

News in focus

Hogan lost a graduate student, Amir Saeedinia, who was travelling from Iran to begin his PhD in Hogan's lab. "He worked very hard to create this opportunity for himself. This was just a start for him in Canada – he was coming to join the group today."

On 9 January, the university identified seven other community members who were listed as passengers. They include Arash Pourzarabi and Pouneh Gorji, graduate students in computer science who were returning to Canada after their wedding in Iran. Turpin said that university flags would be lowered to half mast to remember the victims, and a memorial service would be held.

'We are all heartbroken'

Peyman Servati, an electrical engineer at the University of British Columbia in Vancouver, said on Twitter that he was "so so devastated" by the deaths of Mousavi, Daneshmand and their daughters – his "smart and kind friends".

The University of Toronto announced that flags at its three campuses would fly at half mast in memory of at least six students who were expected to have been on the plane. "We are all heartbroken," university president Meric Gertler said in a statement.

At least five University of Windsor community members were also listed as passengers, the Ontario university said in a statement. They included Hamidreza Setareh Kokab, who had begun studying for a PhD in mechanical engineering last January in Jill Urbanic's lab. "He would have been successful in both academia and industry. We lost a bright light," says Urbanic. Kokab's wife Samira Bashiri, a biology research assistant, also died on the flight.

At Western University in London, Ontario, about 250 people gathered on 8 January to remember 4 students who were killed in the crash. And the University of Waterloo confirmed that two of its students had died.

Flags at the University of Guelph were lowered to mourn for two university graduate students: Ghanimat Azhdari of the Department of Geography, Environment and Geomatics, and Milad Ghasemi Ariani of the Department of Marketing and Consumer Studies.

"Milad had just started his PhD with us in the fall, so much hope, gone," said Statia Elliot, a marketing academic at the University of Guelph, on Twitter. "My heart goes out to family and friends."

Faisal Moola, an ecologist at the University of Guelph, said that it had been an "awful 48 hours for our students and faculty". "Ghanimat was such a proud member of the Qashqai Indigenous tribe in Iran and spoke with such love for her people and her ancestral territories," he wrote on Facebook. "She was a powerful and passionate young leader in defence of Indigenous Peoples across the planet and her life's work continues."



SIGRID GOMBERT/CULTURA/SPL

Chinese scientists are encouraged to study abroad and then return home.

CHINESE ACADEMICS WHO WORK ABROAD ARE SLOWER TO WIN HONOUR

Local networks help to speed researchers to highly prestigious Changjiang scholarship.

By Hepeng Jia

Does working in a foreign country enhance the career of a Chinese scientist? For years, China has been encouraging researchers to study abroad and then bring their expertise home. But a study finds that returnees take longer than peers who remained in China to win one of the country's highest scientific honours.

Of the roughly 1,500 Chinese nationals awarded a Changjiang scholarship in the sciences between 1999 and 2015, those who received a PhD from a foreign university had held their doctorate for 25% longer – about an extra 2.3 years – when they won the scholarship than those who earned their PhD in China. That's the finding of a study led by Tang Li, a public-policy researcher at Fudan University in Shanghai, China.

The prestigious Changjiang scholarship is awarded by the Chinese Ministry of Education. It comes with a yearly stipend of 200,000 yuan (US\$29,000) and is seen as more important than a salary or even individual professorships in terms of conferring respect among peers and indicating scientific achievement.

International mobility has been shown to boost scientists' skills and networks and, once academics return to their homelands, to

increase the country's international expertise and exposure to global research practices. Institutions need to better recognize the benefits of international training and reward it, Tang says. But the results of the study, published last year, suggest that the advantages of overseas training might not be well recognized (F. Li and L. Tang *Sci. Public Policy* **46**, 518–529; 2019). The researchers also report that local connections help academics obtain

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the honour faster, and that this could explain why returnees are at a disadvantage.

Over the past decade, numerous national recruitment programmes have attracted Chinese-born academics back to the country from foreign institutions, often with promises of higher salaries and research funding. The best known, the Thousand Talents Plan, has come under scrutiny in the United States in the past year for potentially being a threat to US research and intellectual property. Academics returning to China from leading international

universities are promised relocation packages of up to one million yuan, as well as top salaries and millions in research grants. To learn more about the impact of working abroad, Tang and her colleague Li Feng at Hohai University in Nanjing, China, decided to review the career trajectories of 1,447 Changjiang scholars. About one-third held PhDs from overseas universities, and about half had short-term overseas experience.

The average time between graduating with a PhD and becoming a Changjiang scholar is 10.3 years, Tang and Feng report. But it took researchers with any type of overseas experience longer to receive the honour than it took those with no international experience. Even Chinese scholars who left the country temporarily to be visiting scholars at international institutions waited 12% longer (about a year extra) for the title than did peers who remained in China.

The researchers controlled for factors that could influence the timing of the award, such as gender, research field, where academics trained overseas and the status of the academic's university when they received the award.

