INTREPID MUSEUM

How Hubble Works

intrepidmuseum.org

Today we will learn about the Hubble Space Telescope and the images produced by it!

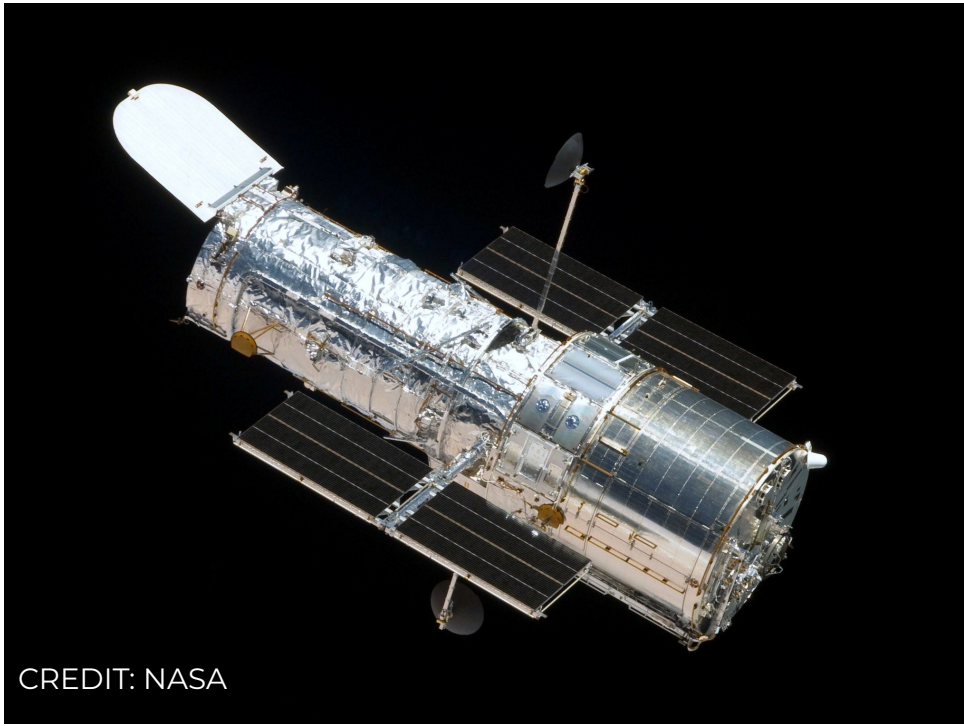
Before we start, let's reflect on these questions:

- What is the Hubble Space Telescope?
- What can the Hubble Space Telescope see?
- What are some images taken by the Hubble Space Telescope?
- How are the colorful images of space objects made?

What is the Hubble Space Telescope?

The Hubble Space Telescope is the first of NASA's Great Observatories, or space-based observatories. Located 350 miles above Earth's surface, Hubble has the vantage point and the technology provided scientists and astronomers with important information about space

The Hubble telescope was launched into space in 1990 and serviced five times between 1993 and 2009 under the Space Shuttle Program. The space shuttle *Enterprise* can be found at the Intrepid Museum.



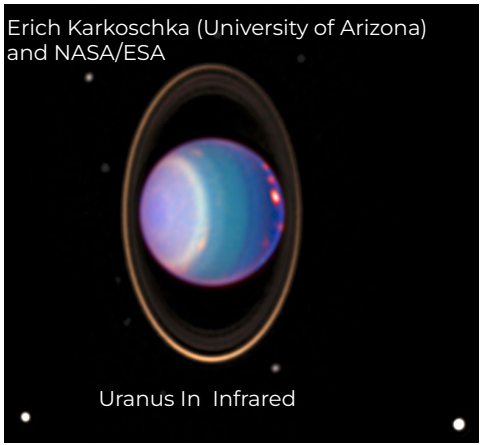
CREDIT: NASA

What can the Hubble Space Telescope see?

