

Turkish science on the brink

Political upheaval is challenging bold plans to become a leading nation in science.

BY ALISON ABBOTT

Ömer Ilday was in a buoyant mood on 15 July last year. He was preparing a press release to promote his latest research, which used super-fast laser bursts to cut away at materials with as little wasted energy as possible.

He was confident of media interest. His technique had exciting applications for industry and medicine — such as reducing burn damage in certain types of surgery. And the paper describing it had just been published in *Nature*¹ — the first in the journal led by a group from Turkey in nearly 25 years.

But that evening Ilday, a materials scientist at Bilkent University in Ankara, started to get alarming text messages from friends: a military coup was under way. In an instant, scientific discovery was swept from the news agenda.

The coup was swiftly suppressed. But Turkish President Recep Tayyip Erdoğan declared a state of emergency that is still in force and has thrown the country's science into turmoil. Thousands of academics have been sacked. The national research agency became so depleted of personnel that it stopped functioning entirely for many months. And Erdoğan, fearful of enemies in places of higher learning, took direct charge of appointing university presidents.

The country was supposed to have been in the middle of a scientific rebirth. Although it had struggled for decades to stem a brain drain, Turkish research funding had taken off since

2005, when the country started negotiations to join the European Union. Research hotspots emerged. Some optimistic young scientists returned home and set up thriving labs. And in 2014, the government announced serious plans to expand research on many fronts.

No one expected progress to be easy. Scientists have long been ill at ease with Turkey's complex politics and its tensions between secular, religious and military forces. But now, faced also with rising rates of terrorism, concerns about Erdoğan's increasing authoritarianism and a currency in free fall, many of the best scientists are wondering whether they should leave the country.

"I think worse will come," says Özgür Akan, a physicist working in neuroscience who decided a few months ago to depart Koç University in Istanbul for the University of Cambridge, UK. "I don't think it will be possible to do high-tech, high-risk research in the next ten years."

Not everyone has abandoned hope — but the mood among scientists is universally nervous.

GLOBAL AMBITION

Sitting in his tidy, light-filled office at the Turkish Council of Higher Education (YÖK) in Ankara, Hasan Mandal says he sees something positive in the instability. "These are challenging times, but turbulence gives us opportunities," says the engineer, who trained and did postdocs in the United Kingdom and Germany. "It is harder to make changes in normal times."



As a deputy president of YÖK, he is one of the architects of the government's research-expansion plans, which include making universities more competitive and creating new research centres and positions (see 'Elevating Turkish science').

The plans emerged from the government's overarching aim for Turkey to become one of the ten largest economies in the world by 2023, the 100th anniversary of the foundation of the Turkish state. (It is now ranked 17th when accounting for purchasing-power parity.) Expanding research capacity on all fronts is integral to that plan, says Hasan.

In Turkey's heavily centralized education system, YÖK controls all the significant decisions of state universities, from the distribution of academic positions between departments to salaries and student numbers. The reforms will inject a degree of flexibility for a select few.

Inspired by Germany's Excellence Initiative and Russia's Project 5-100, Turkey launched competitions between its universities, with the winners getting more funding and positions. Last year, five provincial institutions were selected as 'regional universities' owing to their close connections with local industries and social programmes. And in January, YÖK opened a second competition for another five to earn the title of 'research university' on the basis of their potential to produce internationally competitive research. On top of other spoils, research universities will win the freedom to

OSMAN ORSAL/REUTERS



Demonstrators at Istanbul University react to academic purges last November.

counter the artery-hardening condition atherosclerosis.

A walk through some of Turkey's research hotspots reveals the same energy, enthusiasm and productivity that one sees in top labs anywhere in the world — and they are often as well equipped. But, everywhere, scientists say the political uncertainty is becoming unbearable.

They have been shaken by both the coup attempt and the government's response to it. One immediate consequence was the collapse of the national science and technology agency TÜBİTAK, the country's main research agency funder, which also publishes educational books. Problems had been brewing for a long time: TÜBİTAK had been deeply infiltrated by the religious organization known as the Gülen movement, which is believed to have orchestrated the coup attempt. Over the past few decades, these followers of exiled preacher Fethullah Gülen had established themselves in Turkey's military, judiciary and government offices, as well as in universities.

The Gülenists were political allies of Erdoğan's ruling Justice and Development Party until 2013, when the extent of their clandestine power base became clear. Under the state of emergency after the coup attempt, Erdoğan started to purge suspected Gülenists from public organizations. TÜBİTAK's former president, Yücel Altunbaşak, was jailed in October 2016 for his alleged role in supporting the coup attempt; the agency also lost large numbers of employees, and those who remained seemed afraid to make decisions, with scientists receiving no information at all about grant opportunities or meetings.

