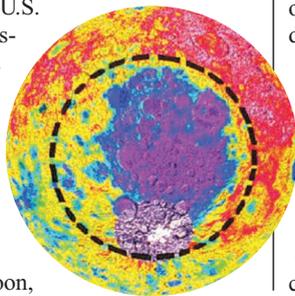
<http://scim.ag/cow-pox>

New Delhi, India 2

India May Join U.S. MoonRise Mission

India's Space Commission has given the go-ahead for work to begin on a possible contribution to a U.S. sample return mission to the moon.

The mission, called MoonRise, would land a probe in the South Pole-Aiken Basin (pictured) on the far side of the moon,



scoop up 1 kilogram of material, and return it to Earth. Launch is currently planned for 2016. The Indian Space Research Organisation (ISRO) hopes to provide an orbiter that would circle the moon for a few years and aid in communication and imaging.

If India does join MoonRise, it would underline a change in Indo-U.S. security relations. Until recently, U.S. labs and companies were prohibited from exchanging technologies with ISRO in an attempt to limit their use for military purposes. But Indian Prime Minister Manmohan Singh and U.S. President Barack Obama met in New Delhi in November and agreed to become strategic partners. The countries may be ready to join hands on a major space mission.

<http://scim.ag/moon-rise>

Tokyo, Japan 3

Whaling Season Cut Short

Citing harassment by the activist group Sea Shepherd Conservation Society, Japan last week called an early halt to this year's research whaling expedition to Antarctic waters, having captured and killed just 172 of a planned 900 whales. Sea Shepherd declared it "Victory in the Southern Ocean Day" for whales.

An international moratorium on commercial whaling took effect in 1985, but Japan relies on a provision allowing research whaling to catch hundreds of minke and smaller numbers of other species each year. Taken whales are examined to determine the age, stomach contents, amount of heavy metals accu-

mulated in tissue, and other data; then the whale meat is sold, with proceeds subsidizing the research whaling expeditions.

Critics contend that the data could be collected through nonlethal means and that Japan's cetacean research is thinly veiled commercial whaling.

<http://scim.ag/short-season>

Armonk, New York 4

Dr. Watson, We Presume

Fresh from mopping the floor with two human opponents in *Jeopardy!*, IBM's factoid-spewing supercomputer Watson is turning its talents to medicine. On 17 February, IBM announced that it was teaming up with software company Nuance Communications Inc. and two universities to produce a computerized "physician's assistant" designed to fetch up-to-date medical information on command.



IBM's Watson supercomputer challenges two former *Jeopardy!* champions.

Nuance, which PC users know as the maker of Dragon speech recognition software, already has a foothold in health care technology. Researchers and clinicians at Columbia University Medical Center and the University of Maryland School of Medicine in Baltimore will contribute medical expertise to the project. And IBM,

NOTED

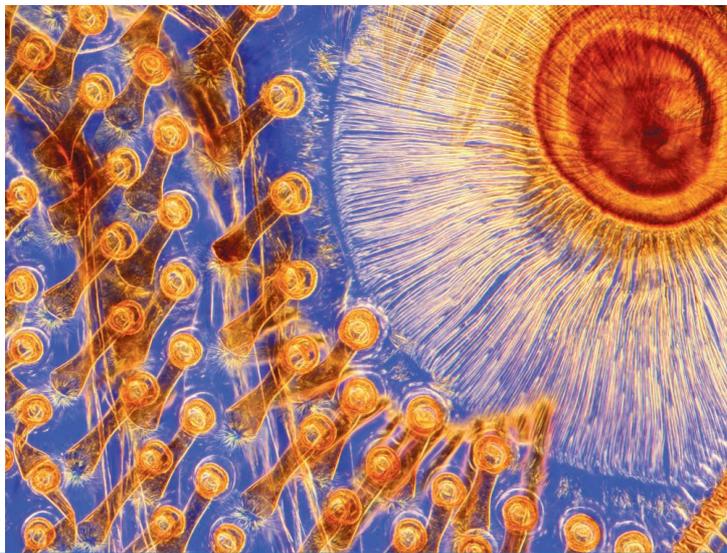
>A company in Oxfordshire, U.K., hopes to cash in on fusion with a design for a supercompact fusion reactor, or tokamak, that it plans to sell as a neutron generator for industry or research. **Tokamak Solutions** says it could build the most basic version of the machine—producing just a hot plasma for research purposes—in a year at a cost of around \$1 million. <http://scim.ag/buy-fusion>

