DREW ANGERER/GETTY

Many people are pushing for legislation that would give US 'Dreamers' a path to citizenship.

investments in their future, to go to college and medical school," says Roberto Gonzales at Harvard University in Cambridge, Massachusetts, who studies how immigration policies affect the lives of undocumented US immigrants. "Now, that's been thrown into peril."

DACA helped engineering student Josue De Luna Navarro to attend the University of New Mexico in Albuquerque. But he fears that the programme could end. "I remember sitting in a chemical-engineering class trying to calculate a molecule moving through a membrane," he says. "How can I focus on something like that when there's a huge terror in my family and my community about deportation?"

Trump and the US Congress are attempting to negotiate legislation to overhaul US immigration policies — which could end DACA, or shore up the programme. On 11 January, a group of six Democratic and Republican senators announced a compromise that would give DACA recipients a path to citizenship while bolstering border security, but Trump rejected the plan. He has argued that Obama lacked the authority to establish the DACA programme.

Ongoing court cases might determine DACA's short-term future, but its ultimate fate lies with Congress, says Michael Olivas, director of the Institute for Higher Education Law and Governance at the University of Houston in Texas. "This is not a legal issue," he says. "Comprehensive immigration reform, or at least a DACA bill without a bunch of other things attached to it, is the answer." ■

GENETICS

Synthetic species can elude gene mixing

Engineered organisms cannot breed with wild cousins.

BY EWEN CALLAWAY

Maciej Maselko has made wild sex deadly — for genetically modified organisms. The synthetic biologist at the University of Minnesota, Twin Cities, in St Paul and his colleagues have used gene-editing tools to create genetically modified yeasts that cannot breed successfully with their wild counterparts. In so doing, they say they have engineered synthetic species.

"We want something that's going to be identical to the original in every way, except it's just genetically incompatible," says Maselko, who presented his work on 16 January at the annual Plant and Animal Genome Conference in San Diego, California. The research was co-led by Michael Smanski, a biochemist at the University of Minnesota.

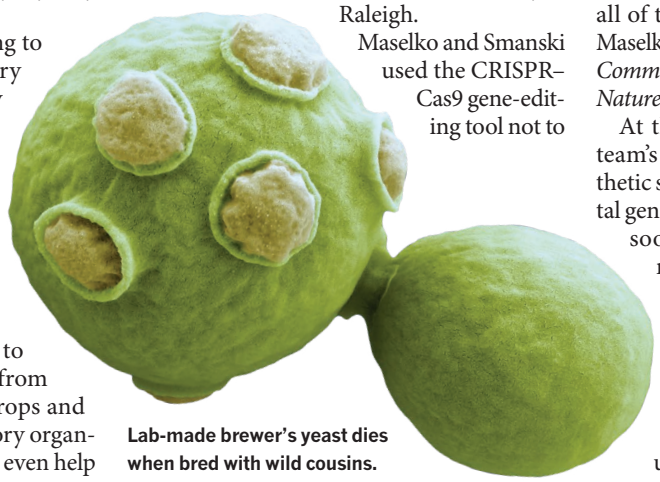
The technology could be used to keep genetically modified plants from spreading genes to unmodified crops and weeds, thereby containing laboratory organisms, the researchers hope. It might even help combat pests and invasive species, by replacing wild organisms with modified counterparts. Other scientists say that the approach is promising, but warn that it could be stymied by technical hurdles, such as the ability of modified organisms to survive and compete in the wild. "This is an ingenious system and, if successful, could have many applications," says evolutionary biologist Fred Gould of the North Carolina State University in Raleigh.

Maselko and Smanski used the CRISPR–Cas9 gene-editing tool not to edit target genes, but to alter their expression. The team guided the Cas9 enzyme to over-activate genes so that their protein products accrued to toxic levels. When they first tested the approach in brewer's yeast (*Saccharomyces cerevisiae*), they raised the levels of a protein called actin to the extent that the cells containing it exploded.

To prevent genetically modified yeast cells from mating successfully with other strains, the team engineered two modifications to the yeast cells. One change was analogous to a 'poison': it produced a version of Cas9 that worked with other factors to recognize and over-activate the actin gene. The second modification, the 'antidote', was a mutation that stopped Cas9 from overexpressing actin.

A yeast strain that contained both poison and antidote produced healthy offspring when mated with a strain carrying the antidote. But when the modified strain was crossed with a different lab strain lacking the antidote, almost all of their offspring popped like balloons, Maselko and Smanski's team reported in *Nature Communications* in October (M. Maselko *et al. Nature Commun.* **8,** 883; 2017).

At the meeting, Maselko discussed the team's progress towards engineering a synthetic species of fruit fly, using a developmental gene called wingless as a poison. Work will soon commence in plants, mosquitoes, nematodes and zebrafish, says Maselko, who, with Smanski, has applied to patent the approach.



EYE OF SCIENCE/SPL

Lab-made brewer's yeast dies when bred with wild cousins.

A COUNTER TO INVASION

A synthetic species could also be used to outcompete and control undesirable species that spread ▶

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

LI XIN/XINHUA VIA ZUMA

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