Science, politics and ideologies

Global political developments towards isolationism, ideology or disregard of facts have scientists concerned about the free exchange of ideas and people

Philip Hunter

Since his inauguration as President of the USA in January 2017, Donald Trump has ushered in various measures that are widely perceived as anti-science, such as the infamous travel ban on people arriving from seven Muslim countries. At the same time Brexit, the UK's impending departure from the EU, has begun to worry scientists across the continent and beyond over the potential impact on research. Other events, such as turmoil in the Middle East and the continuing threat of terrorism, have also contributed to a negative mood. There have been some positive developments too, such as the election of Emmanuel Macron as president of France with his pro-science rhetoric and his promise to act as a counterweight to the USA with the "Make Our Planet Great Again" competition. It could also be argued that one country's loss is another's gain: Canada, for example, has been attracting more graduate-student applicants at the expense of the USA since Trump's election (<https://www.insidehighered.com/news/2017/03/20/canadian-universities-post-large-gains-international-applications>).

The impact of international mobility

However, such gains may be illusory in a global context, as science as a whole suffers whenever there is any friction over travel, collaboration and exchange of information, especially when it affects the USA as the world's leading power in research. So far, firm evidence on how collaboration and mobility affects science has been lacking, but Brexit and Trump's election in particular have galvanized new efforts to gain more solid data. The US National Science Foundation (NSF), in collaboration with the Spanish Ministry for Economy and Competitiveness,

analysed the impact of mobility on a more clearly defined basis [1]. Not surprisingly, their study showed strong correlations between mobility, collaboration and scientific impact. The study was careful to avoid equating impact factor with quality of research and took account of other factors, such as influence, by mapping mobility to productivity. The analysis was based on 14 million research papers from nearly 16 individuals who published between 2008 and 2015, 96% of whom had only one country of affiliation—which was not always their country of birth. This left 4% or just 595,000 researchers who were defined as mobile, because they had two or more affiliations during that period. Everywhere in the world, those scientists had a greater impact than the larger number who stayed in their countries of academic affiliation.

... science as a whole suffers whenever there is any friction over travel, collaboration and exchange of information ...

During this study period, North America was attracting scientists from all over the world, enjoying almost a 50% net gain in researchers, while Europe lost 22% and Asia 20%. This disparity also showed up in terms of impact; even countries that experienced net losses could reap benefits from international collaborations that often involved scientists who had left. Yet, the mobility picture is more nuanced than that, commented structural biologist Venkatarman Ramakrishnan, President of the UK Royal Society and Nobel laureate in Chemistry, who noted that countries can benefit even without attracting people directly.

"Science benefits from a rapid exchange of ideas and new approaches, which are catalysed by mobility", he said. "Even countries like Japan or China, that have very few immigrants, have benefited by many of their young scientists going abroad and bringing back new ideas and expertise".

"Countries that closed themselves off to people and ideas in the past did not thrive scientifically."

The negative corollary is that science suffers in countries that shut themselves off from the world. "Countries that closed themselves off to people and ideas in the past did not thrive scientifically", Ramakrishnan added, noting the classic example of biology in the old Soviet Union under Stalin. The appointment of Trofim Lysenko as Director of the Institute of Genetics within the USSR's Academy of Sciences in 1940 allowed him to promote his pseudo-scientific ideas over inherited characteristics—that became known as Lysenkoism—at the expense of thousands of scientists who insisted on promoting the by then prevailing Mendelian genetics. Scientific dissent from Lysenko's theories of environmentally acquired inheritance was formally outlawed in the Soviet Union in 1948. Several scientists were sentenced to death as enemies of the state, including the botanist Nikolai Vavilov; many others were persecuted and imprisoned.

Science and politics under President Trump

Some US scientists are concerned that a similar culture immune to evidence is now

flourishing under President Trump, with consequences for the course of research as well as individual careers and projects. “The Trump Administration’s stance on climate change is alarming, but not as alarming as its total disregard for facts”, commented Kathy Jacobs, Director of the Centre for Climate Adaptation Science and Solutions at the University of Arizona. She is backed up by Ken Caldeira, a climate scientist at the Carnegie Institution for Science, who specializes in ocean acidification and impact of the carbon cycle. “Trump not only assaults science, but also assaults the very idea that we can agree on broadly shared empirical facts”, he said. “He assaults the idea that we should favour well-informed expertise over ideologically-driven idiocy”. The negative sentiments associated with Trump had made it harder to attract post-docs, he added.

The only consolidation is that the US Constitution circumscribes the President’s power with various checks and balances. “Although science will receive no respect or attention from the current administration, science funding is largely in the control of Congress”, explained Randy Schekman, HHMI (Howard Hughes Medical Institute) Investigator at the University of California, Berkeley, and Nobel laureate in Physiology or Medicine. “And here, at least for biomedical science, we enjoy bipartisan support for a continued investment in health research funded by the NIH. In spite of Trump administration budget proposals that call for substantial cuts in the funding of biomedical science, Congress has gone in the opposite direction with additions to the NIH budget”. Schekman conceded though that the physical sciences, especially in energy and the environment, had fared worse and suffered funding cuts. “There, the current Republican control of Congress aligns more closely to the uninformed opinions of the executive administration”, he said. “So we must look to the rest of the world to continue the effort to rescue our environment and future generations from the inexorable changes wrought by climate change”.

