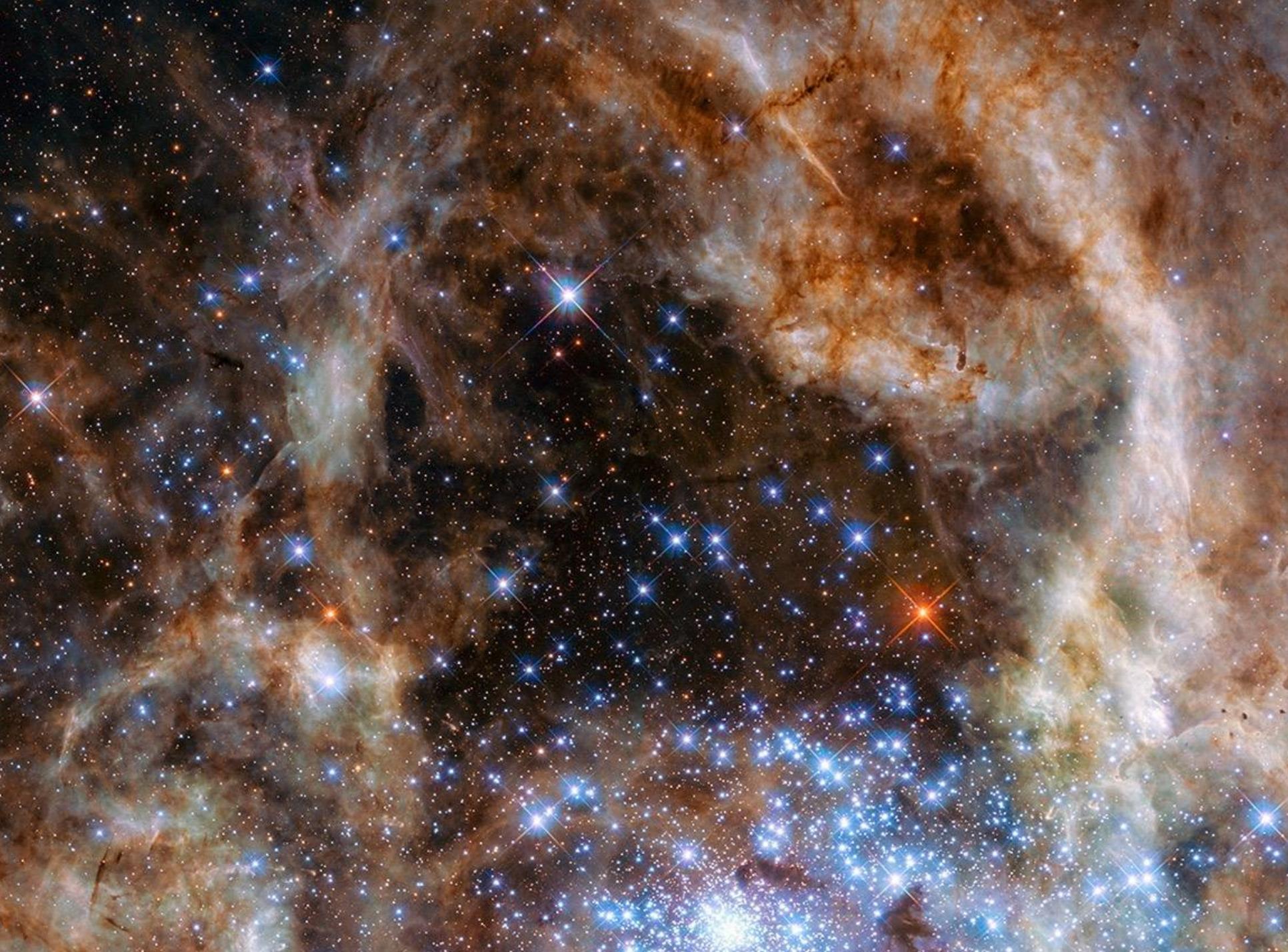


A Curious Cosmos

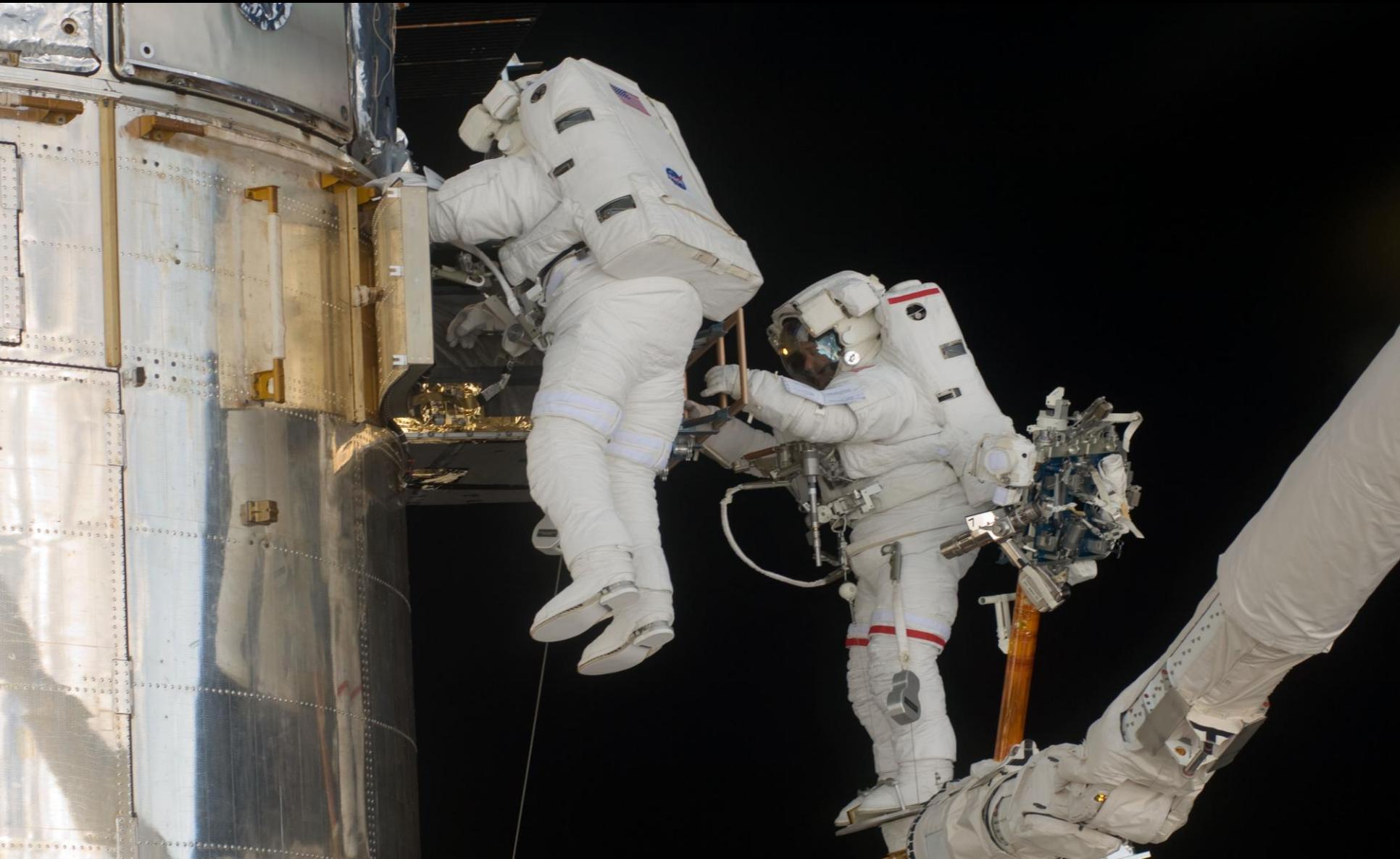