SYSTEMATIC BIAS

Scientists generally agree that removing Gülenists from the system was necessary, and not just because of the coup attempt. They have long complained that TÜBİTAK's distribution of money had become skewed and that processes were no longer transparent. Some social scientists say their projects seemed to be rejected for political reasons. Ali Çarkoğlu of Koç University studies electoral systems, and has for years contributed data about Turkey to international collaborations such as the International Social Survey Programme and the Comparative Study of Electoral Systems. When TÜBİTAK rejected his proposals to run surveys during the 2015 and 2016 elections in Turkey, he obtained money from external sources, including the Open Society Foundations in New York City, founded by philanthropist George Soros. "But then critics said I was accepting 'big-capital, Jewish money', insinuating I was part of an international conspiracy," he says.

Chemist Engin Umut Akkaya of Bilkent University, an outspoken government critic, was banned for a year from seeking TÜBİTAK

open new courses and distribute academic positions without seeking YÖK approval. "The status would make a big difference to us," says urologist Haluk Özen, president of the research-strong Hacettepe University in Ankara.

Outside the university system, the government has established the Health Institutes of Turkey (TÜSEB), which will be headquartered in Istanbul and broadly modelled on the US National Institutes of Health. Its six institutes

a future generation of scientists.

The government hopes that these expansive plans will tantalize Turkey's large scientific diaspora. In fact, many Turkish scientists living abroad had been starting to feel optimistic about their home country. Research spending rose more than tenfold between 2000 and 2011. And some private universities, such as Bilkent and Koç, have developed into havens from the bureaucratic excesses of public universities.

"These are challenging times, but turbulence gives us opportunities."

will emphasize translational research and personalized medicine. TÜSEB is creating 300 research positions this year alone, and will have a generous budget for extramural research.

The government is also converting a handful of university institutes into securely funded national research centres, allowing them to manage their own operations and budgets. "I'm particularly happy that we will be able to pay competitive salaries that could be attractive to top scientists from abroad," says molecular biologist Mehmet Öztürk, director of the International Biomedicine and Genome Institute in İzmir (iBG-izmir), one of the four nominated for this elevated status last December. YÖK has also opened 2,000 new PhD positions to ensure

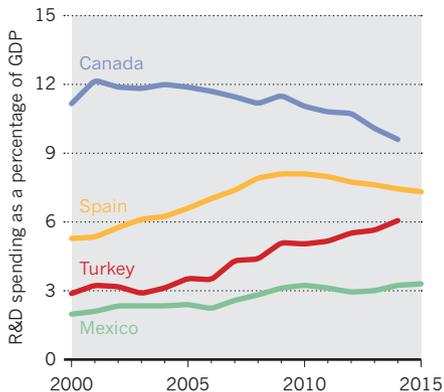
For scientists with large international grants to help them establish and equip their labs, the possibility of an excellent research career in their home country seemed real.

"With such grants, and a supportive university like mine, you have the right conditions to achieve things," says molecular biologist Ebru Erbay, who returned from Harvard University in Cambridge, Massachusetts, to Bilkent in 2010. She has since won grants from both the European Research Council (ERC) and the European Molecular Biology Organization (EMBO), and in the past five months has published papers in both *Science Translational Medicine*² and *Proceedings of the National Academy of Sciences*³ on new mechanisms to

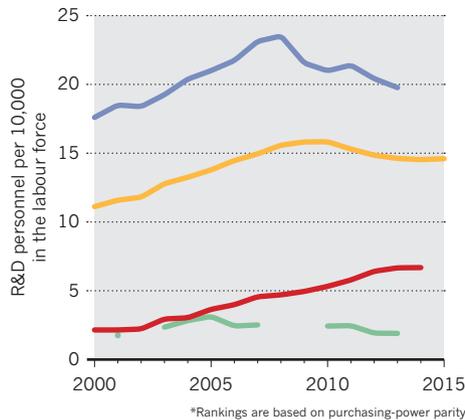
Elevating Turkish science

As part of Turkey's grand plan to be among the top ten world economies by 2023, it has been ramping up its investment in science. With an economy currently ranked 17th by gross domestic product (GDP)*, Turkey has increased its standing in some science metrics relative to Canada (ranked 16), Spain (15) and Mexico (11).

RESEARCH & DEVELOPMENT (R&D) SPENDING



R&D WORKFORCE



funding in November 2014 — ostensibly, for ethical breaches in his reports to the agency, charges that he denied. He took the case to court, which ruled in his favour — two months after the ban was finished. “The situation here makes us feel sad and unfortunate,” he says.

