CAREERS

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GRANTS

Funder storm

A confluence of budget disappointments has confounded US scientists and left many uncertain about their future.

BY HELEN SHEN

Last May, Heidi Fisher feared that her career as an evolutionary geneticist might be over. Although she was a postdoc in a large, successful lab at Harvard University in Cambridge, Massachusetts, and had numerous publications under her belt, she was struggling to secure a faculty position at a university where she could continue her studies on adaptive mating strategies in deer mice.

Her 2012 application for a K99 grant from the US National Institutes of Health (NIH) in Bethesda, Maryland — funding that would help her to establish an independent lab — scored well by a typical year's standards. But looming spending cuts in 2013 and a highly uncertain financial outlook pushed back the NIH's payline (the score separating grants that will be funded from ones that fall short), bumping Fisher's application into a ballooning 'maybe' category, to be decided on once the agency could fully assess its budget prospects.

After a nail-biting, half-year delay, Fisher heard that she would not receive the grant. Crushed, she considered seeking a job in biotechnology, education, legal services or even art. "I thought, 'If I can't get a grant now, am I going to be struggling like this my whole career?'," she says.

Then, in an unexpected turn of events a month later, she learned that the NIH had found a small amount of extra funding to support her award. She has now been offered a faculty position at a leading US research university.

Such twists and turns have become more common across the United States as a result of drawn-out budget disruptions. First came across-the-board government spending cuts known as sequestration — the result of Congress's failure to agree on a deficit-reduction strategy — which lopped 5% from science agencies' budgets on 1 March 2013. Then, in October, partisan budget battles forced a 16-day government shutdown (see *Nature* **502,** 13–14; 2013) that suspended nearly all federally funded science programmes, with dire consequences for some time-sensitive research.

The outlook has brightened somewhat, however: in January, Congress released a 2014 spending deal that suspended sequestration for two years and slightly boosted the budgets for the US National Science Foundation (NSF) in Arlington, Virginia, and the US Department of Energy (DOE) Office of Science over 2012 levels. The NIH, however, took a US$800-million cut, continuing a ten-year downward trend (see *Nature* **505,** 461–462; 2014).

But some observers worry that last year's trauma will continue to influence the attitudes and decisions of scientists in training for some time. "A graduate student who looks at their principal investigator and sees how much trouble they're having is discouraged from going out into academia and setting up their own lab," says Laurie Glimcher, dean of Weill Cornell Medical College in New York City. "I'm sure we're going to lose some of the next generation of scientists."

GRIM STATISTICS

Sequestration slashed funding for the NIH by $1.55 billion, and grant-application success rates fell to a historic low of 16.8%, according to Sally Rockey, NIH deputy director ▶

for extramural research. In an analysis last month of R-series grants — the most common type of NIH research grant — the American Society for Biochemistry and Molecular Biology in Rockville, Maryland, reported that the agency funded 1,000 fewer people last year, a 4% drop from the previous year: the number dropped by only 150, or 0.5%, between 2011 and 2012. "Not getting funded for one year is not necessarily the end of a career," says the society's president, Jeremy Berg, "but some people are at the end of their rope."

Yuntao Wu, an HIV researcher at George Mason University in Manassas, Virginia, ran out of NIH funding in April 2013 after two failed attempts to renew his R01 grant. He laid off his only technician, and for the past year has been running his lab on about $3,000 per month, scraped together from university funds, industry contributions and a private fundraising campaign. The budget barely covers the cost of keeping his cell cultures alive and conducting a few small experiments, says Wu. He submitted around 14 applications to the NIH last year, and is optimistic that at least one will be successful. But he worries about the lasting impressions of the past year on his graduate students, whose research has slowed to a crawl. "They saw me struggle. They saw the lab really struggle," he says.

BUMPY RIDE

NIH-funded researchers were not alone in suffering the sting of sequestration. At the NSF, 690 fewer grants were awarded in 2013 — down 6% from 2012 — according to a report released by the US Government Accountability Office last month.

The physical sciences have seen some recovery after the initial shock in March 2013. Sequestration had threatened to close or delay construction on several large-scale physics initiatives, including the Alcator C-Mod magnetic fusion experiment at the Massachusetts Institute of Technology in Cambridge (see *Nature* **487,** 420; 2012). But in June 2013, responding to Congress, the DOE shifted some money to sustain the C-Mod and cancel scheduled lay-offs (see *Nature* **498,** 527–528; 2013). The project, together with other physics initiatives, also received modest, life-saving funding boosts as part of the $1.1-trillion 2014 federal spending deal approved by Congress in January (see *Nature* http://doi.org/r73; 2014).