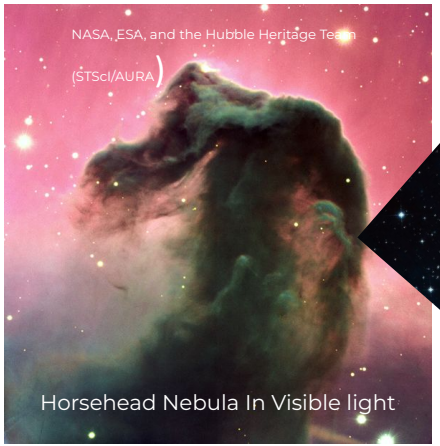
The human eye can only see a small amount of the whole spectrum of light, which we call visible light.

The Hubble Space Telescope is equipped with cameras that can see both infrared and ultraviolet light. This allows the telescope to see more than what we can see with the naked eye.

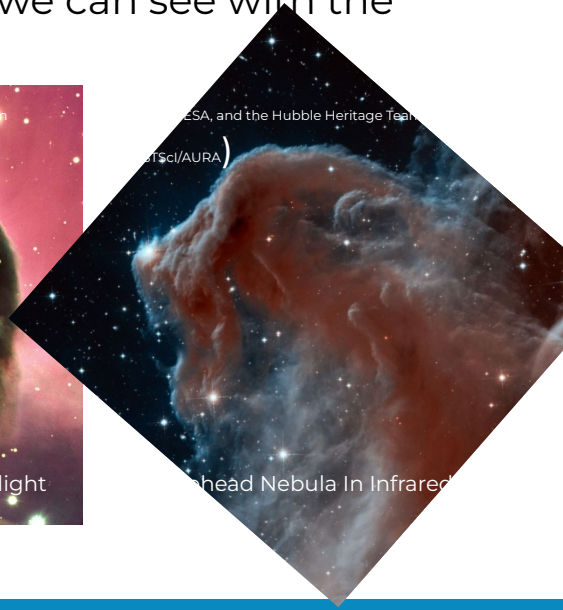
Uranus In Visible light



Uranus In Infrared



Horsehead Nebula In Visible light



Horsehead Nebula In Infrared

What are some images taken by the Hubble Space Telescope?

The Hubble Ultra Deep Field is the result of hours of observation on a small region of space that revealed more than 10,000 galaxies in a very small patch of sky.