Downloaded from <https://www.science.org> on October 17, 2023

CREDITS (TOP TO BOTTOM): COURTESY OF IBM; NASA

Science Snaps Win Prizes

From his home in Stafford, U.K., retired schoolteacher Spike Walker snapped four of the 20 images that won the 2010 Wellcome Image Awards, announced this week. The pictures, created by stacking as many as 44 different frames captured through a microscope, reveal surprising details about four different insects in vivid color. These include the hooks on a caterpillar's belly, a mosquito's feathery antennae, the hairs on a coiled ruby-tailed wasp, and the suckers on the foreleg of a great diving beetle, with which it grasps females during mating (pictured). "The beetle was one I found in a large collection of Victorian slides a friend was wanting to get rid of," Walker says. "The wasp just flew into the kitchen one day." His four photomicrographs, along with the 16 other winners, which included a scan of a patient's aneurysm and an image of a 3-day-old mouse blastocyst undergoing its first cell division, are on display at the Wellcome Collection in London.



of course, is supplying Watson: a suite of algorithms working in concert to parse natural language, process information, and retrieve data.

IBM says computer P.A.s will help physicians and nurses make faster diagnoses and prescribe up-to-date treatments. The company expects the first products to come on the market within 18 to 24 months.

Washington, D.C. 5

Train Wreck, Anyone?

The worst fears of U.S. scientists were realized last week when the House of Representatives approved a budget that would trim roughly \$5 billion from current federal spending on research. The so-called continuing resolution for the last 7 months of the 2011 fiscal year would lower overall discretionary spending by \$61 billion, taking billion-dollar bites out of the National Institutes of Health, National Science Foundation, and Department of Energy's Office of Science (see p. 997). House Republicans were especially keen to derail presidential initiatives in education, energy, and climate research. But the 67 successful amendments—out of a pile of nearly 600 that were drafted by members of both parties—took aim at the entire federal budget, with the exception of mandatory programs like Medicare and Medicaid.

Next week, the spending measure will be taken up by the Senate, which has promised to make its own reductions to President Barack Obama's request for 2011 that the

previous Congress failed to act upon. Its Democratic leaders say they won't be using the House bill as a template, however, and Obama has already threatened a veto. The current agreement to extend 2010 spending levels into 2011 expires on 4 March. If the White House and legislators don't resolve the deadlock by then, the next step could be a government shutdown.

BY THE NUMBERS

28% Percentage of U.S. adults in 2008 who had enough scientific knowledge to read the Tuesday science section in *The New York Times*, according to a survey by the University of Michigan's Jon Miller. That's up from 10% in 1988.

\$3.2 billion Amount of global funding in 2009 for research into neglected diseases, such as tuberculosis and dengue fever, according to a new report. That's up 8% from 2008.

4 Number of species found by a 5-month mission that searched 21 countries for living members of 100 amphibian species thought to be extinct. Among the still-missing: the golden toad of Costa Rica, last spotted in 1989.

FINDINGS

Cancer Diagnosis: An App for That

Cancer researchers have come up with a small device that could allow physicians to find out within 60 minutes whether cells from a suspicious lump in a patient are cancerous or benign.

Oncologists usually have to send suspected cancer cells to a pathology lab and wait days for the results, which are often inconclusive. But now Ralph Weissleder's team at Massachusetts General Hospital (MGH) in Boston has developed a miniature, portable version of a nuclear magnetic resonance (NMR) machine—the work-horse tool that chemists use to identify molecular structures. The researchers used a needle to collect possible tumor cells from patients's abdomens, washed the cells with magnetic nanoparticles, and injected them into their miniature NMR. The device, which is about the size of a coffee mug and can be read with a smartphone, detected levels of nine protein markers for cancer cells.

The method accurately diagnosed biopsies from 68 of 70 patients, the MGH team reports this week in *Science Translational Medicine*. They hope that doctors will one day use the device at the bedside to track the course of a patient's cancer and its response to drugs.



>>FINDINGS

Rising Temperatures Bringing Bigger Floods

In October and November 2000, floods soaked large swaths of England and Wales, causing losses estimated to exceed \$2 billion. Now new research suggests that human-caused climate change, brought about by past emissions of carbon dioxide, almost certainly boosted the risk of these floods.

Pardeep Pall of the University of Oxford in the United Kingdom and his colleagues ran thousands of climate simulations. In roughly half of them, they reduced atmospheric concentrations of carbon dioxide to levels measured in 1900, and they adjusted ocean temperatures and the amount of Arctic sea ice—which affects high-latitude weather patterns—accordingly. In the other simulations, they modeled modern conditions. Then they compared the rainfall amounts generated in both types of simulations. Finally, they fed the rainfall values into a model that assesses the potential for flooding.

In 90% of the simulations, results suggested that the flood risk in England and Wales in autumn 2000 was at least 20% higher than it would have been in 1900, the team reported online last week in *Nature*. In two-thirds of the cases, the flood risk was at least 90% higher.