Dr. Jennifer J. Wiseman

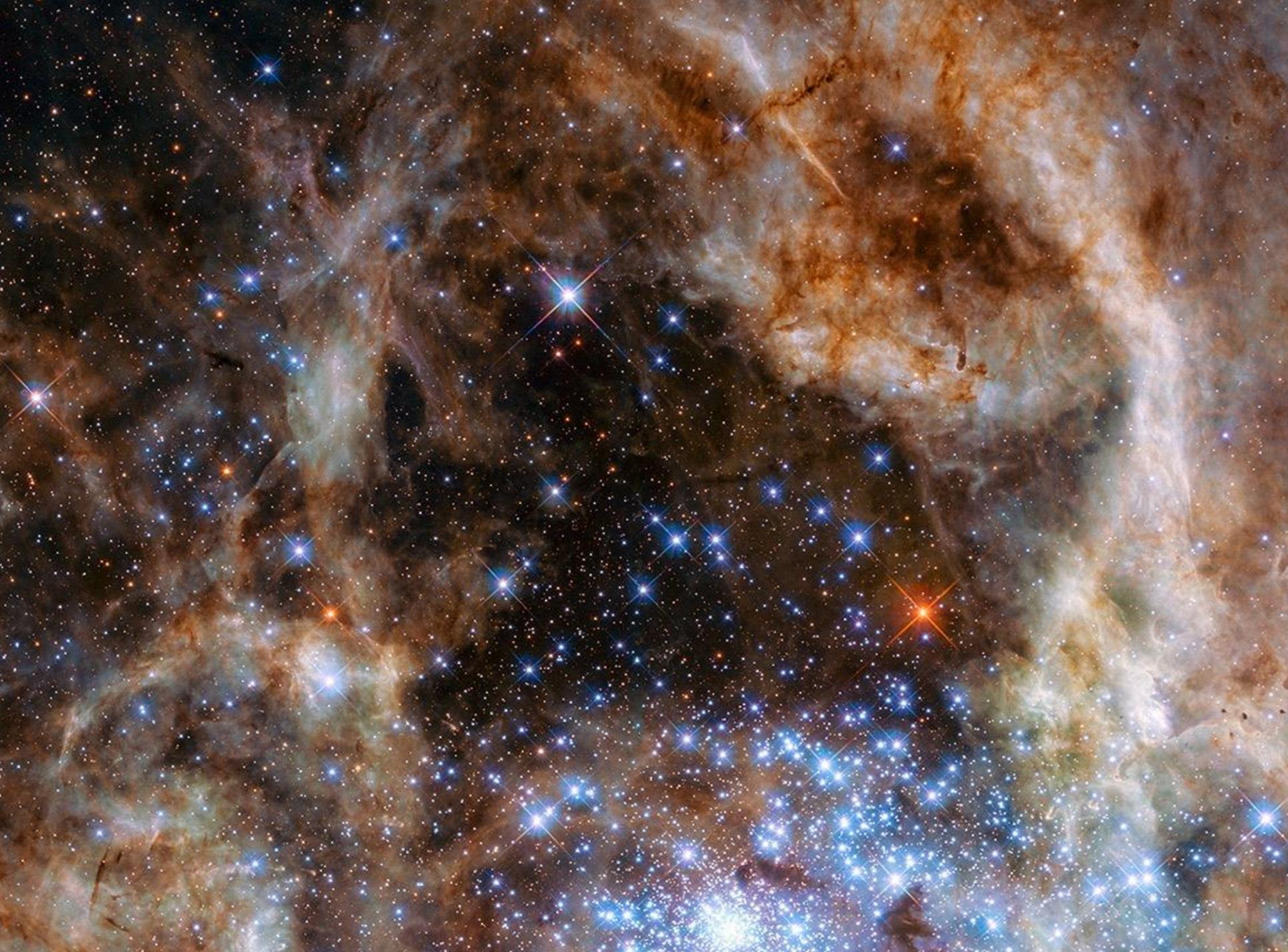




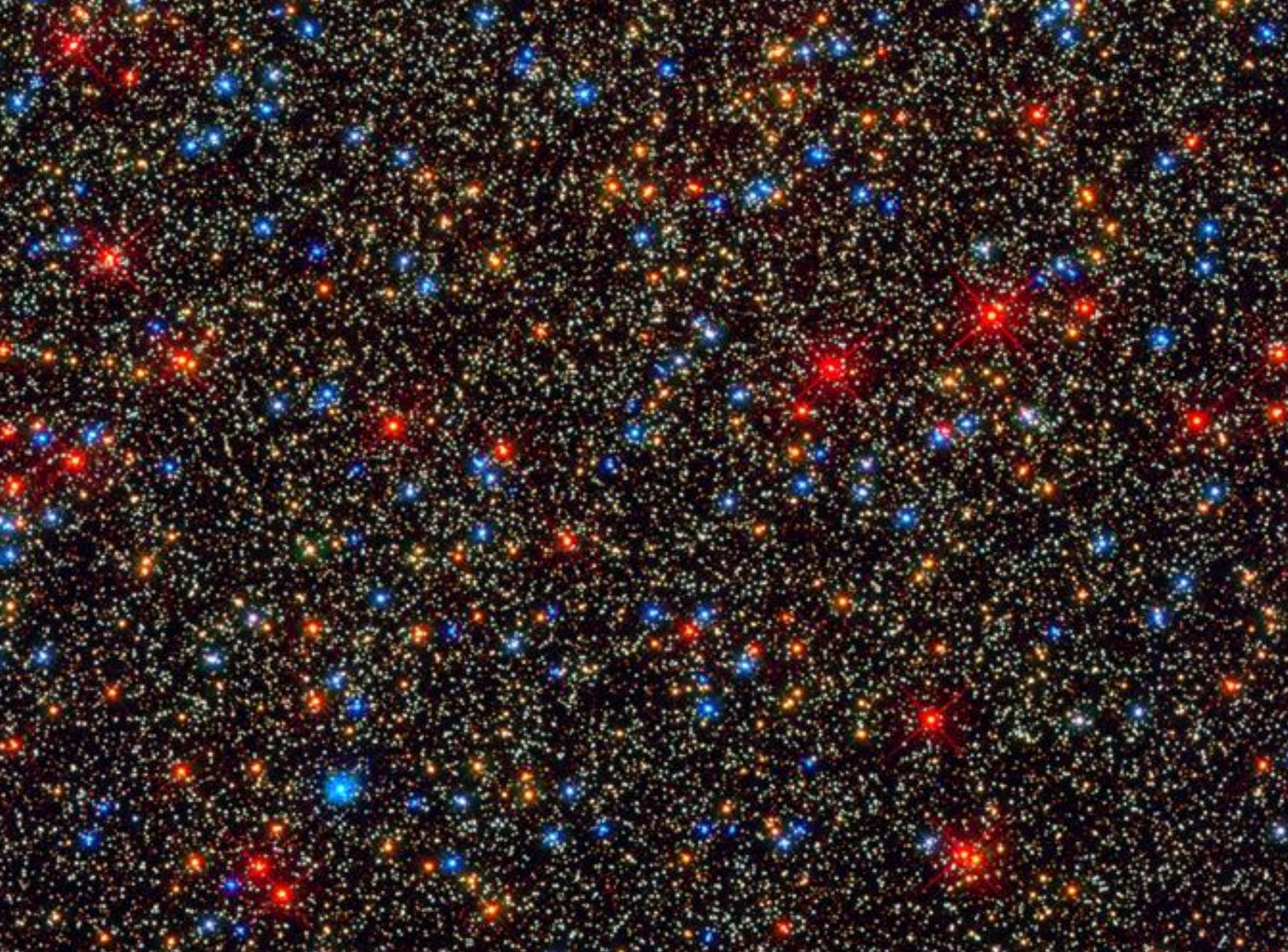


















