

NEWS IN FOCUS

LAB SAFETY Death spurs calls for a culture change on campus **p.270**

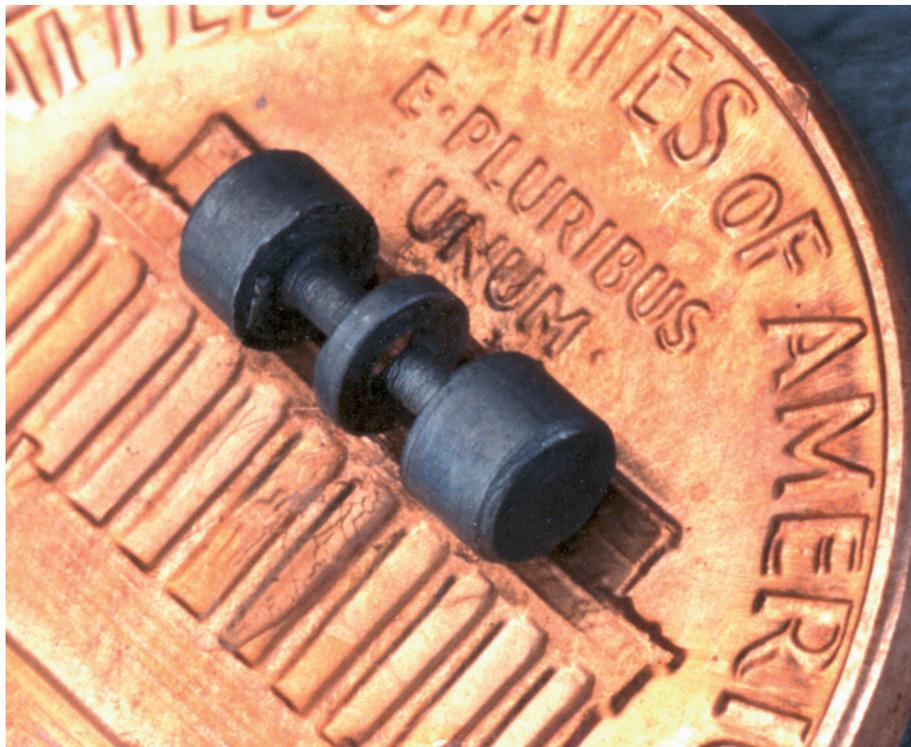
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J. BERGQUIST, D. WINELAND/NIST



A mercury-ion trap was devised by US government scientists, who must now make do with fewer pennies.

POLICY

US budget a taste of battles to come

Deal leaves science agencies with less but avoids deep cuts.

BY EUGENIE SAMUEL REICH, IVAN SEMENIUK, JEFF TOLLEFSON AND MEREDITH WADMAN

Rush Holt calls it “deficit attention disorder”. Speaking earlier this month at a science-policy luncheon on Capitol Hill, the New Jersey Democratic congressman and nuclear physicist was reflecting on the fiscal climate that has settled over Washington DC. Last week, the impact of that climate was felt acutely, as Congress passed a federal spending bill that makes the deepest cut ever to the US budget. For scientists

employed or supported by government research agencies, the news would seem to be dire. The deal, which President Barack Obama signed into law on 15 April, applies the first significant funding cuts to most of those agencies in a generation — with the strong possibility of deeper cuts to come. Yet, given what might have been, the outcome is a relief to most research advocates.

“The basic-research agencies all did pretty well,” says Patrick Clemins, director of the research-and-development budget and policy programme at the American Association for the

Advancement of Science in Washington DC.

Back in February, the Republican-led House of Representatives proposed a budget that would have ripped billions of dollars from the science agencies. That would have left the agencies not only well below the funding levels specified by Obama when he tabled his budget request more than a year ago, but also well below the 2010 levels they have been operating under since October.

The deal restores the bulk of those lost billions. Most science agencies now face cuts of about 1% (see ‘Splitting the difference’). That is a reassuringly small portion of the US\$38.5 billion, or 5.8%, cut from the 2010 allocation for non-military discretionary spending from which most academic research is funded. “In the end,” says Barry Toiv of the Association of American Universities in Washington DC, “it is clear they decided that while it was important to cut federal spending they would continue to prioritize research and education.”

Nevertheless, the fractious debate that has enveloped Congress for the past six and a half months foreshadows a much tougher battle over the 2012 budget. Although Obama has called for investments in science and technology to “win the future”, Republicans have vowed to fight for deep cuts to reduce the escalating deficit without resorting to tax hikes. The remainder of the 2011 fiscal year — around five and a half months — therefore offers science agencies a short window of stability in which to take stock and prepare for renewed turmoil.

