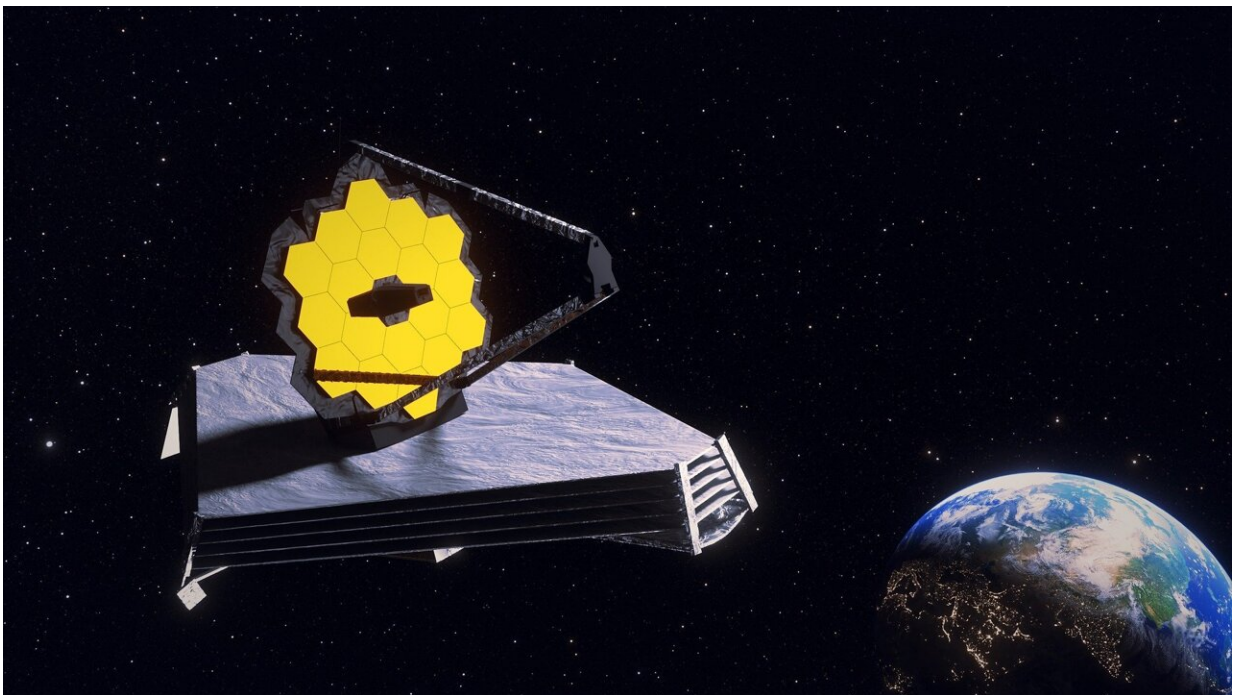


'The start of something wonderful': First full-color images from James Webb telescope to be released Tuesday

July 11 2022, by Christine Condon



Credit: Pixabay/CC0 Public Domain

Lately, the hallways at the Space Telescope Science Institute in Baltimore have been filled with a few more smiles than usual.

Giddy excitement is in the air, anticipating the public release this week

of the first significant, [full-color images](#) to come from the James Webb Space Telescope, said Susan Mullally, deputy project scientist for the [telescope](#).

Staff at the institute, which operates the revolutionary telescope, have put the finishing touches on the public's first look at the power of Webb to observe what was once unobservable—distant galaxies, the atmospheres of faraway planets.

On Tuesday, the center on Johns Hopkins University's campus will open its doors to a host of scientists, journalists and other eager onlookers to unveil Webb's initial round of observations—ones curated by staffers to showcase the telescope's unique capabilities, with the goal of awing even the most uninspired.

[NASA on Friday released](#) a list of the objects captured for Webb's first set of images, including one of the brightest nebulae in the sky, a giant gaseous planet nearly 1,150 light-years from Earth and a quintet of galaxies "locked in a cosmic dance of repeated close encounters."

