

► disease or harm ecosystems. In another contribution to the conference, Maselko's colleague Siba Das, also at the University of Minnesota, presented a mathematical model showing how synthetic speciation could combat invasive carp, which have ravaged rivers and lakes in Minnesota and other central US states.

However, the genetic modifications that stop interbreeding — the poison and antidote

— could carry a steep evolutionary fitness cost, says Omar Akbari, a molecular biologist at the University of California, San Diego. The Cas9 enzyme doesn't always recognize its intended gene and could crank up the activity of other genes. Such 'off-target effects' could sap the health of modified organisms. "I'm not sure if this is going to generate a fit-enough strain to compete in the wild," Akbari says.

Gould agrees that it will be difficult to

engineer reproductive barriers without incurring evolutionary costs. Scientists could potentially overcome this obstacle by releasing large numbers of modified organisms to increase the odds that a synthetic species will overtake wild organisms. Still, Gould — who is working on other genetic approaches to combating pests — is enthusiastic to see another technology. "I would never want to put all my eggs in one basket," he says. ■

MACHINE LEARNING

Chinese firms enter the battle for AI talent

Country's ambition to become global leader in artificial intelligence needs large workforce.

BY DAVID CYRANOSKI

A mountainous district in western Beijing known for its temples and mushroom production is tipped to become China's hub for industries based on artificial intelligence (AI). Earlier this month, the Chinese government announced that it will spend 13.8 billion yuan (US\$2.1 billion) on an AI industrial park — the first major investment in its plan to become a world leader in the field by 2030.

But scientists there wonder whether the proposed 55-hectare AI park, in the Mentougou district 30 kilometres away from the city centre, will be able to attract enough researchers. The government wants it to house 400 companies that will make an estimated 50 billion yuan per year developing products and services in

cloud computing, big data, biorecognition and deep learning. "I don't see any top talent willing to go to work and live there," says a scientist working at an AI start-up in Beijing, who asked to remain anonymous because the government is sensitive to criticism.

Sourcing accomplished AI researchers is a problem that's confronting AI-related companies and research centres around the world. "The future [of AI] is going to be a battle for data and for talent," says David Wipf, lead researcher at Microsoft Research in Beijing.

TALENT GRAB

Chinese AI companies are progressing at a dizzying pace. At least five companies developing facial recognition technologies — including SenseTime and Face++, both based in Beijing

— pulled in more than \$1 billion from investors in 2017. But many AI companies there are struggling to hire researchers. In 2016, the information-technology ministry estimated the country needed an additional 5 million AI workers to meet the industry's needs.

The global pool of experienced AI talent is small. Chinese businesses also have to compete with the aggressive hiring techniques of multinational players such as Google, which some fear are draining universities of researchers by tempting them with high salaries. "It's a talent war — whoever makes the best offer wins," says Nick Zhang, president of the Wuzhen Institute, an AI think tank. He knows of experienced people getting salary offers of \$1 million or more to work at the AI research centres of Chinese social-media giant Tencent or the web-services firm Baidu. "This was unimaginable five years ago," he says.

Accomplished industry veterans might be scarce in China, but the country is rich in bright, hard-working computer-science graduates who have expertise in machine learning and other AI-related fields. Peking University in Beijing established the country's first undergraduate course in AI in 2004, and since then 30 universities have introduced similar courses.

But universities are struggling to meet industry's demands, especially because many of the best graduates leave the country. Young Chinese researchers populate AI laboratories from the United States to Israel. At a December 2017 workshop held at New York University (NYU) Shanghai, called Future Leaders of AI Retreat, almost all of the attendees were Chinese researchers working at US universities or industrial laboratories. Zhang Zheng, an AI researcher at NYU Shanghai who organized the retreat, says that he often



Zhang Yong, head of Chinese tech giant Alibaba, introduces the company's AI, called ET Brain, in 2017.

DANA BERRY/NASA

writes letters of recommendation for Chinese students to study in the United States. “The hope is for them to return later on in their career trajectories,” he says.

There’s also stiff competition for AI researchers within China. Most of the country’s leading AI scientists go to work in industry rather than in academia, says Zhang Zheng. Wipf says that Microsoft set up in Beijing partly to hire the best graduates coming out of nearby Peking and Tsinghua universities, the nation’s premier higher-education institutions.

Last month, Google also established its own AI research centre in Beijing to attract these prodigies. Zhang Zheng says it’s good for the Chinese AI community that international companies are setting up there, because US companies such as Google and Facebook do more fundamental research than local tech giants, he says. “China is lacking top talent, and [working at China-based foreign research hubs] is a way to train them.”