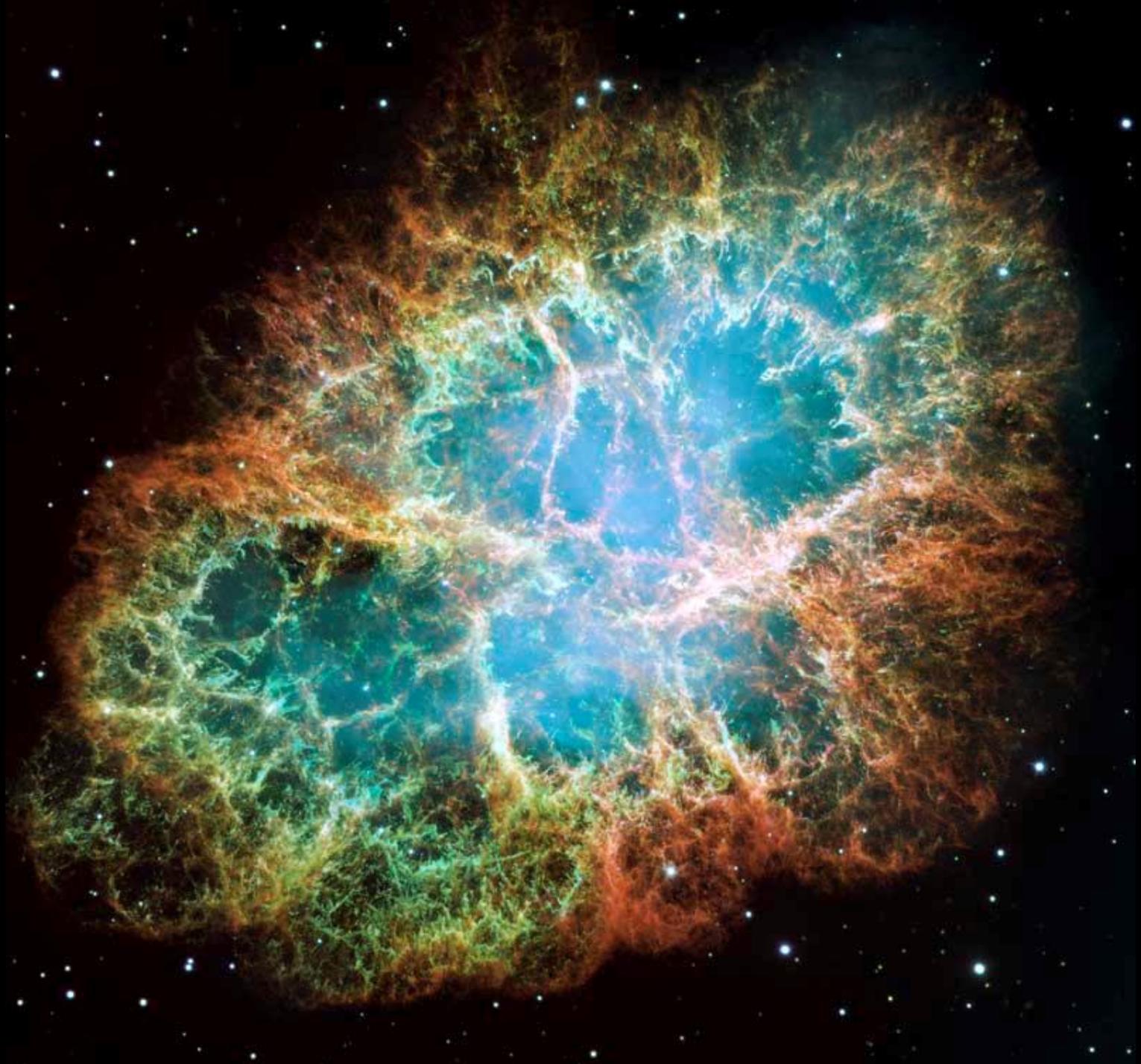
Horsehead Nebula in Infrared



Hubble
Heritage

NASA, ESA, and the Hubble Heritage Team (STScI/AURA)
HST WFC3/IR • STScI-PRC13-12a



