

▶ depend on accurate timings.

Most countries, including China, the United States and large parts of Europe, favour scrapping the leap second and basing UTC on the continuous tick of atomic clocks.

Official time would slowly move out of sync with Earth's rotation, but — given that it would take thousands of years to accumulate a difference that is greater than the shifts already caused by daylight savings time — many argue that this would cause few problems. “We are already shifted by one hour in summer compared to winter time,” says Elisa Felicitas Arias, director of the Time Department at the International Bureau of Weights and Measures (BIPM) in Sèvres, France, who wants to scrap the leap second. “Are we affected because of that?” A correction — perhaps a leap minute or hour — could be added once the drift is appreciable.

A small number of countries however, including Russia and the United Kingdom, want to keep the leap second. Russia is concerned about how its global navigation system, GLONASS — the only one to incorporate leap seconds — would cope, says Vincent Meens of France's National Centre for Space Studies, and the chair of the ITU subgroup tasked with debating the topic. Britain's argument is based largely on the desire to keep a link between official time and Earth's rotation, says Peter Whibberley, a metrologist at the National Physical Laboratory in Teddington, UK.

Astronomers are among those who would be affected if the leap second were to be scrapped. Their software would need to cope with Earth's rotational time — which defines when stars and galaxies are seen in the sky — being offset by more than a second from universal time, says Meens.

On 18 November, the ITU announced that it would defer a decision until 2023 when it will have more information on the impacts of losing the second.

The union did, however, decide to make changes to the international treaty that currently defines UTC, and in turn the leap second. Rather than having a stand-alone definition of UTC, the treaty will cite an SI definition, and mention of the leap second will move to become part of a ‘description’ of UTC in a subsidiary section of the treaty that expires in 2023.

Whibberley says that the effect will be to remove responsibility for UTC from the ITU, and that the General Conference on Weights and Measures (CGPM) — which is already responsible for defining SI units, including the second — is most likely to become the authority in the future. But the change is unlikely to speed up the decision on whether to scrap the leap second: the CGPM's next chance to even propose a change is not until 2018. ■



Decades of studies on chimpanzee brains and behaviour will be captured in an online resource.

BIOMEDICAL RESEARCH

Chimps retire to a digital world

NIH to fund a cache of brain tissue and online data in place of live-animal experimentation.

BY SARA REARDON

Panzee the chimpanzee was a skilled communicator that could tell untrained humans where to find hidden food by using gestures and vocalizations. Austin the chimp was particularly adept with a computer, and scientists have been scanning its genome for clues to its unusual cognitive abilities.

Both apes lived at a language-research centre at Georgia State University in Atlanta, and both died several years ago — but they will live on in an online database of brain scans and behavioural data from nearly 250 chimpanzees.

Researchers hope to combine this trove, now in development, with a biobank of chimpanzee brains to enable scientists anywhere in the world to study the animals' neurobiology.

This push to repurpose old data is especially timely now that the US National Institutes of Health (NIH) has decided to retire its remaining research chimpanzees. The agency decommissioned more than 300 animals in 2013, but kept 50 available for research in case of a public-health emergency. Following an 18 November decision, this remaining population will also be sent to sanctuaries in the coming years. The NIH also hopes to retire another 82 chimps that it supports but does not own, says director Francis Collins.

“We were on a trajectory toward zero, and today's the day we're at zero,” says Jeffrey Kahn, a bioethicist at Johns Hopkins University in Baltimore, Maryland, who led a 2011 study on the NIH chimp colony for the Institute of Medicine.

VINCENT J. MUS/NATL GEOGRAPHIC CREATIVE

The NIH's latest move, along with a decision in June by the US Fish and Wildlife Service to give research chimps endangered-species protections, effectively ends the possibility of biomedical research on the animals in the United States.

The retirement of the NIH chimps will also end non-invasive studies on the 139 NIH-owned animals at the University of Texas MD Anderson Cancer Center primate facility in Bastrop. Its director, Christian Abee, says that researchers have published more than 50 behavioural studies since 2012 using these animals. "There is no other alternative for cognitive research in chimpanzees," he says.

That makes the NIH-funded chimp database all the more important. "This is a very unique window of opportunity to make sure that there's a legacy and a contribution from the lives they have lived," says project leader Chet Sherwood, a biological anthropologist at George Washington University in Washington DC.

ONLINE LEGACY

In the next few months, Sherwood's team plans to launch a website with a database for researchers and an educational component for the public. The site will eventually include existing data on the chimps' performance in behaviour and personality tests, scans of the

primates' brain structure and activity, and their pedigrees and some genetic information. Sherwood and his colleagues plan to model the website on that of the Human Connectome Project, an open-access collection of brain scans from 1,200 individuals that researchers can use to study the links between brain structure and activity and human traits.

The team is also collaborating with the Allen Brain Institute in Seattle, Washington, to create an atlas of gene expression in the chimp brain. Researchers who want to study chimp brains in more detail can request tissue and blood samples from the team, which has nearly 250 preserved organs stored at facilities in Washington DC and Atlanta.

But some scientists and advocates worry about the consequences of losing access to research chimps. Frankie Trull, director of the Foundation for Biomedical Research in Washington DC, which advocates for animal research, says that the US government may regret its decision if a public-health threat emerges that would be best studied in chimpanzees. Others caution that the dwindling

number of research animals will make it difficult to develop therapies — such as vaccines against Ebola — for wild chimps, which would help both the animals and human beings.

In the meantime, the NIH is struggling to find homes for its newly retired chimps. By law, retired animals are sent to a federal sanctuary known as Chimp Haven in Keithville, Louisiana, but that facility has only 25 places available now. Nearly 310 NIH-owned animals need to be resettled, and Collins says that the agency is still evaluating its options — a situation that worries lawmakers.

On 20 November, two members of Congress sent the NIH a letter asking the agency for its plan to rehome the remaining chimps. "We want to make sure that for the sake of taxpayers and these much-abused chimpanzees, these delays are overcome immediately," they wrote.

Although retired, the apes of Chimp Haven may one day re-enter research labs — posthumously. Sherwood's team is drafting an agreement with the sanctuary to obtain the animals' brains when they die; it also hopes to acquire organs from chimps in zoos and research facilities. "You can imagine 20 years from now, this ageing population won't be here," he says. "If we weren't making the efforts today, there wouldn't be a way to study neurobiology in chimpanzees." ■

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