

# New Scientist

WEEKLY January 29 - February 4, 2022

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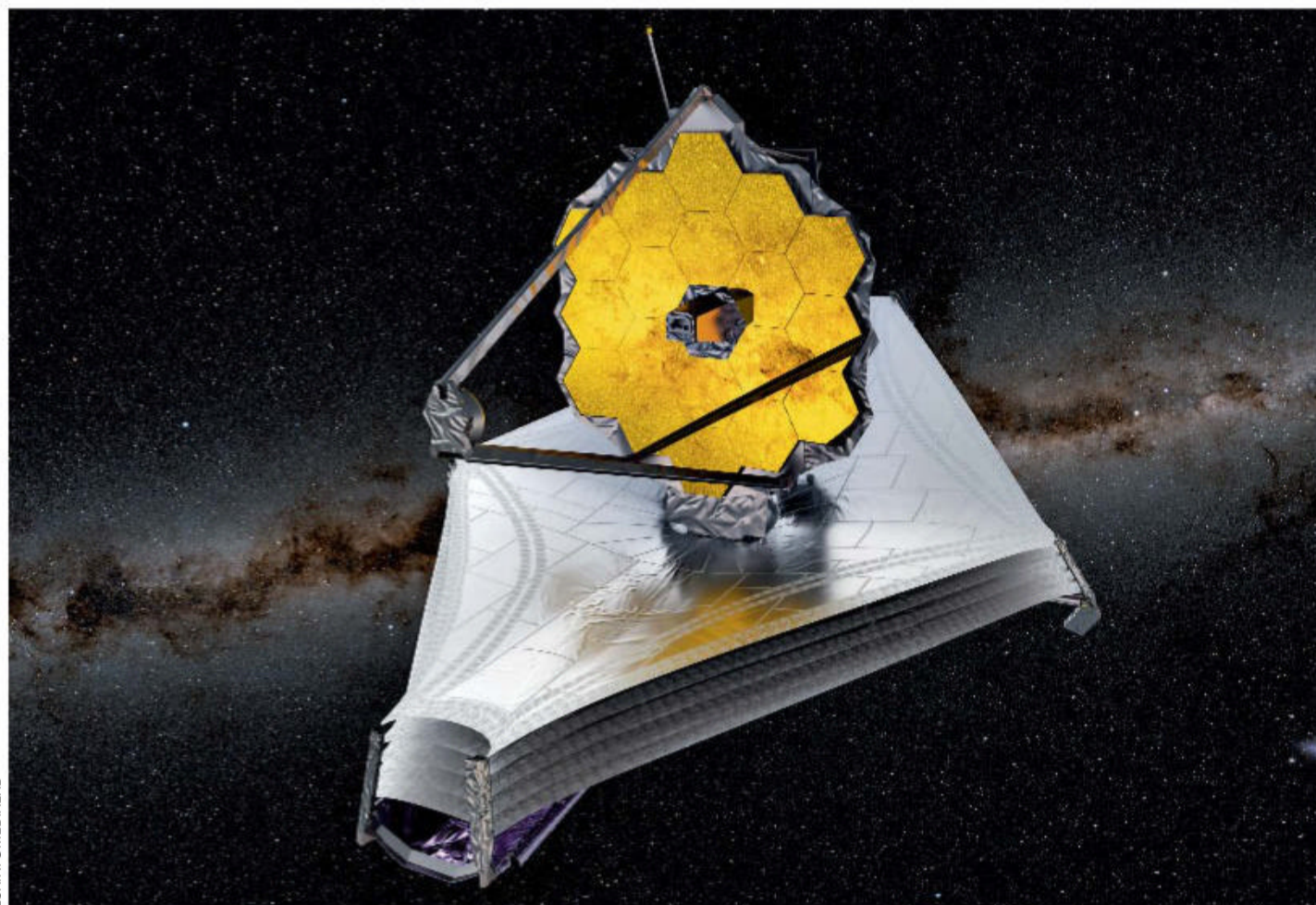
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**Artist's illustration of the James Webb Space Telescope**

that make up the telescope's primary mirror have to be aligned with incredible precision – they have to line up to within one five-thousandth the width of a human hair, said JWST team member Lee Feinberg at NASA's Goddard Space Flight Center in Maryland in a

**"We're a month in to the mission, and the baby hasn't even opened its eyes yet"**

24 January press conference. That process is expected to take about three months, followed by a month of calibrating the scientific instruments before the first detailed images can be taken.

"Everything we're doing is about getting the observatory ready to do transformative science," said JWST scientist Jane Rigby, also at NASA Goddard, in the press conference. "We're a month in, and the baby hasn't even opened its eyes yet." If all goes well, the science mission will begin around the end of June.

The first year of science is already mapped out, with more than 300 observing programmes planned, said Rigby. Many of them will be dedicated to examining exoplanets, peering into their atmospheres to learn more about their composition and potential habitability.

Others will look for the most distant galaxies in the observable universe, studying how they formed and evolved over time. Some observing programmes will seek to understand dark matter and dark energy in an attempt to unravel the greatest mysteries of the cosmos.

As every part of the launch and the trip to L2 has gone so smoothly, JWST has enough fuel to keep observing for more than 10 years. ■

## Astronomy

# Telescope reaches new home

The James Webb Space Telescope has arrived at a gravitationally stable point 1.5 million kilometres from Earth, reports **Leah Crane**

ONE month after its launch, the James Webb Space Telescope (JWST) has arrived at its destination. On 24 January, the spacecraft fired its thrusters for about 5 minutes to place it into its final orbit, and now it is ready to calibrate its mirrors and scientific instruments before peering out into the universe.

The telescope is at a gravitationally stable spot called a Lagrange point, where all the forces on the spacecraft balance out to keep it in place, orbiting the sun along with Earth. This particular Lagrange point, called L2, is about 1.5 million kilometres away from the planet in the direction opposite to the sun. It won't stay parked directly at the

Lagrange point, but will wobble back and forth around it in what is called a halo orbit, which requires a small burn of the thrusters about every three weeks but is more stable in the long run.

Aside from the fact that parking near a Lagrange point will save fuel, L2 is a particularly good spot for observing the sky without worrying about heat or light from the sun, Earth or the moon. JWST faces away from all of those objects, with its huge sunshield blocking out their light to protect the telescope's sensitive observations.

The telescope requires extreme cold to function, which the sunshield will also provide. While the sun-facing side of the shield will be at a temperature of about 85°C, the other side will be kept at about -233°C, nearly as cold as the average temperature in deep space. Now that JWST has reached its parking spot, it will take about a week for everything to cool down before the telescope's engineers can begin the final necessary steps ahead of the first observations.

Those final steps have two parts. First, the 18 hexagonal segments



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