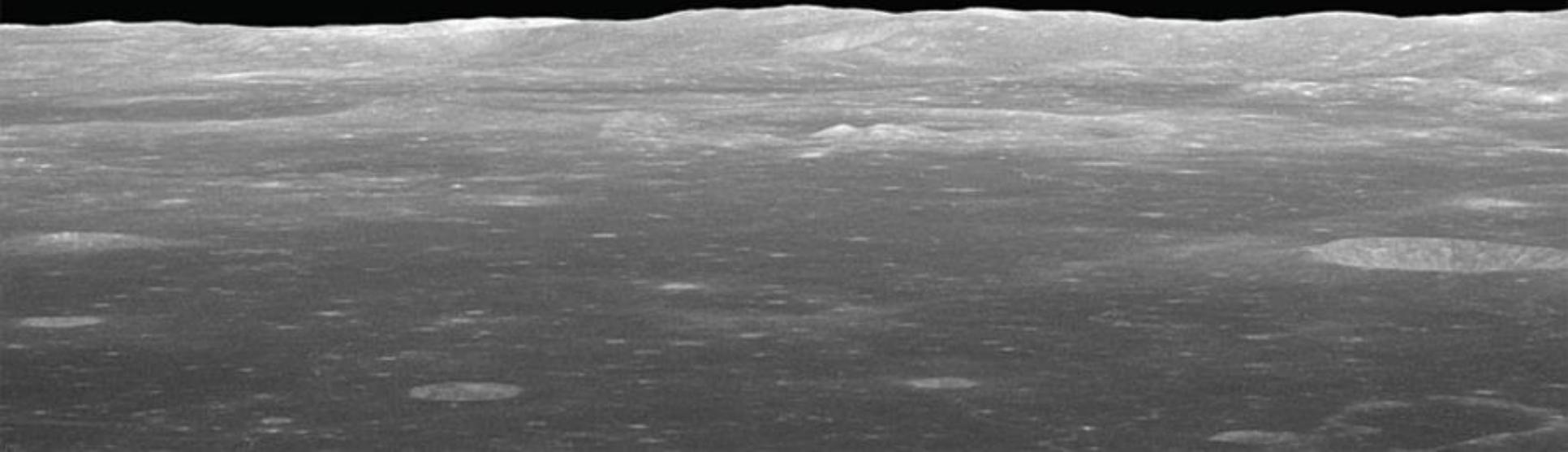




Are there other planets in the universe?



Is there another Earth out there? Life?



What about distant worlds? Thousands of years ago, Greek philosophers speculated.



“There are infinite worlds both like and unlike this world of ours...We must believe that in all worlds there are living creatures and planets and other things we see in this world.”

*Epicurus
c. 300 B.C*

And so did medieval scholars.

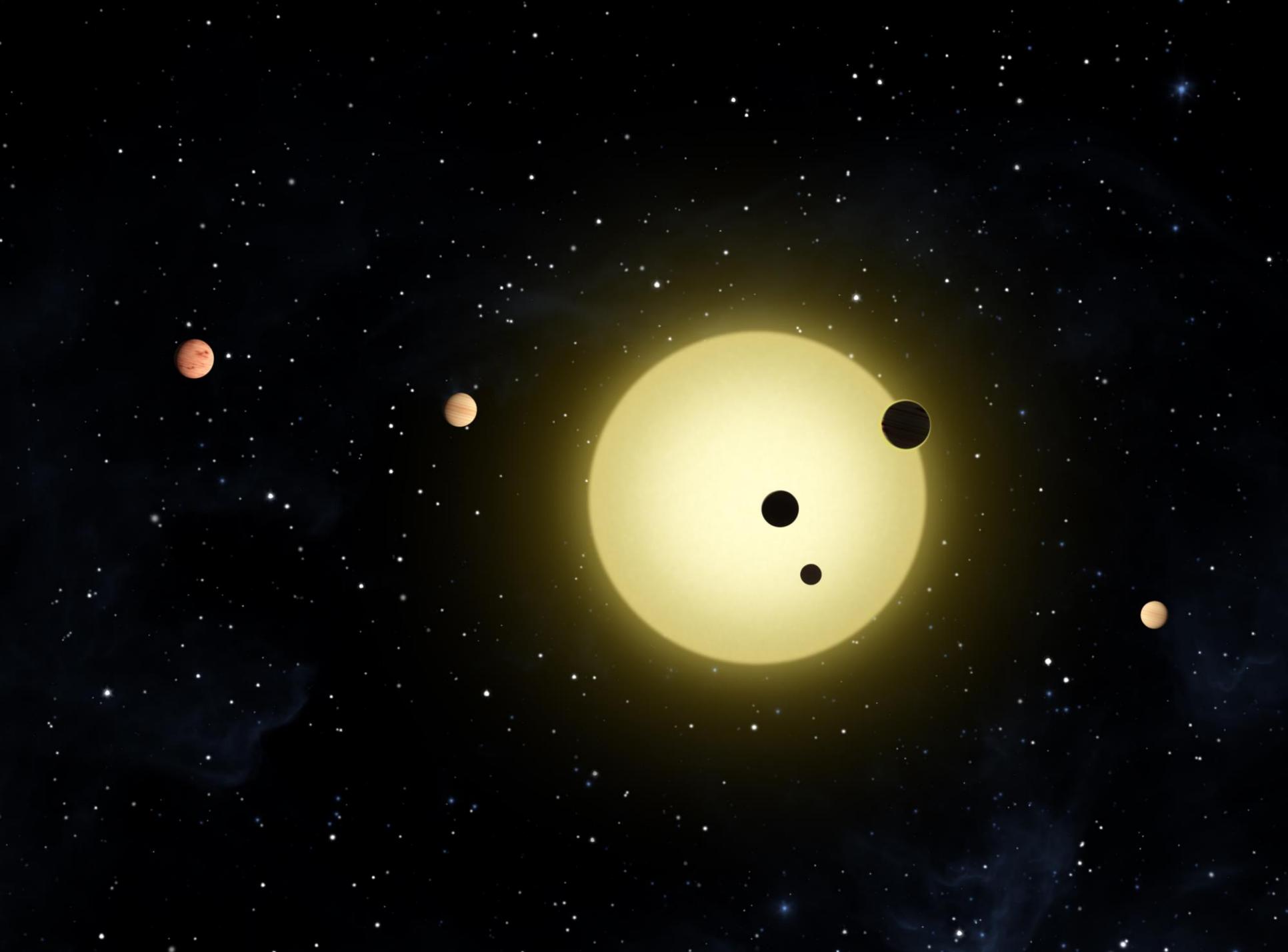
The year 1584

"There are countless suns and countless earths all rotating around their suns in exactly the same way as the seven planets of our system . . . The countless worlds in the universe are no worse and no less inhabited than our Earth"