Schekman also noted a general lack of respect for science expressed by the Trump administration, reflected in various ways: “For the first time in decades, the 2017 American Nobel laureates were not invited to be greeted by the President, an annual custom that I can say was one of the great thrills of my life—to be greeted by President

Obama, a man with a deep appreciation of science, not only for the role it has in the advancement of society, but because of the intrinsic importance of a thirst for human understanding”.

Rather more seriously, this lack of attention to science is also reflected in the fact that the Trump administration has not appointed a science advisor more than 1 year after taking office. However, Jacobs suggested with a hint of irony that this might be a blessing in disguise. “It may be a good thing that the Trump Administration has not named a science advisor, since it is unlikely that the administration would select someone who is well trained, effective and credible”, she said. “The effect of the Trump Administration on both federal and extramural research has already been alarming, not just because of budget cuts, but because of the chilling effect on the efforts of federal scientists and program managers. The changes so far have seriously affected the US role in the global science community”.

International solidarity

Although Trump may only be in power for 4 years, his legacy, or rather the shadow he has cast, will endure longer than that, argued Magnus Nordborg, Scientific Director of the Gregor Mendel Institute (GMI) in Vienna, Austria: “The effects on US science will take years to manifest themselves fully”. GMI was one of various institutions that offered shelter for scientists from Muslim countries subject to the travel bans who were temporarily stranded with nowhere to go or work. This was quickly resolved when US courts blocked the ban, but it left a sour aftertaste.

The travel ban did though have a positive aspect in brewing solidarity within the scientific community and a determination among researchers to unite, according to Maria Leptin, Director of the European Molecular Biology Organization EMBO (EMBO) in Heidelberg, Germany. EMBO created the “Science Solidarity” list, a forum to bring together scientists stranded by the travel ban with institutions or laboratories willing to accommodate them. Although in the end it was not needed at the time, the enterprise demonstrated the immense solidarity among the scientific communities, with researchers from all over the world volunteering to host colleagues unable to enter the USA. “It showed everyone that scientists display

solidarity and help each other in these situations”, Leptin said. “It does seem like it matters fantastically that people know they are not alone”.

The move has left a positive legacy, according to Jürgen Kleine-Vehn from the Universität für Bodenkultur in Wien in Austria, who also offered laboratory space as part of the scheme. “Thanks to EMBO, the community got a forum and it was just beautiful to see that scientists stand together”, he recalled. “After we got EMBO to step in, it was obviously more than just offering temporal laboratory space to some stranded scientists, it became also an open political statement”.

Erdogan’s Turkey

Yet, the USA is not the only country that causes concerns over its policies. As Nordborg pointed out, other countries have also embraced policies that could ultimately hurt science. A notable example is Turkey under the regime of Recep Erdoğan, which, in July 2017, banned teaching of evolution in school curricula. Although this did not directly compromise research itself, it reflects the government’s increasingly religious and nationalist attitude since Erdoğan became prime minister in 2003 and then president in August 2014. His Justice and Development Party (AKP) comes from a conservative tradition aligned with the country’s past as the hub of the Ottoman Empire and a strong Islamic identity. The Erdoğan administration became increasingly hard line, and the Scientific and Technological Research Council of Turkey (TÜBİTAK) has been criticized for taking an anti-evolutionary stance itself since the AKP’s hold on power strengthened through the new Millennium.

Yet, Erdoğan presided over a strong economic recovery after a crash in 2001 that came with growing spending on R&D from 3% of GDP in 2001 to more than 6% now. As a result, the country’s scientific output began to increase by almost all measures (<https://www.elsevier.com/connect/turkeys-scientific-research-output-is-booming-but-what-about-the-quality>). The same study ranks Turkey number 18 in the world for research output in 2013, and number 4 for growth behind China, India and Brazil. The study also found that Turkey was producing proportionally more high-quality papers than China and India, particularly in medicine.

Hopes and expectations were raised further in October 2015 when Turkey opened the Izmir Biomedicine and Genome Centre (IBG) as a major biotech hub comparable to large research facilities in Europe and the USA. This was lauded by many leading scientists, including Tim Hunt, now Director of research at the Okinawa Institute of Science and Technology in Japan and Nobel laureate in Physiology or Medicine. He described the IBG as a “fantastic opportunity” for talented Turkish scientists to return to their country to a well-equipped and well-funded laboratory.

But then the roof fell in with the failed coup d'état of July 2016, which was followed by a draconian crackdown on, and sacking of, many academics deemed to have been associated or sympathetic with the short-lived uprising. Turkish scientists were banned from leaving the country and those abroad were ordered back. As a result, Hunt's optimism evaporated, although he still cautioned observers over judging events there from afar. “As I get older I realize that most of what one hears from distant lands is propaganda of one sort or another from winners and losers alike”, he said. “Achieving a balanced view is far from straightforward”.