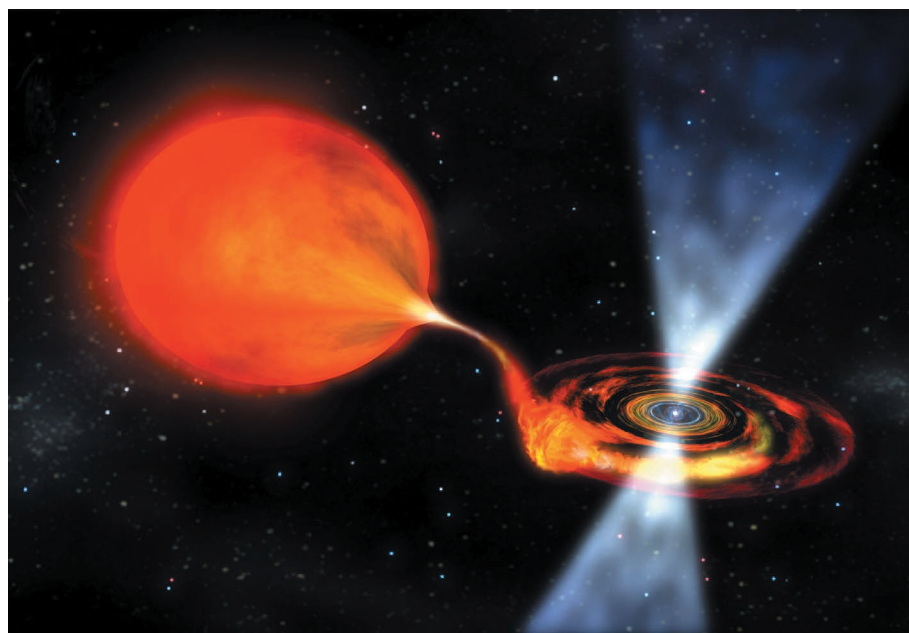
AI TRAINING

The Chinese government realizes that it needs to train and retain more AI graduates if it is to become the world leader in the field by 2030. Its AI road map, released by the Communist Party’s powerful State Council last July, calls for increased education in AI at primary and middle schools.

Online AI training courses are also becoming popular. “The enthusiasm for learning AI is very high,” says Zhang Jiang, who teaches AI at Beijing Normal University’s School of Systems Science.

The country still trails behind the United States in most AI indicators, such as private investment and number of patents, according to figures from the Wuzhen Institute. Nick Zhang says that gap is closing fast, especially in applications such as computer vision.

There’s greater uncertainty about whether China will be able to achieve pioneering breakthroughs in the next decade. “There is still a very big gap before China can lead the competition, because it lacks fundamental innovations,” says Zhang Jiang. “China is still a good learner, but not a good innovator.” ■ [SEE EDITORIAL P.249](#)



A pulsar (artist’s impression) gives off beams of radiation as it sucks matter from a companion star.

SPACE SCIENCE

Pulsars can function as a celestial GPS

Experiment shows how spacecraft could use stellar signals to navigate in deep space without human instruction.

BY ALEXANDRA WITZE

From its perch aboard the International Space Station, a NASA experiment has shown how future missions might navigate their way through deep space. Spacecraft could triangulate their location, in a sort of celestial Global Positioning System (GPS), using the regular, rhythmic signals from distant dead stars.

Last November, the Neutron Star Interior Composition Explorer (NICER) spent a day and a half looking at a handful of pulsars — rapidly spinning stellar remnants that give off beams of powerful radiation as they rotate. By

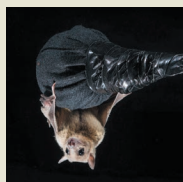
measuring tiny changes in the arrival times of the pulses, NICER could pinpoint its location to within 5 kilometres.

It is the first demonstration in space of the long-sought technology known as pulsar navigation. One day, the method could help spacecraft steer themselves without regular instructions from Earth.

“We think it’s a big deal,” said Keith Gendreau, an astrophysicist at NASA’s Goddard Space Flight Center in Greenbelt, Maryland, and the mission’s principal investigator. “It’s a great way to apply some of our astrophysics to exploration goals that include going into the outer Solar System and beyond.” ▶


MORE ONLINE

TOP NEWS



‘Bat-nav’ reveals how the brain tracks other animals
[go.nature.com/2mcoai](#)

MORE NEWS

- University of Rochester president resigns as sexual-harassment probe ends
[go.nature.com/2dbttpg](#)
- Latest science search engine links papers to grants and patents
[go.nature.com/2rdn7sx](#)

NATURE PODCAST



Pinning down the climate’s carbon-dioxide sensitivity, and the battle over babies’ first bacteria
[nature.com/nature/podcast](#)

WEIZMANN INST. OF SCIENCE