Giordano Bruno
in *De L'infinito*
Universo E Mondi

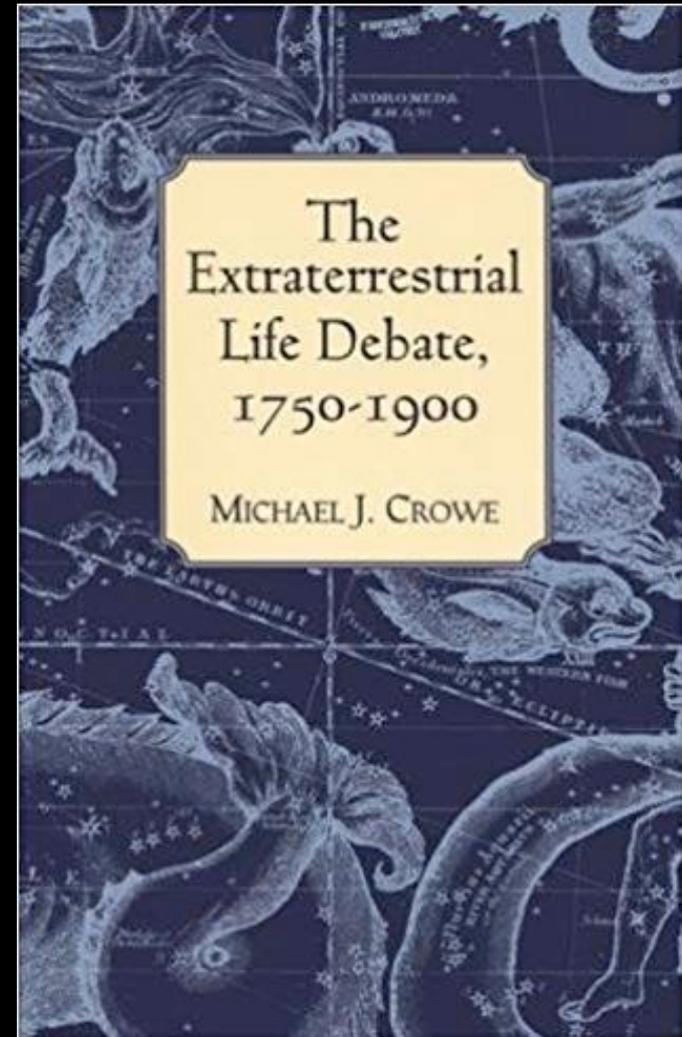
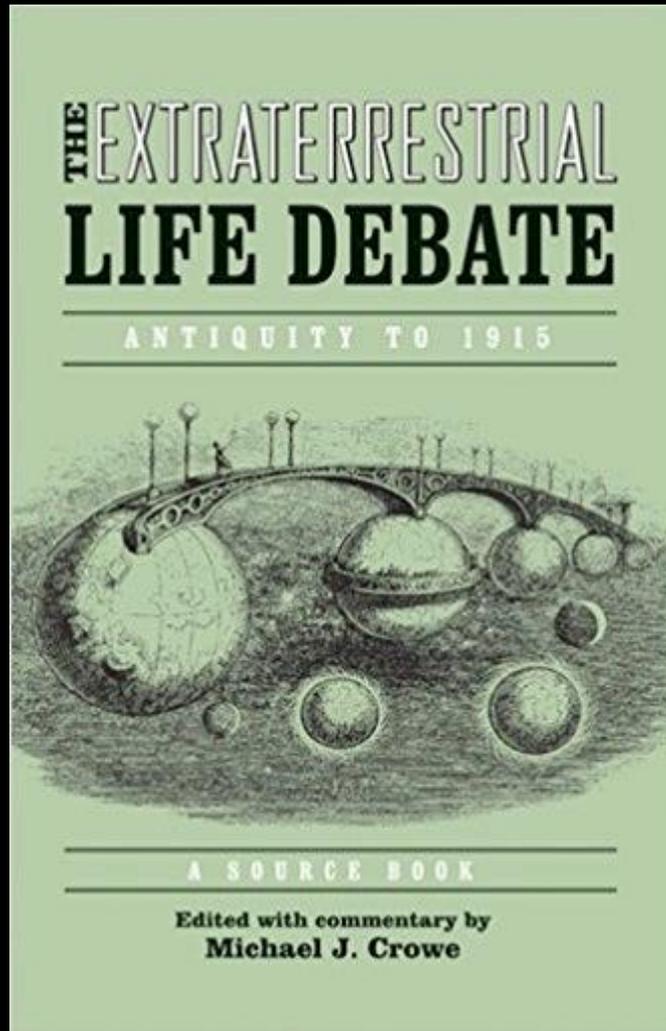








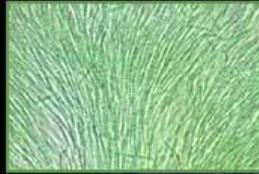
Michael Crowe: Extraterrestrial Life Debate Sourcebooks



And how will we know a planet supports life?

