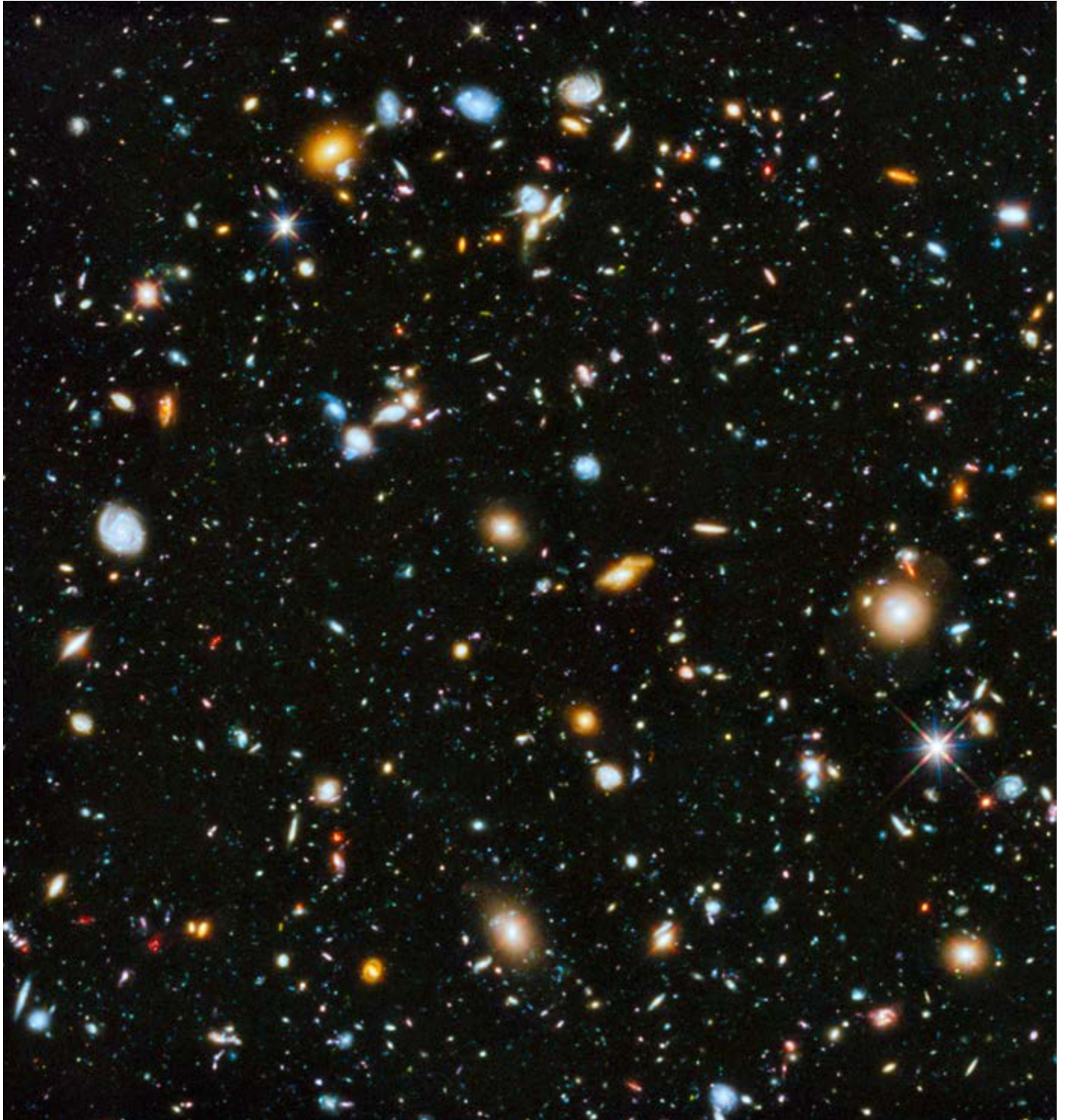
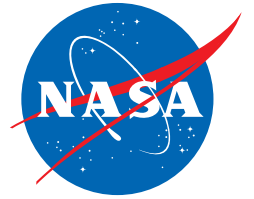


Hubble Ultra Deep Field 2014

National Aeronautics and
Space Administration



Colorful Multiwavelength Image Reveals Rich Harvest of Galaxies

Galaxies, galaxies everywhere, as far as the Hubble Space Telescope can see. This image presents an unprecedented view of the evolving universe. It reveals about 10,000 galaxies of all shapes and sizes stretching billions of light-years out in space and billions of years back in time.