BASIC RESEARCH

Although few agencies would call themselves “winners” in the new budget, the sense of a narrow escape must have been palpable at the Department of Energy’s Office of Science. Best known for funding high-energy and nuclear physics, the office had been targeted for an 18% cut relative to 2010 by House Republicans (see ‘The arduous journey of the 2011 US budget’), a measure that would have meant thousands of lay-offs at national labs. In the end, the office came out of the deal with a cut of just over 2.1%. “It’s a reasonable budget,” says Pier Oddone, director of Fermilab in Batavia, Illinois. Oddone says that if the cut is applied evenly to all of the Office of Science’s funding, Fermilab should still be able to continue to run its particle accelerator, ▶

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► the Tevatron, until the end of this year.

Last week the White House conceded in a statement that the promised 10-year budget doubling for the physical sciences would probably not materialize. The America COMPETES Act, re-authorized last December, had called for the boost, relative to 2007 baselines, for the Office of Science, the National Science Foundation (NSF) and the National Institute of Standards and Technology (NIST). Investment would still be “strong”, it said.

Anita Jones, a computer scientist at the University of Virginia in Charlottesville, is unconvinced. Jones, who served on the National Academy of Sciences panel that called for the budget doubling in the influential report *Rising Above the Gathering Storm*, says that with the current budget, “Americans will cede the discovery of new ‘innovation territories’ to other nations”.

On the surface, the NIST seems to have been hit hard, with a 12.5% cut relative to 2010 levels. But its Scientific and Technical Research and Services, the account that covers the agency’s labs, was reduced by just 1.4%. The remaining cuts will be made in extramural research, development and construction. “I’d say the feeling is a mixture of relief that the NIST labs escaped larger cuts hitting other parts of the government, and disappointment that the increases promised by the America COMPETES act have failed to materialize,” says one NIST scientist who is not authorized to speak on policy.

BIOMEDICAL RESEARCH

At the National Institutes of Health (NIH), a cut of just over 1% amounts to a loss of \$323 million, including \$50 million that Congress has specified will come out of funding for buildings and facilities on the agency’s campus in Bethesda, Maryland. The rest will be distributed proportionately across the NIH’s 27 institutes and centres, and the office of the director.

“The bottom line for the NIH is: it could have been worse,” says Jennifer Zeitzer, the director of legislative relations at the Federation of American Societies for Experimental Biology in Bethesda, Maryland.

THE ARDUOUS JOURNEY OF THE 2011 US BUDGET (FIGURES IN US\$ MILLION)

| Agency | 2010 enacted | 2011 request | 2011 — after proposed cut* | 2011 enacted |
|--|--------------|--------------|----------------------------|--------------|
| National Institutes of Health (NIH) | 31,089 | 32,089 | 30,519 | 30,766 |
| NASA | 18,725 | 19,000 | 18,421 | 18,448 |
| Environmental Protection Agency (EPA) | 10,281 | 10,020 | 7,283 | 8,812* |
| National Science Foundation (NSF) | 6,873 | 7,424 | 6,597 | 6,807 |
| Centers for Disease Control and Prevention (CDC) | 6,475 | 6,342 | 5,419 | 5,733 |
| Department of Energy Office of Science (DOE OS) | 4,964 | 5,121 | 4,010 | 4,858 |
| National Oceanic and Atmospheric Administration (NOAA) | 4,748 | 5,555 | 4,631 | 4,597 |
| Food and Drug Administration (FDA) | 2,364 | 2,508 | 2,123 | 2,447* |
| US Geological Survey (USGS) | 1,112 | 1,133 | 1,105 | 1,084 |
| National Institute of Standards and Technology (NIST) | 857 | 922 | 700 | 750 |

*Estimated

A notable absence from the new bill was any funding for the Cures Acceleration Network, an NIH programme designed to speed new treatments to the clinic, authorized in the landmark 2010 health-reform law. NIH director Francis Collins is hoping that the network will underpin the National Center for Advancing Translational Sciences that he intends to launch in October. He and the administration are asking for \$100 million for the network in next year’s budget. However, the absence of any specified fund for it in 2011 does not bode well for funding levels in 2012.

“In that year and beyond, the threat is much greater,” says David Moore, director of government relations at the Association of American Medical Colleges in Washington DC.