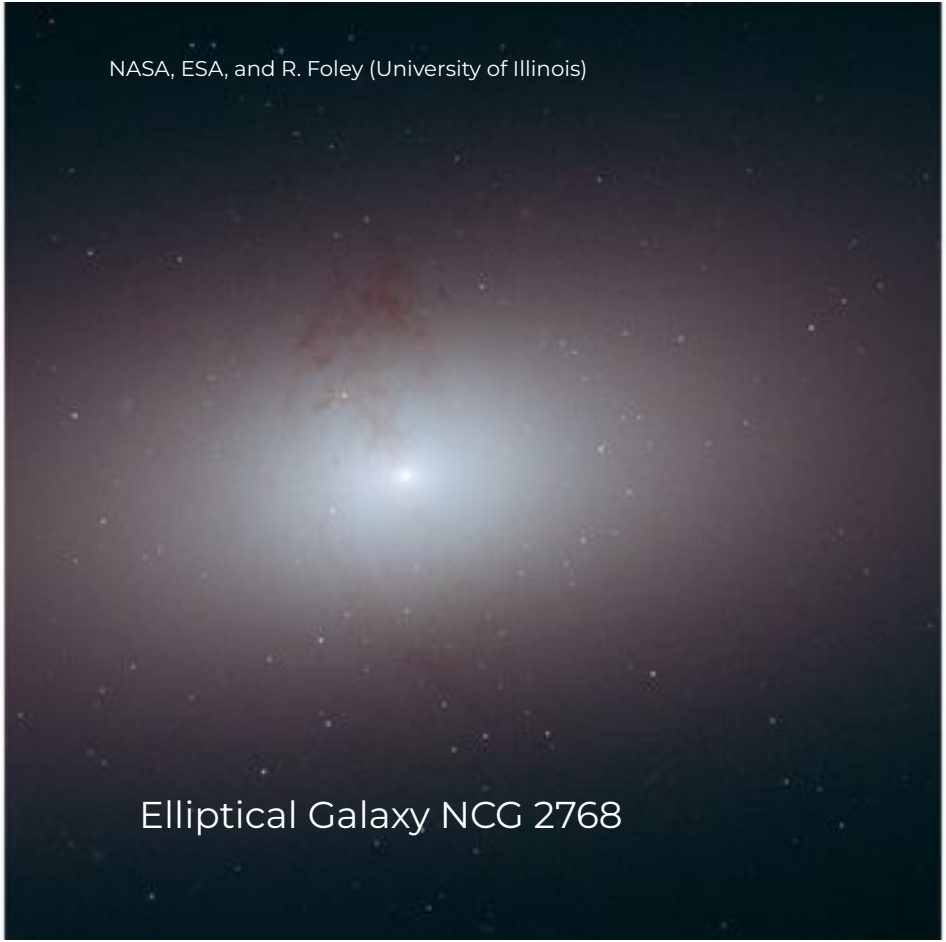
The top right image shows both fully formed galaxies and the beginnings of galaxies that are in the most distant parts of the universe as their light is being stretched as the universe expands.

In this image, we can also see **interacting galaxies** merging together and getting larger.

What are some images taken by the Hubble Space Telescope?

Galaxies are systems of billions of stars, along with gas and dust, held together by gravity. One 2016 study estimated that the observable universe contains two trillion galaxies.

Elliptical galaxies are the result of two or more disk galaxies merging, which destroys much of the structure of the original galaxies and leaves behind more of a smooth, featureless image in a spherical shape.



How are the colorful images of space objects made?