<http://scim.ag/more-floods>

Cheers! Ancient Britons Made Skull Cups

Humans have been using skulls as cups for thousands of years to toast friends—or enemies. Now a team analyzing bones from Gough Cave in Somerset, United Kingdom, has found what it claims to be the earliest evidence for the practice.

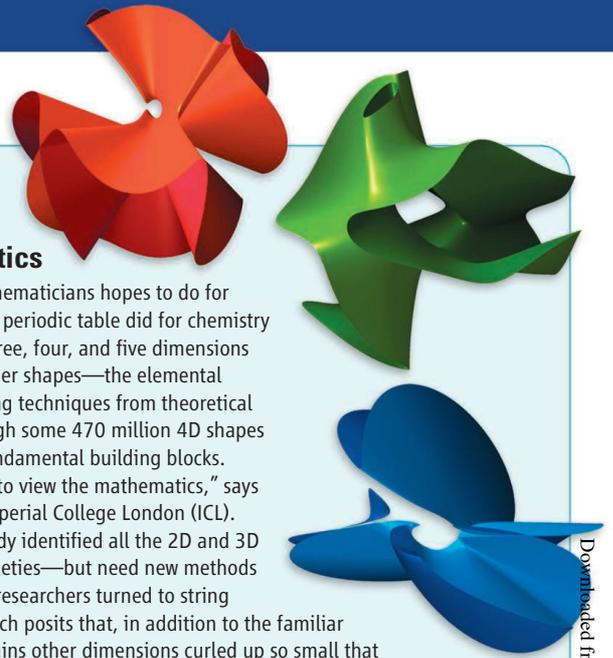
Led by paleontologist Silvia Bello of the Natural History Museum in London,

**Random Sample****Elementary Mathematics**

An international group of mathematicians hopes to do for math what Dmitri Mendeleev's periodic table did for chemistry by identifying the shapes in three, four, and five dimensions that cannot be divided into other shapes—the elemental “atoms” of geometry. Borrowing techniques from theoretical physics, they plan to sift through some 470 million 4D shapes in search of a few thousand fundamental building blocks. “We’re using physics as a lens to view the mathematics,” says team leader Alessio Corti of Imperial College London (ICL).

Mathematicians have already identified all the 2D and 3D basic shapes—called Fano varieties—but need new methods for higher dimensions. So the researchers turned to string theory, a branch of physics which posits that, in addition to the familiar dimensions, the universe contains other dimensions curled up so small that their effects are hard to detect. Tools developed by string theorists to study such curled-up dimensions can tell the team whether higher-dimensional shapes, slices of which are shown here, are Fano varieties.

The researchers—who are from the United Kingdom, Russia, Japan, and Australia—communicate via a blog (<http://scim.ag/fano-v>) and Twitter, so anyone can see how they’re getting on. Knowing the basic building blocks of geometry, they hope, will be useful for mathematicians, string theorists, and engineers. Team member Tom Coates of ICL says it should take roughly 3 years to work through the 4D shapes. And the 5D ones? “We simply don’t know.”



the team studied three skulls previously found in a cave layer radiocarbon dated to 14,700 years ago, during the Ice Age when the Magdalenian culture thrived there. The pattern of cutmarks and abrasions on the skulls suggests that the cranial vaults were carefully preserved while the rest of the faces were smashed off, the eyes gouged out, and the lower jaws carefully removed. Bello's team concluded online last week in *PLoS ONE* that the skulls were deliberately fashioned into cups or other containers, likely for a ceremony. Other bones from the cave show signs of cannibalism, and researchers suggest that the cups may even have been used to serve up the brains of an enemy. <http://scim.ag/skull-cups>

Longer Genes, Longer Flight

Every year, some 50 billion birds take to the air for their seasonal migrations. They may go 500 kilometers in a day and a few even travel from pole to pole. But how do they know when, where, and how far to fly? Now ornithologists have pinned down one of the genes that influences migratory behavior. And strange as it may sound, the length of that gene influences the length of the flights.

Jakob Mueller and Bart Kempenaers of the Max Planck Institute for Ornithology in Starnberg, Germany, along with Francisco Pulido, now at the Complutense University of Madrid in Spain, evaluated 14 populations of blackcaps (pictured) ranging from western Russia, through Europe, south to Africa. These populations vary in their inclinations to migrate. Blackcaps in Cape Verde, for example, never leave home, whereas those in Russia travel more than 3500 kilometers.

The researchers found that one gene, called *ADCYAP1* is correlated with the birds' typical pre-migratory behavior. They reported online in the *Proceedings of the Royal Society B* that groups that stayed put tended to have a shorter version of the gene, whereas long-distance migrants tended to have longer versions. The gene specifies a peptide in the brain that influences daily rhythms and affects energy use—increasing body temperature, metabolic rate, and fat usage. These sorts of changes occur as a bird gets ready to migrate. <http://scim.ag/long-flights>



AAAS MEETING

More than 8000 people attended the AAAS annual meeting in Washington, D.C., from 18 to 21 February. Here are some snapshots from the meeting. Go to http://scim.ag/aaas_2011 for extensive coverage, including stories, podcasts, and live chats.