The short-term reality is harsher for the Centers for Disease Control and Prevention (CDC), in Atlanta, Georgia. The portion of its budget controlled by Congress will be cut this year by 11.5%, or \$742 million. (Some spending by the agency, for instance on vaccine programmes, is automatic and not under Congressional control.)

Donald Hoppert, director of government relations at the American Public Health Association in Washington DC, says that his group is “deeply disappointed” with the cuts to the

CDC. “[They] will jeopardize our efforts to address the growing burden of chronic disease and injury, infectious disease and environmental hazards in communities across the nation. Any short-term savings are far outweighed by the long-term costs to the public’s health,” he says.

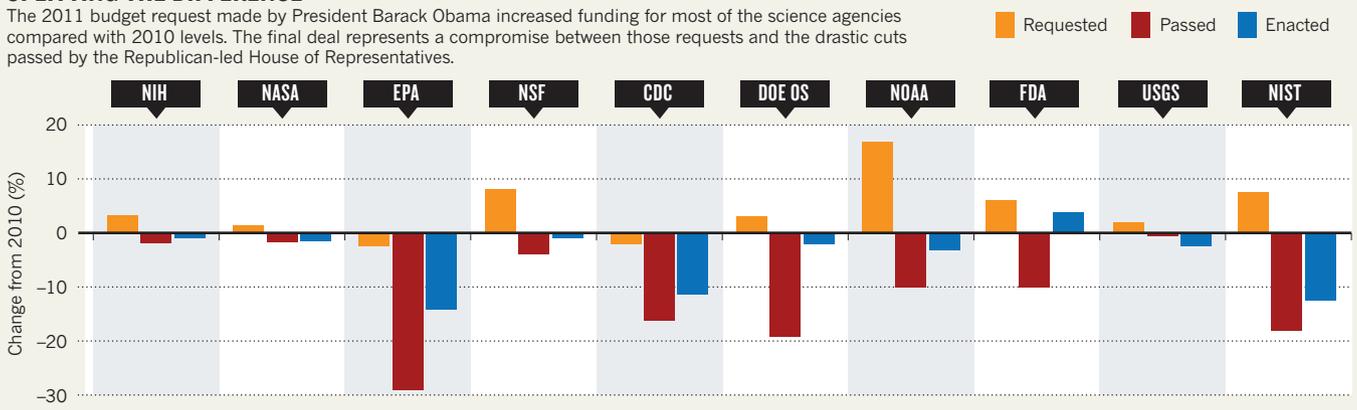
REGULATORY SCIENCE

During the budget debate, officials at the Food and Drug Administration (FDA) wondered whether the agency would receive enough money this year to begin to fulfil the requirements of the Food Safety Modernization Act. The act, which was signed into law on 4 January, gives the agency significant new powers to inspect both domestic and imported food products. House Republicans had proposed cutting the FDA’s budget by \$241 million, which would have been a major setback for the act. Instead, the final deal gives the FDA an increase of about \$83 million, more than half of which is allocated to food safety.

In the realm of environmental regulation, Senate Democrats and the White House successfully fended off Republican efforts to hobble the Environmental Protection Agency by restoring nearly half of the \$3 billion in proposed cuts, and keeping

SPLITTING THE DIFFERENCE

The 2011 budget request made by President Barack Obama increased funding for most of the science agencies compared with 2010 levels. The final deal represents a compromise between those requests and the drastic cuts passed by the Republican-led House of Representatives.



cuts for science-and-technology research programmes at 4% relative to 2010. A Republican demand to strip the agency of its authority to regulate greenhouse-gas emissions was also removed from the final agreement. “On climate, it is a pretty strong victory for the administration,” says David Goldston, director of government affairs at the Natural Resources Defense Council in Washington DC. Although the administration gave some ground, Goldston says, the bill no longer represents an outright assault on environmental policies. “The broad attack is not there any more,” he says. The bulk of the cuts to the EPA — nearly \$1 billion — have been made in grants to states to develop clean water-related infrastructure. The bill also cuts \$112.5 million from grants to help state regulatory agencies prepare for new federal air-quality and climate regulations.