One former member of a TÜBİTAK scientific board, who asked not to be named for fear of retribution, told *Nature* that he resigned in 2015 because the agency had started to replace

who also asked not to be named, was put under official investigation by his university in December, on suspicion of being a sympathizer of the Kurdistan Workers' Party (PKK), which Erdoğan lists as a terrorist organization. His colleagues confirm that he does not support the PKK, and he did not sign the petition. But he did participate in protests against his university's administration a few years ago. He is now nervously waiting to see whether his name is on the

“Every day you just don't know what is going to happen.”

some of the scientists he had recommended for reviewing panels with people he did not know. “There was a slide over the years towards arbitrary rules and decisions behind closed doors — I felt that the administration was interfering with the choices about grants.”

The hobbled agency slowly started to work again last December, although some scientists report that they have heard nothing about applications that they submitted as long ago as spring last year. The long gap in funding has been disruptive, researchers say.

And scientists have been unnerved by the purges at state universities, which they say have swept away innocent colleagues — mostly social scientists — along with the Gülenists. In waves of presidential decrees issued under the state of emergency since last September, more than 7,300 academics from across Turkey have been dismissed from universities. Independent analysts confirm that many of them have no association with the coup — but were known critics of Erdoğan and his policies. Many had simply signed a petition calling for peace between government forces and Kurdish separatists.

No one knows when the waves of dismissals will stop. One social scientist in Istanbul,

next purge list. If convicted, he will lose his job and his pension, and will never be able to work for a public organization again. He may also lose his passport. “I asked them to show me their evidence, but in the state of emergency they do not have to,” he says. “Things are very bleak.”

ATMOSPHERE OF UNREST

In the reigning confusion, the government further upset scientists by removing evolution from a draft high-school curriculum that it published last month. Evolution has been under pressure from Islamists in Turkey for years. In 2009, TÜBİTAK censored a special issue of its own popular-science magazine dedicated to Charles Darwin's centenary. Since then, it has stopped publication of any books that mention evolution, says evolutionary biologist İsmail Sağlam of Hacettepe University and the University of California, Davis. And last year, the Natural History Museum in Ankara removed its permanent exhibition on evolution. “It adds up to a systematic trend,” says Sağlam. “This is not a matter of politics, but of education.”

The atmosphere has frightened off foreign scientists. Nearly all international meetings planned to take place in Turkey in 2017 have

been cancelled, and individual researchers have dropped plans to visit.

Some Turkish scientists, such as Ilday, are not completely fazed by the political atmosphere — they are watching and waiting to see what happens. “I am not personally affected, and I am happy with the way the country supports science,” he says in his spacious, high-tech labs at Bilkent. His ERC grant allows him to do basic research, which he says is liberating, given that large TÜBİTAK grants are available only for applied science.

But even with excellent facilities, Ilday has found that the best students rarely want to stick around. Principal investigators throughout the country routinely report that it is getting ever-harder to recruit PhD students, and almost impossible to hire postdocs. Those who are good enough choose to leave as soon as possible.

“I try to concentrate on my science and my students — but we can't help but be distracted by the general news,” says Güneş Özhan, a developmental biologist at the iBG-izmir. “Every day you just don't know what is going to happen.”

Still, Özhan, who studies brain regeneration in zebrafish, doesn't regret her return home in 2014, after ten years in Germany. The historic Mediterranean city of İzmir makes for pleasant living, and her EMBO Installation grant, along with funds from other sources, gives her as much money as she needs. It has allowed her to build a state-of-the-art zebrafish facility that is better than the one she enjoyed at the Max Planck Institute of Molecular Cell Biology and Genetics in Dresden. She even has a social room where students can sleep when they do overnight experiments. And the iBG-izmir's new status as a national research centre will make things more sustainable, she says.

“But it's getting a bit hard to survive,” she admits. Her colleague Yongsoo Park, a South Korean who researches neurotransmission, expresses the same ambivalence. “The research facilities are fine — and, wow, it's so great here that I can go with the kids to the sea every weekend.” But fears linger. His family speaks very little Turkish and he constantly worries about their safety.

“The state of emergency has not served science well,” says Gokhan Hotamisligil, a geneticist at Harvard who closely follows developments in science in his homeland and hosts monthly scientific colloquia for the local Turkish diaspora. These meetings regularly attract more than 100 attendees. “The country has made wonderful investments in science — now the government needs to do more to signal that it has not forgotten about it.” ■ [SEE EDITORIAL P.271](#)

Alison Abbott is *Nature's* senior European correspondent.

1. Kerse, C. *et al. Nature* **537**, 84–88 (2016).
2. Çimen, I. *et al. Sci. Transl. Med.* **8**, 353ra126 (2016).
3. Tufanlı, O. *et al. Proc. Natl Acad. Sci. USA* <http://dx.doi.org/10.1073/pnas.1621188114> (2017).