In the second part of the study, the researchers examined the Changjiang scholars' networks. They found that academics with strong local connections – measured as having obtained a bachelor's degree and PhD at the same institution in which they work – were faster to obtain the title. Scholars working at their alma mater received the honour, on average, about 2 to 8 months faster than did those working at a different university.

Tang suggests that because award recipients are nominated by their university, researchers who have spent their academic career in China might be more likely to be nominated – and more familiar to the reviewers – than are academics who have been out of China for years.

Dong Jielin, a guest researcher in science policy at Tsinghua University in Beijing, says that the results support the belief among some that China has an unhealthy academic environment that rewards personal connections over skills and experience. Efforts to reform this culture are needed, she says.

But Cao Cong, a science-policy researcher at the University of Nottingham Ningbo China, has another theory. He suggests that in the past, researchers with overseas training might have been slower to obtain the award because they were not as academically competitive as the best locally trained scientists. Before programmes such as Thousand Talents, many overseas-trained PhD graduates preferred to apply for foreign faculty positions, and so academics who returned to China might have done so because they couldn't secure an overseas position, he says.

Cao suggests that a future study should examine overseas-trained scientists who have returned more recently, to see whether the study's conclusion still holds.

SPACEX TESTS BLACK SATELLITE TO REDUCE REFLECTIVITY

'DarkSat' prototype could help to address 'megaconstellation' threat to astronomy.

By Alexandra Witze in Honolulu, Hawaii

The SpaceX company launched 60 of its Starlink broadband Internet satellites into orbit on 6 January – including one, called DarkSat, that is partially painted black. The probe is testing one strategy to reduce the brightness of satellite 'megaconstellations', which scientists fear could interfere with astronomical observations.

Various companies plan to launch thousands of Internet satellites in the coming years; SpaceX, of Hawthorne, California, aims to launch 24 batches of Starlinks this year. By the mid-2020s, thousands to tens of thousands of new satellites could be soaring overhead. Bright streaks caused by light reflecting off them could degrade astronomical images.

"I was complaining to my wife that I can't sleep very well these days because of this," says Tony Tyson, a physicist at the University of California, Davis, and chief scientist of the Vera C. Rubin Observatory, a major US telescope under construction in Chile.

Astronomers discussed the potential impact of the satellites on various telescopes, and what could be done about the problem, on 8 January at a meeting of the American Astronomical Society in Honolulu, Hawaii. "2020 is the window to figure out what makes a difference in reducing the impact," says Jeffrey Hall, director of Lowell Observatory in Flagstaff,

Arizona, and chair of the society's committee on light pollution.

"SpaceX is absolutely committed to finding a way forward so our Starlink project doesn't impede the value of the research you all are undertaking," Patricia Cooper, SpaceX's vice-president for satellite government affairs, told a session at the astronomy meeting.

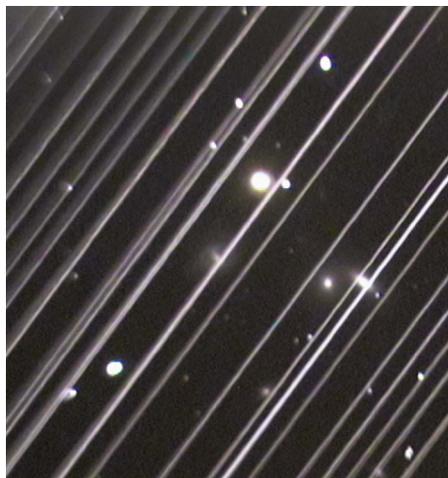
Three batches of Starlinks have been launched, totalling about 180 satellites so far. They are most obvious in the night sky immediately after launch, before they boost their orbits to higher altitudes where they are farther away and look dimmer. It's not yet clear how significant a problem Starlinks will be for astronomy, although scientists have complained about trails in their images.

Many astronomers panicked in June, soon after SpaceX launched the first batch of 60 Starlinks and telescopes began photographing their trails. Their brightness came as a surprise, says Patrick Seitzer, an astronomer at the University of Michigan in Ann Arbor. "The new megaconstellations coming online have the potential to be brighter than 99% of everything else in Earth orbit, and that's where the concern comes from," he says.

Several factors contribute to the puzzling brightness, astronomers reported at the meeting. SpaceX says the position of the solar panels might have something to do with it: at lower elevations, before the orbit boost, the satellites' panels are positioned like an open book to reduce drag. That temporary orientation could make them reflect more sunlight. The speed at which a satellite moves across a telescope's field of view is also important – the more slowly it moves, the more brightness accumulates per pixel of imagery.

There are no regulations that control how bright or dim a satellite needs to be, notes Ralph Gaume, director of the astronomical-sciences division of the US National Science Foundation in Alexandria, Virginia.

Calculations suggest that the Starlink trails will interfere with astronomy most significantly during the hours surrounding twilight and dawn. That's a particular problem for observations that need to be made during twilight, such as searches for some near-Earth asteroids. And on short summer nights, the satellite trails could be visible all night long.



The diagonal lines in this image show light reflected from SpaceX's Starlink satellites.