Infants Watch What You Say

Your baby's language skills may surprise you. Before they even crawl, infants can distinguish between two languages they've never heard before just by looking at the face of a speaker. And this ability is enhanced if they're raised in a bilingual household.



Developmental psychologist Janet Werker of the University of British Columbia in Canada described at the AAAS meeting tests she and Núria Sebastián of Pompeu Fabra University in Barcelona conducted on 8-month-old Spanish babies. Some were raised in homes in which only Spanish is spoken, some in homes whose residents spoke only Catalan, and some in bilingual homes. Werker and her colleague showed the babies a soundless video of three women who were bilingual speakers of French and English—languages the babies didn't know. Each was shown in turn speaking sentences in one of the languages. Eventually the babies got used to this and stopped watching. Then the language changed. Babies raised in bilingual homes looked at the video again. The monolingual babies showed little reaction; but other studies have shown that they can make the distinction until they are 6 months old.

Werker speculates that the babies may be focusing on differences in lip shapes as the languages are spoken or on "the whole ensemble of muscle movements in the face." <http://scim.ag/baby-language>

Methane From Oil Spill Migrating Undigested?

The blowout of BP's Macondo well didn't just spew some 5 million barrels of oil into the Gulf of Mexico last year. Lots of methane also whooshed out, but what happened to it is a matter of debate. Some researchers

have concluded that almost all the methane was eaten by an enormous bloom of bacteria. But microbial geochemist Samantha Joye of the University of Georgia, Athens, reported at the AAAS meeting that the picture is far more complicated.

Joye and her colleagues have estimated that 500,000 tons of methane and other gases escaped from the busted well. She reported at the meeting that the breakdown of the dissolved gas dropped sharply 6 weeks after the blowout began, even though there was still plenty of methane in the water. Methane oxidation by bacteria, which had been 60,000 times higher than normal to the southwest of the well, fell to 300 times the background rate, according to her unpublished data.

Joye speculated that the microbes ran out of another nutrient, which would have prevented them from metabolizing more methane. She also reported that her team detected far more methane than expected to the northeast of the well in late summer, after it had been capped. "It looks like there's a significant amount of gas in the ecosystem," and it's spread across a larger area, she said. <http://scim.ag/spill-methane>

Seaweed: Malaria's Nemesis?

In the war against malaria, researchers may have recruited an unlikely ally: a seaweed found in Fiji. In 2005, Julia Kubanek, a chemical ecologist at the Georgia Institute of Technology in Atlanta, and her colleagues discovered that the seaweed, a red alga called *Callophycus serratus*, contains unusual ring-shaped compounds called bromophycolides that are particularly effective at killing cer-



Julia Kubanek with *Callophycus serratus*.

tain fungi. In 2009, they found one that also kills the malarial parasite in red blood cells.

Now, Kubanek reported at the AAAS meeting, her group has discovered the mechanism. Malarial parasites infect red blood cells, where they thrive on hemoglobin, the body's oxygen-carrying molecules. As the parasites break hemoglobin down, they release heme, a pigment that is toxic to them. To protect themselves, the parasites crystallize the heme and store it in a separate chamber. Kubanek reported that the bromophycolide prevents this crystallization, causing heme to accumulate and poison the parasite. Next, she and her colleagues will test the compound in mice infected with the parasite. <http://scim.ag/anti-malarial>

Trading Tuna for Sardines

Overfishing has not just decimated populations of tasty fish such as tuna and cod; it's also drastically altered the balance of biomass in the world's oceans, according to a new study reported at the AAAS meeting.

A team led by Villy Christensen of the University of British Columbia in Canada analyzed models depicting more than 200 marine food webs around the world at various time periods from 1880 to 2007. Christensen's team then estimated the distribution of biomass in these ecosystems and extrapolated the results to cover all of the oceans. The result: The total biomass of predatory fish plummeted by about two-thirds over the past 100 years—54% in the past 40 years alone—while the biomass of the fish they prey on, such as sardines and anchovies, rose by 130%.

"It's a very different ocean," Christensen says, adding that the shift in the balance of the food web isn't healthy or sustainable. <http://scim.ag/ocean-biomass>

THEY SAID IT

Climate change denialism by evangelicals is a "heresy committed against all of creation, nothing less than a monstrous wrong."

—Richard Cizik, a former evangelical preacher and founder of The New Evangelical Partnership for the Common Good, speaking at a AAAS session titled Evangelicals, Science, and Policy: Toward a Constructive Engagement.



This Week's Section

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