“There is no doubt that the international status of Turkish science has suffered since 2016...”

There is no doubt that the international status of Turkish science has suffered since 2016, reflected, for example, by cancellation or relocation of international events and conferences that had been planned to be held there. Even that though can be interpreted in different ways, according to Mehmet Ozturk, Director of the IBG. “There are many reasons affecting negatively the attraction of Turkey for major international conferences and events”, he said. “But the major factor is terrorism. In the past, Turkish cities were attacked more often than European cities which aggravated the situation. But now, thank God, there is a relative calm all around the world. I think this will have a positive effect on scientific tourism”.

Ozturk also emphasized the desire of many Turkish scientists for their country to be successful despite the negative forces and

argued research in the country has always had to cope with instability and regional conflicts. He ducked somewhat the question about teaching evolution by pointing out that various US schools had banned teaching of Darwinism at various times, without confirming that this was not official government policy.

“Hardly any scientists argue that Brexit is positive for UK research at any rate, but opinions are more divided over whether the damage will be temporary or sustained over the longer term.”

Gunes Ozhan, Associate Professor and Group Leader at the IBG, returned to the country from Germany in 2014 before the failed coup. He agreed that negative publicity had been a problem since 2016, but also stressed how supportive many expat Turkish scientists still were of the country. “Despite the negative publicity and the atmosphere that can get tensed up rapidly nowadays, Turkish scientists working abroad want to come back to Turkey intensely”, he said. “A general relief in the political atmosphere would help these people to consider this option in a more positive manner”.

Ozhan indicated he had been working hard to maintain Turkey's international standing in science and had succeeded in organizing some events: “As an individual, I managed to organize three international workshops, two funded by the British Council-TUBİTAK Newton-Katip Celebi Fund in 2016 and 2017 and one funded by ICgeb (International Centre for Genetic Engineering and Biotechnology). The last two were organized after the failed coup attempt”. Ozhan issued a plea to the international science community to rise above geopolitical factors and maintain or re-establish links with Turkish researchers.

Mitigating Brexit

Similar sentiments have been expressed in the different context of Brexit, which, although not anti-science itself, has a disruptive effect on many cross-border collaborative research programmes in Europe. UK academic institutions had done particularly

well at attracting grants from EU bodies, especially the European Research Council (ERC), and many had leadership roles in Europe-wide collaborations, which they may now lose. Hardly any scientists argue that Brexit is positive for UK research at any rate, but opinions are more divided over whether the damage will be temporary or sustained over the longer term.

In the short term, anecdotal evidence of negative impacts is widespread; Nordborg, for example, explained that his laboratory had job applicants from Britain who specifically cited Brexit as a reason for leaving the UK. Ramakrishnan, however, suggested that, when it comes to science, there is common understanding that there are mutual interests in maintaining the present arrangements as closely as possible. “The science community in the UK benefited from EU membership and was strongly in favour of remain, and the current uncertainty naturally creates a certain anxiety”, he explained. “But while people are anxious currently, there is considerable goodwill on both sides to continue interactions”.

“Shekman cites Brexit not so much as a direct impediment to science, but as an example of a new nativism that impedes free exchange of ideas.”

Ramakrishnan was also reassured by the UK government's announcement on 8th December 2017 that EU citizens living in the country can stay after Brexit in 2019, which was a central demand of the country's scientific community. Such factors lead many, including Leptin, to conclude that Brexit will just be a blip for UK science rather than a lasting blow. “Graduate students and post-docs say they have seen a decline since the Brexit vote, but I bet that's only transient and when people get used to the idea they'll look for the laboratory they really want and find a way of going there”, Leptin commented.

While the science community's response to Brexit may be one of damage limitation with few if any obvious upsides, at least that exercise may succeed. But there are also concerns that other, global developments may impose direct or indirect friction. Shekman cites Brexit not so much as a direct

impediment to science, but as an example of a new nativism that impedes free exchange of ideas. Similarly, Jacobs reckoned that recent geopolitical events are dangerous and counterproductive to progress generally. “There are ripple effects across the globe associated with the consolidation of power and wealth”, she said. “This can’t be good for long-term global political stability”.

Yet, recent events in the USA, the UK and Turkey have also highlighted a common will among scientists to cooperate and to mitigate the impact of restrictions on the trade of ideas. This is absolutely essential, noted Roger Guillemin, who won the US National Medal of Science in 1976, and the Nobel prize for medicine or physiology the following year. “I am still in favour of

collaboration between scientists and thinkers regardless of geopolitical borders”, he concluded.

Reference

1. Sugimoto CR, Robinson-Garcia N, Murray DS, Yegros-Yegros A, Costas R, Larivière V (2017) Scientists have most impact when they're free to move. *Nature* 550: 29–31