Other big projects, such as the Alaska Volcano Observatory (AVO), have not fared so well (see *Nature* http://doi.org/r74; 2013). Funding for the University of Alaska Fairbanks' part in the volcano-monitoring programme — a collaboration with the US Geological Survey in Reston, Virginia, and the Alaska Division of Geological and Geophysical Surveys in Fairbanks — shrank from $1 million to $513,000, according to Jeff Freymueller, coordinating scientist for the project. And that topped off years of dwindling research budgets, he says. "We're on the verge of losing monitoring capabilities on a couple of volcanoes."

Losing real-time eruption data from the monitoring network has dealt a blow to the next generation of volcanologists, adds Freymueller, as well as threatening aviation safety.

Since the sequester cuts, the university has not been able to replace the outgoing AVO graduate students who had been mining data from the roughly 200 seismic stations for insights into how volcanoes work.

TRAINING TEST

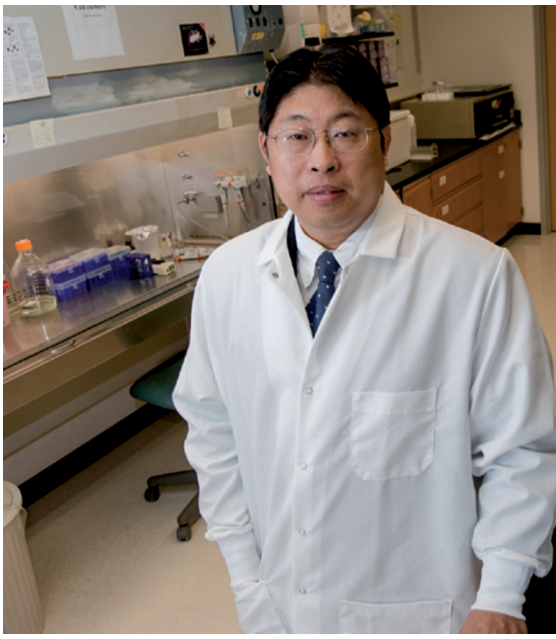
The full effects of sequestration on graduate students and postdocs around the country have been difficult to quantify. There are some regional indications, however: last October, a survey of 230 trainees at the University of California, San Francisco, showed that 71% of graduate students and 78% of postdocs thought that the current budget climate had decreased their desire to pursue research careers in academia. The university's Science Policy Group, the campus organization that designed the survey, hopes to repeat the survey in other universities.

Career-development professionals at several institutions have noticed a few common patterns emerging among young scientists. For example, at the Jefferson Graduate School of Biomedical Sciences in Philadelphia, Pennsylvania, Lisa Kozlowski, associate dean for postdoctoral affairs and recruitment, is counselling more and more postdocs who have been given just a few months to get their affairs in order and leave their labs when their funding runs out.

The turmoil of the past year should serve as a wake-up call for all trainees, says Kozlowski, even for those who escaped the worst effects of the sequestration. She says that too many graduate students and postdocs procrastinate on making long-term career plans, or simply overlook their importance. Advance planning, including professional networking and cultivating leadership skills, are more important than ever in an uncertain funding climate. "Start early, even when you think you're set in the lab and well-funded," she advises.

"If I can't get a grant now, am I going to be struggling like this my whole career?"
Heidi Fisher

Many career-development professionals say that bleak budgets are pushing trainees to look outside of academia. Sibby Anderson-Thompkins, director of postdoctoral affairs at the University of North Carolina at Chapel Hill, saw a particular shift last year in interest towards careers in science communication and science policy. "I think they realize with sequestration that decision-makers often don't understand research and the impact of research," she says.



Yuntao Wu was unable to renew his NIH grant.

EVAN CANTWELL/GEORGE MASON UNIV.

One of those mulling such a move is postdoc Melissa O'Connor of the Medical University of South Carolina in Charleston. Facing tight budgets, her supervisor elected to spend the rest of his R01 grant on collecting data to bolster a future grant application rather than applying to renew his funding. That means that support for O'Connor's work on immune-cell signalling will run out in May.

O'Connor has dabbled in science advocacy, and in October 2012, she was selected for a one-year science-policy fellowship by the American Society for Pharmacology and Experimental Therapeutics in Bethesda. "Whether or not I get a career in that direction," she says of her new-found interest, "it's always going to be something I'm actively involved in."

Soon enough, O'Connor and other young scientist-advocates may find themselves working to deal with a fresh set of budget challenges. As Congress negotiates a federal budget for the 2015 fiscal year, the approaching elections will probably polarize discussions along the same party divides that touched off last year's chaos, notes Jennifer Zeitzer, director of legislative relations at the Federation of American Societies for Experimental Biology in Bethesda. And unless Congress can agree on an alternative plan, sequestration is set to restart in 2016. "It's just a little bit of breathing room before the next round of budget problems," says Zeitzer. ■

Helen Shen *is a freelance writer based in Mountain View, California.*