Look for evidence of oxygen

O_3 Ozone, produced by plants, algae

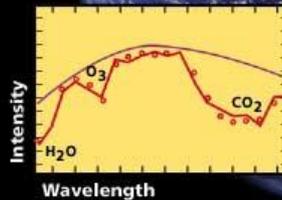


Look for liquid water

H_2O Liquid water



Analyze the reflected light from the planet to see if the planet has an atmosphere



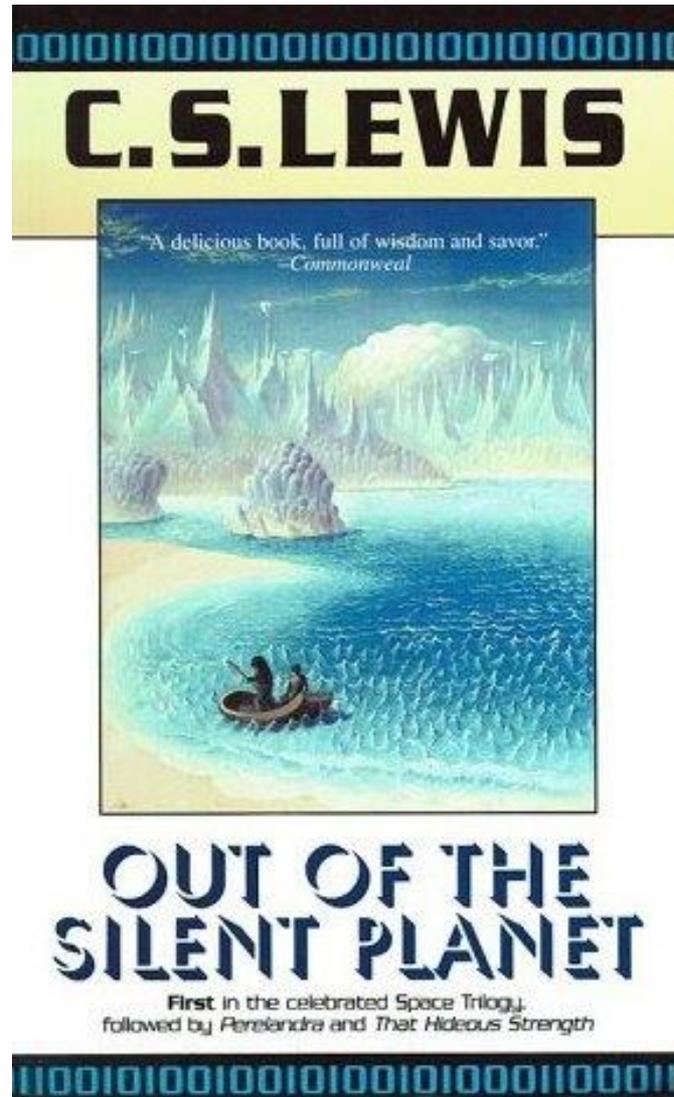
Look for signs of biological activity (methane)



Methane produced by living organisms

and rule out other explanations.

C.S. Lewis wrote about the spiritual state of possible life elsewhere...