ENERGY, EARTH AND SPACE

The bill passed last week will reduce government funding for research on energy efficiency and renewable energy by \$438 million, but that’s modest compared with the much larger cut proposed by House Republicans. Similarly, the energy department’s Advanced Research Project Agency-Energy will receive \$180 million — far short of Obama’s original \$300-million request, but more than triple what the Republicans allocated in February,

At the National Oceanic and Atmospheric Administration (NOAA), the bill prevents money from being spent on the agency’s Climate Service, which the administration has proposed as a central clearing house for climate data and longer-term forecasting. It also flatlines funding for weather- and climate-monitoring activities under the Joint Polar Satellite System. On 13 April, NOAA director Jane Lubchenco warned a Senate subcommittee that delays caused by the funding shortfall could jeopardize forecasting ability.

At NASA, a 1.5% cut will allow the space agency to proceed with plans to develop its human-spaceflight infrastructure, including a multipurpose crew vehicle and a heavy-lift rocket, to which the new spending bill allocates a minimum of \$1.2 billion and \$1.8 billion, respectively. NASA’s science programme, which includes the over-budget James Webb Space Telescope (the launch of which has now been delayed until 2018), receives a robust \$5 billion in the spending bill. But for NASA, as for other science agencies, the new budget leaves longer-term issues unsolved. With the final shuttle flight scheduled for June, the space agency faces a major transition this year — to a hiatus in which the nation is unable to fly its own astronauts. Future budgets will determine the length of that gap. ■

Additional reporting by Adam Mann and Gwyneth Dickey Zakaib

FUNDING

Canadian research shift makes waves

Agency’s focus on industry-driven projects raises concerns that basic science will suffer.

BY HANNAH HOAG

Canada’s largest research entity has a new focus — and some disaffected scientists. On 1 April, the National Research Council (NRC), made up of more than 20 institutes and programmes with a total annual budget larger than Can\$1 billion (US\$1 billion), switched to a funding strategy that downplays basic research in favour of programmes designed to attract industry partners and generate revenue. Some researchers suggest that the shift is politically driven, because it brings the agency into philosophical alignment with the governing Conservative Party of Canada, which is in the middle of an election campaign.

The change was announced in a memo from NRC president John McDougall on 2 March, and involves the transfer of authority over 20% of the agency’s research funds and the entire Can\$60-million budget for large equipment and building costs to the NRC’s senior executive committee, which will direct it towards research with a focus on economic development, rather than pure science. Until now, individual institutes have had authority over research spending. McDougall wrote that in future, 80% of the research budget will be centralized, with “curiosity and exploratory activities” to be funded by the remaining 20%.

In Canada, most funding for academic researchers flows through agencies other than the NRC. However, with 4,700 scientists, guest researchers, technologists and support staff pursuing specialities from astrophysics to plant biotechnology at its institutes, the NRC plays a vital part in the nation’s scientific community, as a generator of original research and a service provider to government and industry. The shift away from basic science “weakens” the NRC’s labs, because they “are required to bridge two cultures — the basic and applied”, says John Polanyi, a Nobel laureate and a chemist at the University of Toronto.

But in a follow-up memo on 24 March, McDougall said “most ‘researcher directed’ and basic work is now carried out in academic institutions. Duplicating the efforts of universities at NRC doesn’t make much sense.”

Four proposed ‘flagship programmes’ described in the original memo, each with a

marketable outcome, provide a glimpse at the direction the agency has in mind. They include developing a strain of wheat resilient to environmental stress; improving the manufacture of printable electronics; increasing domestic production of biocomposite materials; and using algae to soak up carbon dioxide emissions from industry. NRC researchers have expressed concern that jobs and programmes that do not fit with the new agenda are at risk. The agency declined to comment.

Tom Brzustowski, who studies commercialization of innovation at the University of Ottawa, says that the adjustment to the NRC’s focus will support areas that have been weak. “By focusing on the flagship programmes there is still room to do the whole spectrum of research. It’s a good strategic move,” he says.



“Duplicating the efforts of universities at NRC doesn’t make much sense.”

John McDougall

But the news has rekindled anxiety over how Canada’s government has been directing science funding — criticisms that have grown sharper as the federal election on 2 May approaches. On 22 March, the government presented its 2011 budget, which offered modest increases to the federal research councils, but did not make up for cuts in 2009 (see *Nature* 457, 646; 2009). The budget also included multimillion-dollar investments in neuroscience and physics. Few question the quality of work that such investments would produce, but critics say that the government is exerting too much control over the country’s research, rather than allowing peer review to guide funding.

“It’s risky to divert funds away from the granting councils, but the government does it because it looks politically better for them,” says Robert Dunn, associate director of scientific affairs at the Montreal Neurological Institute. “Peer review is the very best mechanism to ensure that the limited research resources we have are allocated to the best researchers and projects.” ■