News in brief

CLIMATE CHANGE EXPANDS CENTRAL ASIA'S DESERTS

With global temperatures rising, desert climates have spread north — by up to 100 kilometres in parts of Central Asia since the 1980s, a climate assessment reveals.

The study also found that over the past 35 years, temperatures have increased across all of Central Asia, which includes parts of China, Uzbekistan and Kyrgyzstan (Q. Hu and Z. Han *Geophys. Res. Lett.* **49**, e2022GL098895; 2022).

The research team used air temperature and precipitation data from 1960 to 2020 to divide Central Asia into 11 climate types. They found that since the late 1980s, the area classed as having a desert climate has expanded eastwards, and has spread north by as much as 100 kilometres in northern Uzbekistan and Kyrgyzstan, in southern Kazakhstan and around the Junggar Basin in northwestern China.

Co-author Qi Hu, an Earth and climate scientist at the University of Nebraska–Lincoln, says this is a substantial expansion and has had a domino effect on adjacent climate zones, which have also become drier.

In some areas, the annual average temperature was at least 5 °C higher between 1990 and 2020 than it was between 1960 and 1979, with summers becoming drier and rainfall occurring mostly during winter.

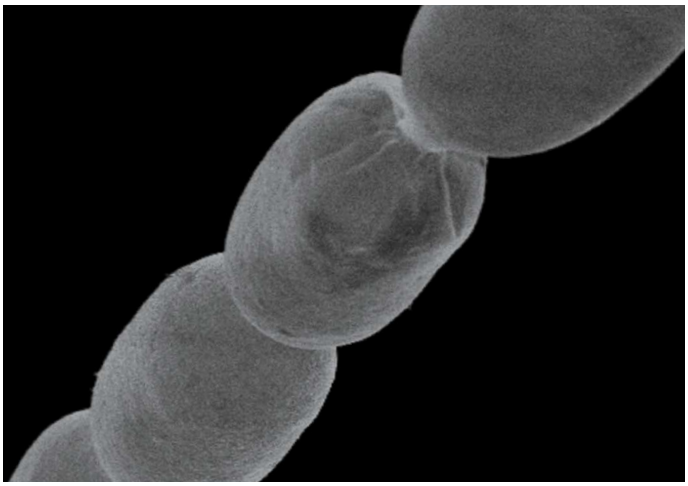
EUROPEAN MISSION PLANS TO AMBUSH A RARE COMET

The European Space Agency (ESA) last month approved the first mission that will launch without a pre-selected target. Instead, it will wait in space, ready to fly at short notice.

The Comet Interceptor mission will launch in 2028 and will travel to a point of gravitational stability 1.5 million kilometres from Earth. Once there, it will be able to wait for up to six years for a suitable comet to pass close enough to Earth's orbit to visit. If that occurs, the probe will leave on a fly-by course. The main spacecraft will approach to a distance of about 1,000 kilometres — far enough away to avoid being damaged by nearby material — while two smaller probes will dive closer, down to as little as 400 kilometres from the surface.

The goal is to find a pristine object, known as a long-period comet, that is approaching the Sun for the first time. The encounter would provide a window on material that formed at the dawn of the Solar System, 4.5 billion years ago. Other missions have visited comets that have been altered by the Sun because they have spent time in the inner Solar System.

Alternatively, the craft could intercept an object from another solar system, similar to the rock 'Oumuamua, which crossed the Solar System in 2017.



LARGEST BACTERIUM EVER FOUND IS SURPRISINGLY COMPLEX

Biologists have found filament-like bacteria that can reach nearly 1 centimetre long — the largest ever found — and have an inner structure reminiscent of the cells in more-complex organisms. The results appeared in *Science* (J.-M. Volland *et al. Science* **376**, 1453–1458; 2022).

Biologist Olivier Gros at the University of Antilles in Pointe-à-Pitre, on the French West Indies island of Guadeloupe, discovered *Thiomargarita magnifica* on rotting mangrove leaves. He found that the bacteria live by oxidizing sulfur.

"At the beginning, I thought it was something like a fungi or something — not bacteria, but a eukaryote, maybe," Gros says. Unlike bacteria and archaea, which are simple microorganisms, eukaryotes — which include animals and plants — have complex cells containing a nucleus and organelles such as mitochondria.

One of Gros's collaborators, marine biologist Jean-Marie Volland at Lawrence Berkeley National Laboratory in California, looked at the bacterium more closely using a range of imaging techniques, helping to confirm that it was a single cell.

The next-largest *Thiomargarita* is only around 750 micrometres long. Other filament-like bacterial structures are also found in the mangroves, but these all consist of tens or hundreds of cells.

Central to the bacterium is its vacuole — an inert, fluid-filled membrane. Around its edge are thousands of membrane-bound structures called pepins. The authors describe these as being similar to the organelles found mostly in the cells of eukaryotes.

Pepins contain DNA and ribosomes, molecular machines that translate instructions from DNA to make proteins. In other bacteria, genetic material floats freely inside the cell, usually in the form of just one circular chromosome. The pepins collectively host up to 700,000 copies of the genome, but it is unclear whether each pepin contains just one copy of the genome, or more than one.

Petra Levin at Washington University in St. Louis, Missouri, says that the discovery challenges conventional wisdom that bacteria have lower size limits than eukaryotic cells. "There's probably an upper limit on cell size at some point, but I don't think it will be peculiar to bacteria or archaea or eukaryotes."

L TO R: MATYAS REHAK/SHUTTERSTOCK; GERAINT JONES/UCL MULLARD SPACE SCI. LAB.; OLIVIER GROS/LAWRENCE BERKELEY NATL LAB.