Press play on the next slide to watch a video made around the Hubble Space Telescopes 25 year anniversary in 2015 that will tell us how data from the telescope is used to provide us the colorful images of space objects we have seen.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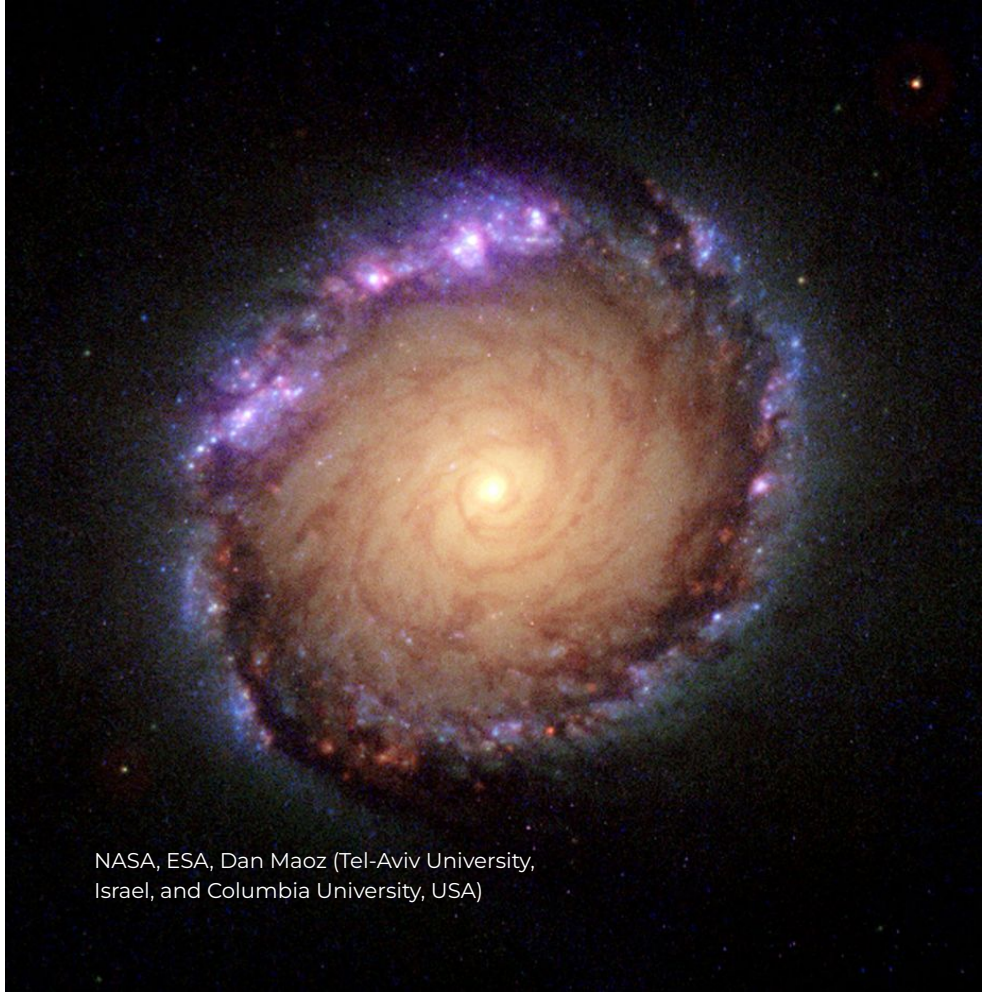
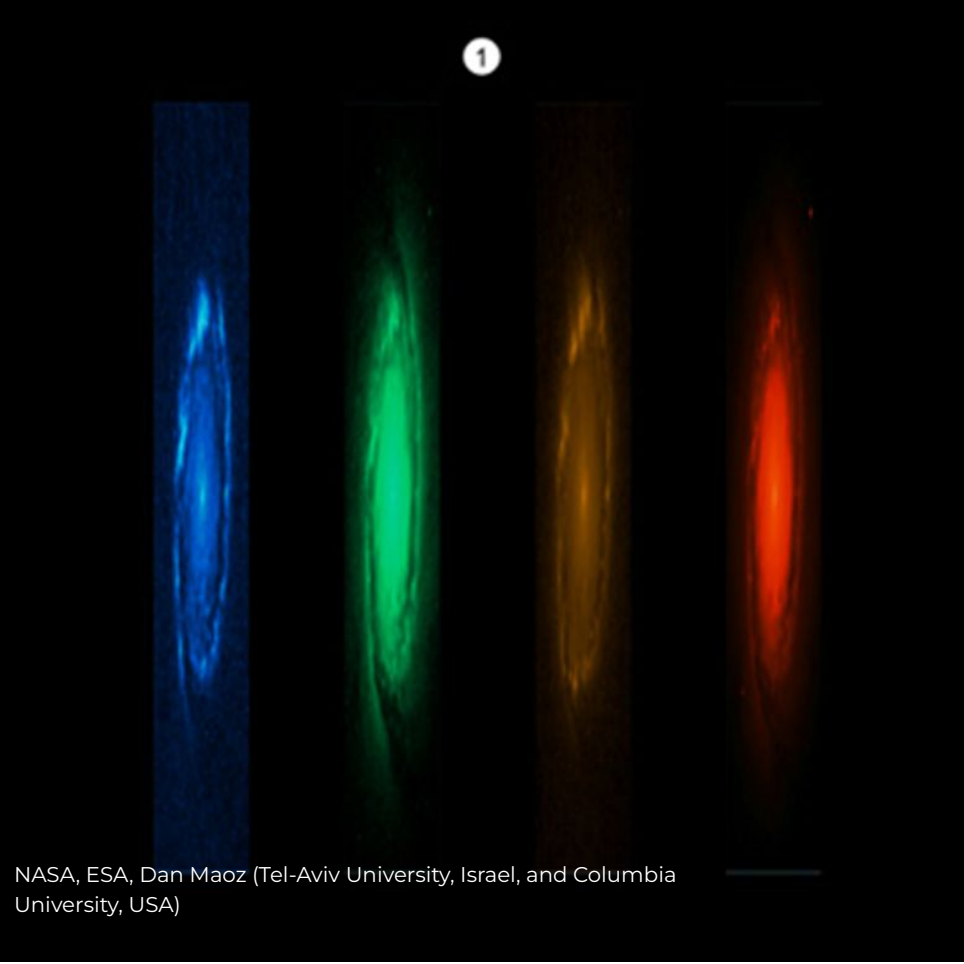
How are the colorful images of space objects made?