When Hubble was first launched in 1990, astronomers weren't sure that a space telescope could look so far into the universe. To their surprise and delight, this "proof of concept" was first demonstrated with the original Hubble Deep Field image captured in 1995, when the telescope took a long exposure — over the course of 10 days — of a relatively empty piece of sky.

The vivid portrait appearing on the front of this lithograph is a culmination of a decade's worth of surveys, from 2002 to 2012, collectively called the Hubble Ultra Deep Field (HUDF).

The image adds ultraviolet observations to the visible and near-infrared snapshots taken in previous HUDF surveys.

Ultraviolet light gives researchers a direct look at the location of star-forming regions within galaxies, especially those residing 5 billion to 10 billion light-years from Earth. These galaxies are not adequately seen in other observations. Ultraviolet light reveals the blue glow from the largest, hottest, and youngest stars.

In contrast, the smallest, reddest objects in the image are extremely distant galaxies that formed around a billion years after the big bang. Though they are ablaze with star formation, they appear red because their light has been stretched to infrared wavelengths by the universe's expansion.

Mature spiral (bluish-green) and elliptical (yellowish-orange) galaxies that reside nearby also appear in this view. These colors are not what the human eye sees. They are a combination of wavelengths that are both visible and not visible to the human eye.

Combining ultraviolet, visible, and near-infrared light in one image reveals a more complete picture of how galaxies develop over time, from the tiny, red clumps of stars and gas in the early universe to the giant spirals and ellipticals we see today.

You can get images and news about the Hubble Space Telescope on our website, hubblesite.org. For images and information on the Hubble mission, go to www.nasa.gov/hubble. Follow the Hubble mission on social media: [@NASAHubble](https://twitter.com/NASAHubble).

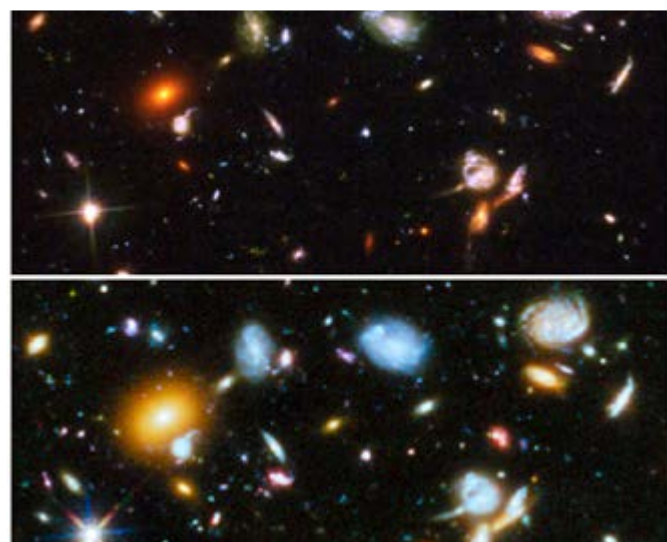
National Aeronautics and Space Administration

[Goddard Space Flight Center](http://www.nasa.gov)

8800 Greenbelt Road
Greenbelt, Maryland 20771

www.nasa.gov

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These images reveal views of two Hubble Ultra Deep Field (HUDF) surveys of the same region of space, uncovering galaxies extending billions of years back in time.

The portrait at top is the original HUDF, taken in 2004 in visible light. This landmark view represents the deepest visible-light image ever taken. The snapshot at bottom is HUDF 2014, a multiwavelength view that spans from ultraviolet to near-infrared light. Ultraviolet light (shown in blue) reveals the glow of young stars in galaxies. Extremely distant, redder galaxies also appear. Some are so distant that they are only visible in infrared light.

Credit for HUDF: NASA, ESA, S. Beckwith (STScI), and the HUDF team

Hubble's powerful vision opens an "undiscovered country" for current and future observatories to explore, helping astronomers piece together the universe's history book.

Credit: NASA, ESA, H. Teplitz and M. Rafelski (IPAC/Caltech), A. Koekemoer (STScI), R. Windhorst (Arizona State University), and Z. Levay (STScI)

VOCABULARY

Galaxy: A collection of millions to billions of stars, gas, dust, and dark matter held together by their mutual gravity.

Ultraviolet (UV) light: Electromagnetic radiation with shorter wavelengths, higher energies, and higher frequencies than visible light. UV light is lower in energy than X-rays.

Near-infrared: The region of the infrared spectrum that is closest to visible light. Near-infrared light has slightly longer wavelengths and slightly lower frequencies and energies than visible light.



STScI

