

SEVEN DAYS

The news in brief

CLIMATE CHANGE

Climate milestone

The concentration of carbon dioxide in Earth's atmosphere reached a record high of 414.7 parts per million (p.p.m.) in May, according to data released on 4 June by the US National Oceanic and Atmospheric Administration and the Scripps Institution of Oceanography in La Jolla, California. The institutions, which maintain separate CO₂-monitoring stations atop Mauna Loa, Hawaii's largest volcano, say that the current level of atmospheric CO₂ is probably the highest it's been in at least 800,000 years. Human activities have caused atmospheric CO₂ levels to soar since the Industrial Revolution, but scientists say that the annual rate of increase has been particularly steep over the past seven years. The latest seasonal peak is around 3.5 p.p.m. higher than the one registered in May 2018, marking the second-largest year-to-year jump on record.

FUNDING

UK research plans

The United Kingdom's powerful research-funding body, UK Research and Innovation (UKRI), revealed on 10 June how it plans to spend its almost £7.5-billion (US\$9.5-billion) budget for 2019–20. UKRI will focus on science that helps to address societal challenges, including the ageing population, food security and clean energy. The plans also detail how UKRI will achieve the government's ambitious target of spending 2.4% of gross domestic product on research by 2027, by distributing an extra £7 billion allocated by the government between 2017 and 2021. Over the next year, UKRI's discipline-specific research councils will disburse almost



AHMED MUSTAFA/AFP/GETTY

Sudanese academics defiant

In a brutal crackdown, paramilitaries are thought to have killed some 100 pro-democracy protesters in Sudan, and politicians opposed to the current military regime have been arrested. But the protesters, who included prominent academics and whose demands include freeing universities from government influence, are undeterred. On 9 June, the Sudanese Professionals Association (SPA), an organization of pro-democracy groups, launched a campaign of civil disobedience against the ruling military council, in place since a military coup in April toppled the country's long-standing dictator. The SPA says it will continue until power is handed to civilians and "all the demands of

the revolution are fully met". This includes a requirement for vice-chancellors and presidents of public universities appointed by the former regime to step down, says SPA member Muntasir El-Tayeb, a molecular geneticist at the University of Khartoum. The violence comes six months after protests in Khartoum began, and shortly after talks between the army and the SPA broke down. Protesters staged a sit-in outside the military headquarters, and loyalist paramilitaries used live ammunition to clear them. SPA-affiliated doctors say that 113 demonstrators were killed. The African Union has suspended Sudan's membership until a civilian-led government is installed.

£5 billion to researchers working in fields including medical research, physical sciences and biology. A further £900 million will be spent on science infrastructure, and £1.5 billion will go to schemes designed to boost the economy and international collaboration. UKRI will also create a research-integrity body to examine the quality of institutions' misconduct investigations. UKRI was

created in 2018 to bring together all UK public research agencies.

PEOPLE

Frieden plea

Thomas Frieden, former director of the US Centers for Disease Control and Prevention (CDC), pleaded guilty on 4 June to a charge of disorderly conduct. Frieden was arrested in August 2018

after a woman accused him of groping her buttocks at a party in his New York City apartment in 2017. Prosecutors in Brooklyn's criminal court dropped charges of forcible touching, sexual abuse and harassment against Frieden after he agreed to plead guilty to the lesser charge and avoid contact with the woman for a year. Frieden, who has denied the groping allegations, will not have a criminal record. As

Nature went to press, Frieden's lawyer declined a request for comment. Frieden served as director of the CDC in Atlanta, Georgia, for eight years, but stepped down when President Donald Trump took office in January 2017. Frieden is now president and chief executive of the non-profit organization Resolve to Save Lives in New York City.

ENVIRONMENT

Logging crackdown

Brazil's environment agency, Ibama, sent 165 environmental field agents to 7 states on 5 June to combat illegal logging operations in the country's Amazon rainforest. The agents are backed by military and police forces as part of Operation Sovereign Amazon. The goal "is to search the regions with the highest concentration of illicit activity to contain the expansion of environmental damage", Ibama said in a statement. The crackdown comes after satellite-generated data obtained by Brazil's space research institute, the INPE, detected a jump in logging activities in the Amazon in May (pictured, a logging truck in Brazil's Araribóia Indigenous Reserve). That month, 739 square kilometres of rainforest disappeared,



compared with 550 square kilometres lost in May 2018, an increase of 34%. The INPE found that Brazil's Amazon lost about 0.19 square kilometres per hour last month, the fastest rate of loss in a decade.

RESEARCH

Preprint server

Medical scientists now have a preprint server on which to share results before peer review. The repository, called medRxiv, was launched by the founders of the popular biology preprint server bioRxiv. Only certain disciplines of medical science can be posted on bioRxiv, and proponents say the new server will speed up information sharing in clinical research, which could be especially valuable during outbreaks of diseases such as Ebola. The founders have set up safeguards to alleviate

concerns about publishing unvetted clinical research. For instance, authors will need to provide details of their study's ethical approval and patient consent, and disclose funding sources. Preprints will be screened by a clinical scientist and a clinical editor, and the medRxiv team says it won't post research deemed a risk to the public. The website will also state clearly that work is not peer reviewed. MedRxiv is accepting manuscripts and the site will be live on 25 June.

Research ethics

A brain and heart hospital and research centre in Japan says an internal investigation found 158 cases in which studies had violated ethics standards since 2013. Two cardiac studies at the National Cerebral and Cardiovascular Center in Suita were done without approval from an ethics review board, the centre

said in a statement. In the other 156 cases, participants weren't given the option to opt out of a study once they had left hospital. Hisao Ogawa, the centre's president, apologized to the people affected and their families at a press conference on 30 May. The institute said the authors of two papers that resulted from the cardiac studies without ethics approval would be seeking retractions, and that it will also commission an independent investigation and consider disciplinary action.

SPACE

Space vacancy

Space tourists will be able to visit the International Space Station under the auspices of NASA, the agency announced on 7 June. Beginning as early as 2020, the astronauts would travel to orbit aboard a US commercial spacecraft. Up to two such missions a year, for as long as 30 days each, will be considered. The move is part of NASA's ongoing push to commercialize the US portion of the space station; companies can now also apply to fly for-profit payloads on it, not just research payloads. Russia has permitted seven tourists to visit the space station — the last to visit was Guy Laliberté, of Canada, in 2009.

TREND WATCH

A high-power magnet of novel design has reached a record intensity of 45.5 tesla. Only pulsed magnets, which sustain fields for a fraction of a second at a time, have achieved higher intensities so far.

David Larbalestier and his collaborators at the US National High Magnetic Field Laboratory (NHMFL) in Tallahassee, Florida, ran intense electric currents through coils made of a cuprate superconductor to generate magnetic fields with low energy consumption (S. Hahn *et al. Nature* <https://doi.org/10.1038/s41586-019-1293-1>; 2019). The resulting field strength exceeded that of

energy-hungry resistive (non-superconducting) magnets used by state-of-the-art magnet labs. It also surpassed the strength of conventional superconductors, and 'hybrid' superconducting-resistive magnets.

Previous cuprate-based magnets were too fragile for use in technological applications, but the novel design should be able to sustain fields of up to 60 tesla, Larbalestier says. Thousands of researchers take their samples to magnet facilities such as the NHMFL every year, to conduct experiments with higher-intensity fields than can be achieved in a typical lab.

RECORD-BREAKING MAGNETS

A new magnet has reached a field strength of 45.5 tesla, exceeding the maximum strengths achieved so far by other superconducting and resistive magnets.

