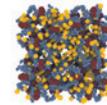


THIS WEEK

EDITORIALS

PUBLISHING Towards greater sharing of computer code **p.536**

WORLD VIEW Scientists must mobilize to track Ebola outbreak **p.537**



OXYGEN Sponge-like powder holds secret to gas storage **p.539**

Pillars of reform

The Chinese government's planned overhaul of its core research-funding system is vital if the country is to achieve its potential on the global scientific stage.

China has come to an unsettling conclusion: the system that it uses to invest in science and technology is broken. The nation's past efforts to become a great innovative state have produced clear signs of success: a flourishing space programme, a dominant global position in genome sequencing and some internationally prominent technology companies. But scratching beneath that surface reveals a creeping suspicion that China is not getting value for the money it diverts into research.

These misgivings seem to have reached crisis point. China today is full of new initiatives, reforms and an anti-corruption drive that together aim to set the nation on the right track. The impact on science is set to be monumental — if China follows it through.

The problems that lead to inefficiency in science are various. Research programmes overlap. Low-quality researchers, often selected more than a decade ago when they were the best that China could get, are now a dead weight in a system that has since managed to acquire much better. And worryingly, earlier this month, the government accused researchers at some of the country's most prestigious universities of misusing research funds (see *Nature* <http://doi.org/wpb;2014>). Shutting down such egregious abusers is a first step, and the ten-year prison terms handed down to two scientists who diverted funds certainly indicate that China is determined to make others think twice before they forge receipts.

The nation is also right to reform how the Chinese Academy of Sciences supports promising research projects. And perhaps most boldly — although the details are still sketchy — the finance and science ministries last week announced a joint effort to completely overhaul the way competitive funding is distributed.

In principle, this could drive improvements in the crucial area of how research and researchers are assessed. Critics have long argued that small grants in China are reviewed strictly, whereas large grants receive little or no review. The large grants, critics charge, are too often decided on the basis of personal connections, not scientific validity. The latest reform aims to stop the science ministry awarding these large grants and will instead distribute them through a new (albeit still vaguely defined) 'five-pillar system'.

The key to China's new system is how it will judge which research is worth pursuing. How can it promote the truly innovative and feasible while suppressing science that is either not original or unfeasible? This is not a new problem. Policy-makers and leaders of the science community worldwide grapple with these questions. The topic was again addressed at a meeting on research assessment and evaluation in Shanghai last week, co-sponsored by *Nature*.

Discussions there ranged from the evaluation of young researchers to the difficulty of balancing societal impact with research that drives innovation. For instance, Nobel-prizewinning biophysicist Kurt Wüthrich argued for focusing less on past achievements and failures, and more on "talented underachievers" — those with great

ideas who just might not have proved themselves yet.

Assessment of research is an especially urgent issue for China as it attempts to leave behind cronyism and an incestuous grant system. It would be too easy to fall back on hyper-quantitative assessment — a system that results in scientists running from one project to the next, trying to join as many as they can to maximize the number of papers and awards that they rack up.

The reform of the Chinese Academy of Sciences is meant to change that. An initiative in translational research, launched earlier this

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month (see page 547), has put recruitment of the best researchers at the centre of its planning — and has arranged an impressive international committee to ensure that happens.

Will the reform of China's core competitive funding system work? It is a promising sign that the National Natural Science Foundation of China, the well-respected body that

distributes the smaller grants, will be one of the five pillars now tasked with broader research assessment.

But what about the other pillars? Will they be the old fragmented divisions of the science ministry with new names, or will they really be streamlined units that are determined to make every renminbi count? How the government acts on that point will largely determine the future of research in China.

In doing so, it will influence the rate at which China's overseas scientists are willing to head back home, and whether foreign scientists will respond to China's attempts to lure them. Such reforms could also help to resolve one of the big questions in modern science: if and when the impact of research in China will surpass that of the United States. ■

Call to action

Time to ramp up science's contribution to controlling the Ebola outbreak.

Science has so far taken a back seat as the Ebola outbreak has continued to spread. Research has deferred to the need to gear up the public-health response. But there is a growing sense that, unless science can somehow now change the game, the outbreak will be difficult to bring under control.

The Ebola virus has killed more than 4,800 people in six countries, and has affected people in another two, the latest being Mali. There are still not enough medical staff and treatment beds to handle the current caseload. The World Health Organization (WHO) projects that