NEWS IN FOCUS

JOURNALS Baffled scientists see findings scooped — by fake authors **p.470**

POLICY Regulatory huffing and puffing over electronic cigarettes **p.473**

PHYSICS Resurrected hope for room-temperature superconductor **p.474**

OCEANOGRAPHY A billion-dollar scientific dive beneath the waves **p.480**

IODP-USIO

US research vessel the *JOIDES Resolution* on an expedition in the Gulf of Alaska.

OCEANS

Drilling hit by budget woes

US funding for research vessel uncertain as international programme reorganizes.

BY ALEXANDRA WITZE

This week's arrival of US research vessel the *JOIDES Resolution* in Busan, South Korea, will mark an important milestone in scientific drilling. On 30 September, the Integrated Ocean Drilling Program (IODP) — the framework that has governed the extraction of geological cores from the sea floor for the past decade — will cease to exist. The next day, it will be reborn for another decade with a new name and blueprint, but the same old problem: how to pay for what is arguably the most successful international research collaboration ever.

The future of the *JOIDES Resolution* is particularly in doubt, which is a source of consternation for the geoscientists who depend on her services. For the past decade, the ship has been a workhorse of scientific ocean drilling, racking up 34 expeditions under the IODP. By contrast, vessels run by other countries have managed just 18 (see 'Drilling down').

But the ocean-sciences division of the US National Science Foundation (NSF), which funds the *JOIDES Resolution* from its headquarters in Arlington, Virginia, has run into a perfect storm of financial commitments. Rising costs for new facilities, coupled with double-digit budgetary cuts in core science programmes over

the past two years, have led the NSF to consider slashing the money available for the vessel.

Rumours of the impending change have caused uproar among US geoscientists. They have sent a flood of letters to the NSF to highlight the valuable research conducted through ocean drilling — the only way to access continuous geological records older than about a million years. International collaborators such as Brazil and China that bring money to NSF coffers through membership fees now face the prospect of less time at sea.

The NSF's head of ocean sciences, David Conover, points out that other programmes in his division are also suffering. "Everybody ►

► wishes we had more money to give," he says. In November, he will appear before the National Science Board with options on how the *JOIDES Resolution* might operate after its contract with the NSF ends in September 2014. The board will vote to authorize some level of funding, which will dictate how much research the ship can do. It currently costs about US\$65 million a year to conduct roughly four expeditions.

The United States has led the field of scientific ocean drilling since 1968, and today 26 countries share several expedition vessels under the IODP. The programme's other flagship is Japan's *Chikyu*, a \$540-million vessel with 'riser' technology that allows it to drill much deeper than the *JOIDES Resolution* can.

Scientists aboard the *Chikyu* have drilled into the fault that caused the deadly 2011 earthquake near Tohoku, Japan, and have investigated a dangerous fault zone closer to Tokyo, to probe the mechanics of these killer hazards. But the *Chikyu*, like the *JOIDES Resolution*, has faced higher operating costs than expected; it spends about five months a year on science, and the rest of its time on mostly industry work, to help to pay the bills. At an April workshop in Tokyo, *Chikyu* scientists laid out an ambitious wish list of projects, from exploring an ancient Mediterranean dry period to drilling into Earth's crust-mantle boundary, that would easily fill 12 months a year if Japan's government could afford them.

Other parts of the IODP effort are run by the European Consortium for Ocean Research Drilling, which operates 'mission-specific' platforms — hiring ships that are matched to

DRILLING DOWN

Budget pressure has reduced the number of missions undertaken by US drilling ship the *JOIDES Resolution*.

each expedition. The group has scrambled to find money to operate roughly one mission a year, and currently has a ship drilling in the Baltic Sea to explore past glacial cycles.

But these long-standing arrangements are being shuffled. In the rechristened, reorganized 'International Ocean Discovery Program', the United States, Japan and Europe will fund their own platforms directly instead of combining funds in a central pot of about \$200 million. After years of courting, US officials have also brought in partners such as Brazil and China, which each pay \$3 million annually to the US programme. Many had hoped that this influx of international funds might allow the *JOIDES Resolution* to sail more expeditions each year.

But the NSF's budget woes make that look unlikely. Several years ago, the agency spent \$115 million on retrofitting the *JOIDES Resolution*, but the ship has spent only seven to eight months a year on science since then. "If it can only continue at that level, I think the community would view the glass as half full rather than half empty," says Keir Becker, a marine geologist at the University of Miami in Florida, and head of the new group that will coordinate activities among the US, Japan and Europe.

"If the United States falls over, then all these other countries are going to be left hanging," says Mike Coffin, a marine geologist at the University of Tasmania in Hobart, Australia. "Everyone is extremely concerned about what the United States is doing." (Australia has put in a five-year bid to continue participation in the programme.)

Conover brushes aside rumours that the United States is abandoning scientific drilling. "We are not terminating the programme," he says. But he adds that the NSF's ocean sciences division can only stretch so far. Its budget this year is almost \$343 million, or \$9 million less than the year before. Budget sequestration and other cutbacks have reduced its funding for core science by about 12% over two years.

At the same time, the 35-year-old *JOIDES Resolution* has only so much life left in it. "The community is waking up and seeing that we don't have this tool forever," says Bradford Clement, who oversees the ship's science services at Texas A&M University in College Station. "There is a sense of urgency here." ■

SEE EDITORIAL P.461

PUBLISHING

Mystery over obesity 'fraud'

Researcher baffled after his results appear in bogus paper.

BY DECLAN BUTLER

Ghost writing is taking on an altogether different meaning in a mysterious case of alleged scientific fraud. The authors of a paper published in July (*A. Veziraki et al. Biochem. Biophys. Res. Commun.* <http://doi.org/nxb>; 2013), which reported significant findings in obesity research, seem to be phantoms. They are not only unknown at the institution listed on the paper, but no trace of them as researchers can be found.

The paper, published in the Elsevier journal *Biochemical and Biophysical Research*

Communications (BBRC), is not the kind of prank that journals have encountered before, in which hoaxsters have submitted dummy papers to highlight weaknesses in the peer-review process. The paper's reported findings — that overexpression of two novel proteins in fat cells leads to improvements in metabolic processes related to diabetes and obesity in mice — are, in fact, true.

Too true, in the opinion of Bruce Spiegelman, a cell biologist at Harvard Medical School's Dana-Farber Cancer Institute in Boston, Massachusetts. He says that he has presented similar findings at about six research meetings,

and is preparing to submit them to a journal. He suspects that the *BBRC* paper was intended as a spoiler of his own lab's work.

Now withdrawn, the article lists five authors who are all supposedly from the School of Health Sciences at the University of Thessaly in Trikala, Greece, and is entitled 'Identification of meteorin and metnl as two novel pro-differentiative adipokines: Possible roles in controlling adipogenesis and insulin sensitivity'. Adipokines are proteins secreted by fat tissue that play an active part in such processes as sugar and fat metabolism, inflammation and obesity-related metabolic disorders, including insulin resistance and diabetes.

Spiegelman says that he smelt a rat as soon as he saw the paper. Meteorin and metnl have been little studied, and no previous paper has shown a role for them in obesity. It was therefore suspicious, he says, to see a paper published out of the blue reporting that they were novel adipokines and that their overexpression in adipose cells led to improvements in diabetes and obesity in mice — exactly the same findings as the work he had presented.

On 20 July, he e-mailed Ernesto Carafoli, *BBRC*'s editor-in-chief, to air his concerns.