Click through the next two slides to see how this image of NGC 1512, a spiral galaxy, was made.

As galaxies collect dust and gas, a shape can begin to emerge. A **spiral galaxy** is one of these shapes. The majority of galaxies that scientists have discovered so far are spiral galaxies. The other two common shapes are elliptical and irregular galaxies.



NASA, ESA, Dan Maoz (Tel-Aviv University, Israel, and Columbia University, USA)



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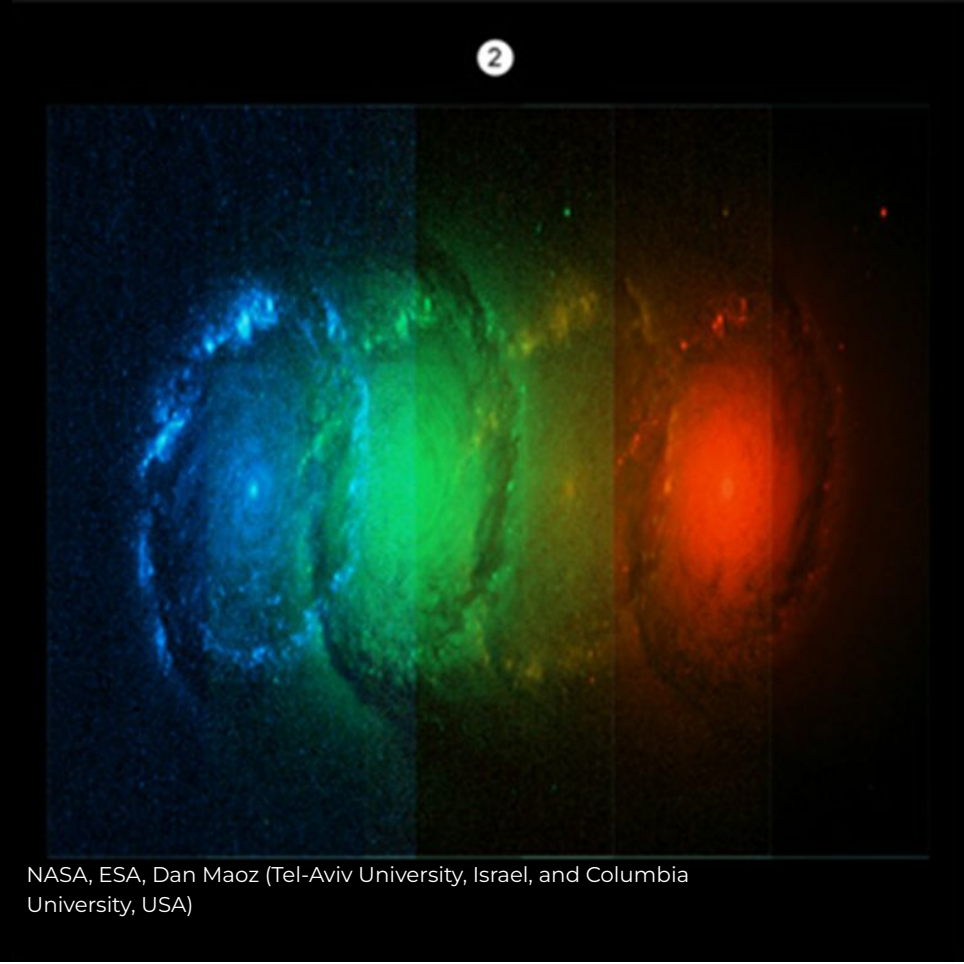