"There will definitely be the deepest field we've ever seen. There will be our first glimpse at what an exoplanet atmosphere looks like with Webb," Mullally said. "And there will be other images—I think—that will just simply take your breath away."

The National Aeronautics and Space Administration is holding an official unveiling at the Goddard Space Flight Center about 30 miles south of Baltimore in Greenbelt, where much of the telescope was assembled.

But Baltimore is the telescope's earthbound home base, where technicians have carefully monitored the spacecraft since its launch last year.

The images promise to be spectacular, not least because the images that have already come from Webb—snapshots taken during calibration—wowed astronomers. Filled with backgrounds of swirling galaxies, the early images showed off Webb's ability to peer deep into space, and therefore back in time. Using infrared technology, Webb will be able to cast its eyes to 100 million to 250 million years after the Big Bang, providing a new gaze upon the early universe.

It's been a long time coming. Construction on the roughly \$10 billion telescope officially began in 2004, following years of planning kicked off by a workshop at Baltimore's institute in September 1989. Over the years, unexpected complications ballooned the project's cost and steadily pushed back its launch date, until Christmas Day last year, when it was sent skyward from South America.

Choosing which observations to highlight after so many years of work was far from simple, Mullally said.

"It was a lot of astronomers sitting in the room going: 'That really highlights this part of astronomy, but that really shows off this bit,'" she said. "And so, how do you get to the best image that allows you to tell that scientific story that you really want people to understand?"

Crafting the images is also something of a subjective process. Artists at the institute must essentially assign color to black and white images as scientifically as possible, creating visual representations of wavelengths of light that humans cannot see.

A few days after the images are released, a roughly 50-terabyte trove of the telescope's data will hit a public archive, Mullally said. That's mainly for interested astronomers, giving them a window into the telescope's first few months in the cosmos. The data, collected while the telescope's instruments were calibrated, could be fodder for future investigations,

and help scientists outside the mission better understand the way it works.

For astronomers such as Eliza Kempton, an associate professor of astronomy at the University of Maryland, the arrival of information from Webb is a career-defining moment.

Kempton has been studying a specific exoplanet, called GJ1214b, ever since it was discovered in 2009. Though it is just 40 light-years from Earth, certain details about the planet remain a mystery, including the makeup of its atmosphere, since it is surrounded by a thick layer of haze. Efforts to observe it with the Hubble and Spitzer space telescopes, and from telescopes on the ground, haven't solved the puzzle. But Webb promises to.

"We really exhausted our options," Kempton said. "And so JWST is the thing that we've been waiting for this whole time."

The details about GJ1214b, captured using Webb's novel mid-infrared instrument, will allow astronomers to infer characteristics about other sub-Neptune exoplanets, so named because they are larger than Earth but smaller than Neptune. They are among the most commonly occurring type of planet, but our solar system doesn't contain one, Kempton said.

Kempton is among the lucky group of scientists whose requests for observation time have been approved, and hers is coming up quickly. It's planned for the end of July.

"It's very exciting, and I'm sure that we will be a little bit perplexed. I'm sure that whatever we do see will be somewhat surprising," she said. "It's just a few weeks away, so I kind of wake up in the morning and I'm trying not to get too anxious about the fact that this is coming so soon, and we don't really know what we're going to see."

Webb's first year or so of scientific programs has been decided, and schedulers are packing in a constant stream of observations, keeping in mind that certain celestial phenomena scientists want to view are visible only at particular times. It's a [balancing act](#), with the aim of ensuring few precious minutes in the telescope's life span, limited by its fuel storage and its ability to withstand the harsh conditions of space, are not wasted. But with so much on the horizon, it seems clear that Tuesday will simply be Webb's first impression on our imagination of the cosmos.

"It's going to be the start of something wonderful," Mullally said.

2022 The Baltimore Sun.

Distributed by Tribune Content Agency, LLC.

Citation: 'The start of something wonderful': First full-color images from James Webb telescope to be released Tuesday (2022, July 11) retrieved 27 April 2024 from <https://phys.org/news/2022-07-full-color-images-james-webb-telescope.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.