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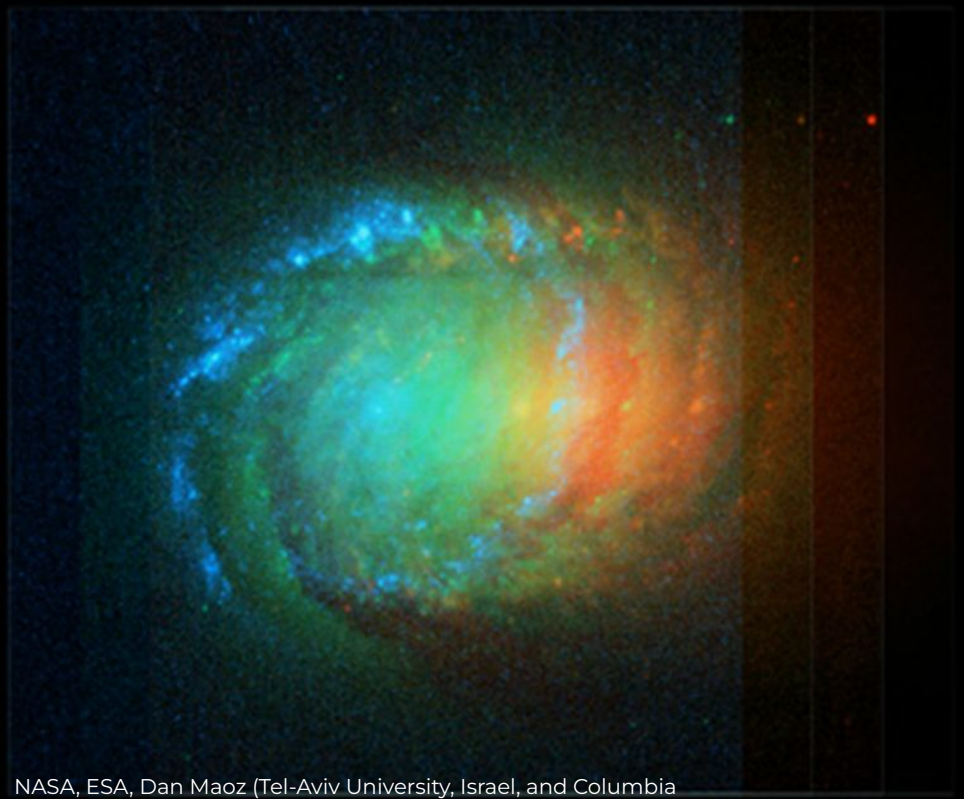

NASA, ESA, Dan Maoz (Tel-Aviv University, Israel, and Columbia University, USA)

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NASA, ESA, Dan Maoz (Tel-Aviv University, Israel, and Columbia University, USA)

Help Scientists Identify Galaxies!

- Images from telescopes like Hubble can provide a lot of information about our universe, but these images have to be interpreted by people in order to make meaning out of them.
- Galaxies are classified according to their shape and you can play a part in this classification through Galaxy Zoo. With your help, scientists can learn more about our universe and the galaxies that inhabit it.

Reflection

- What was difficult about classifying galaxies in Galaxy Zoo? What might be difficult for astronomers interpreting similar data?
- What was the most interesting thing that you learned?
- What do you want to learn more about?

For More Information

Hubble Resource Gallery

Astronomy Live on James Webb Telescope

Intrepid Sea Air & Space Museum

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