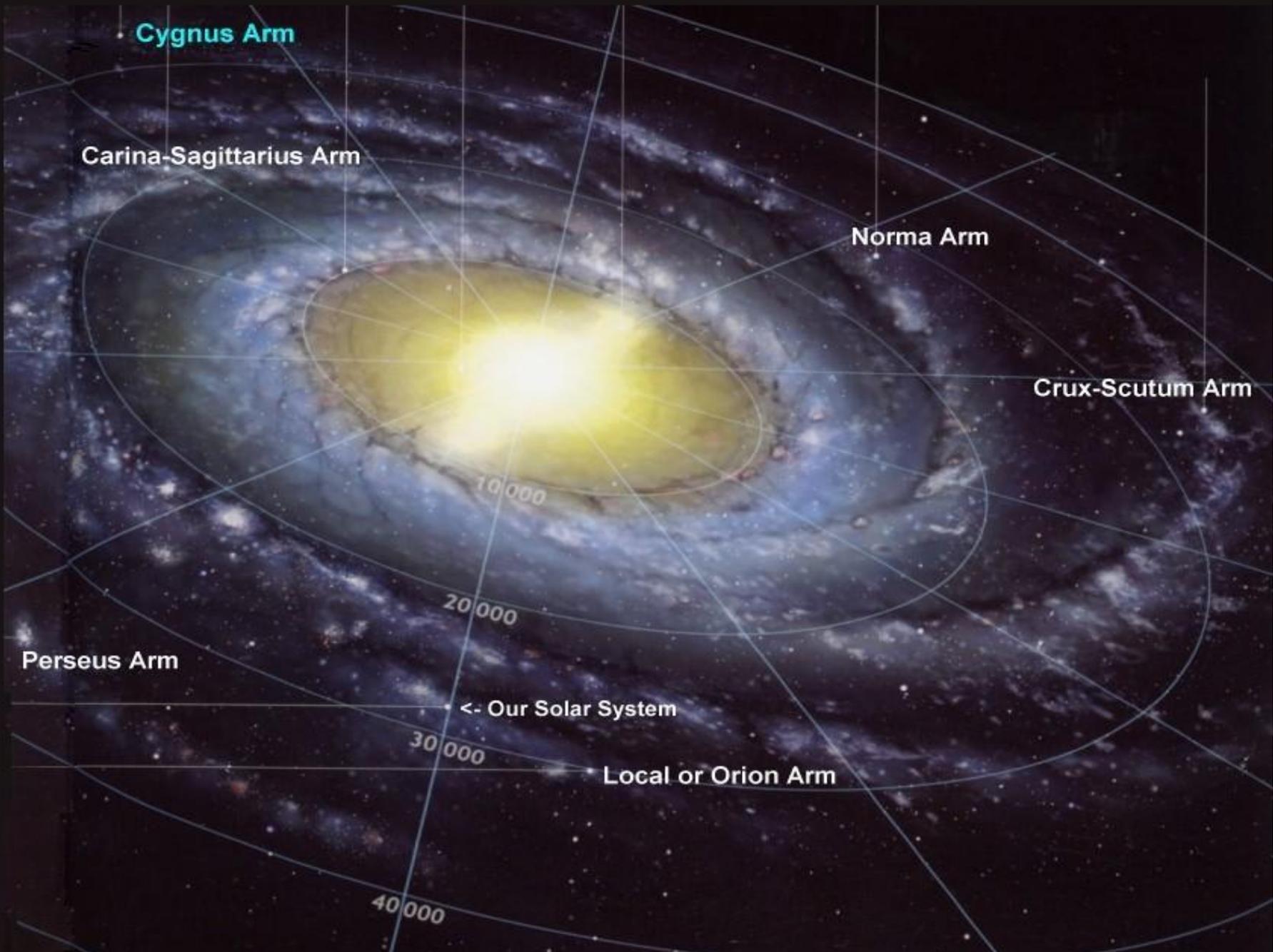


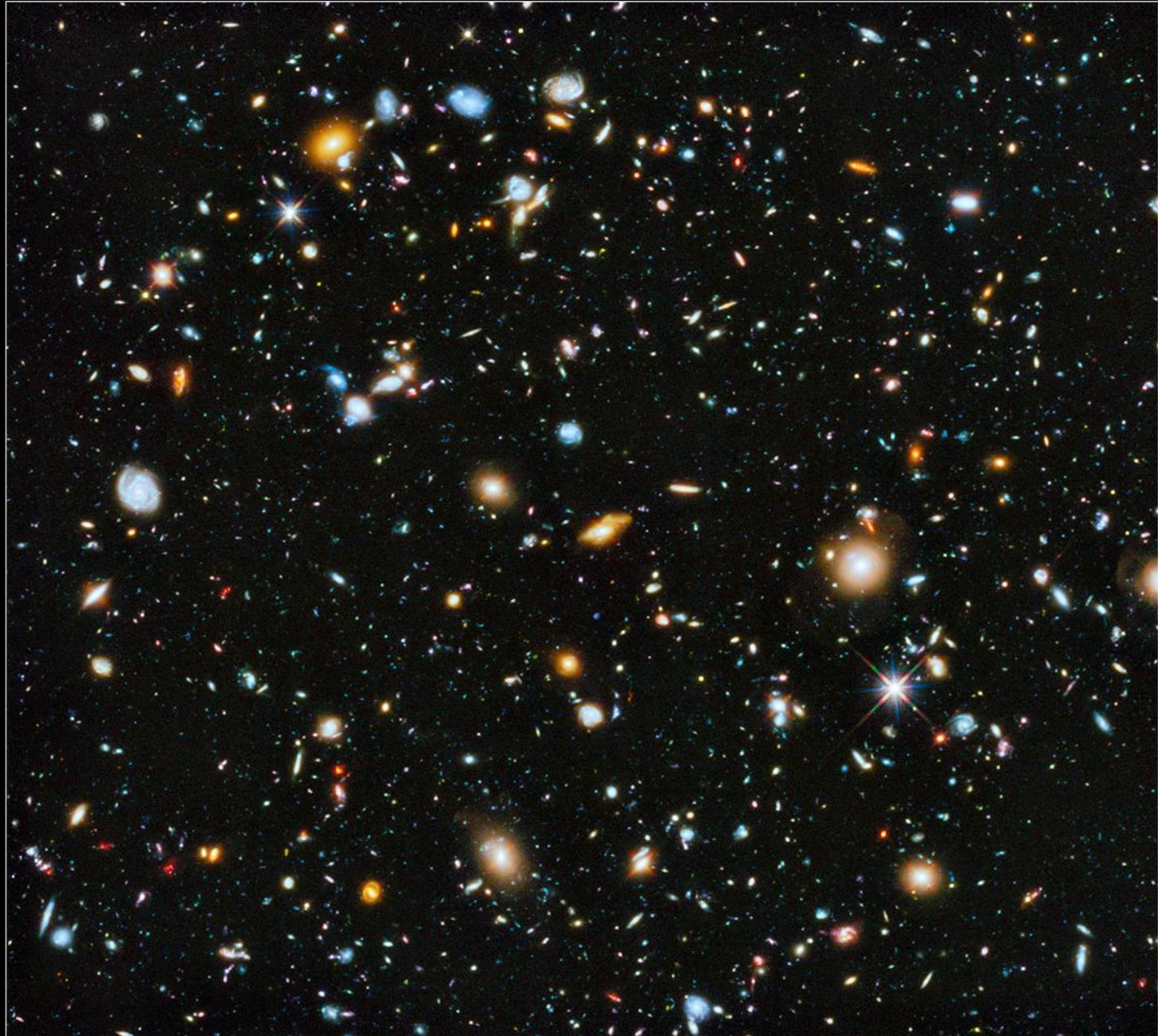
Spiral Galaxy NGC 1309



Hubble
Heritage

NASA, ESA, The Hubble Heritage Team (STScI/AURA), and A. Riess (STScI)
Hubble Space Telescope ACS • STScI-PRC06-07





June 3, 2014

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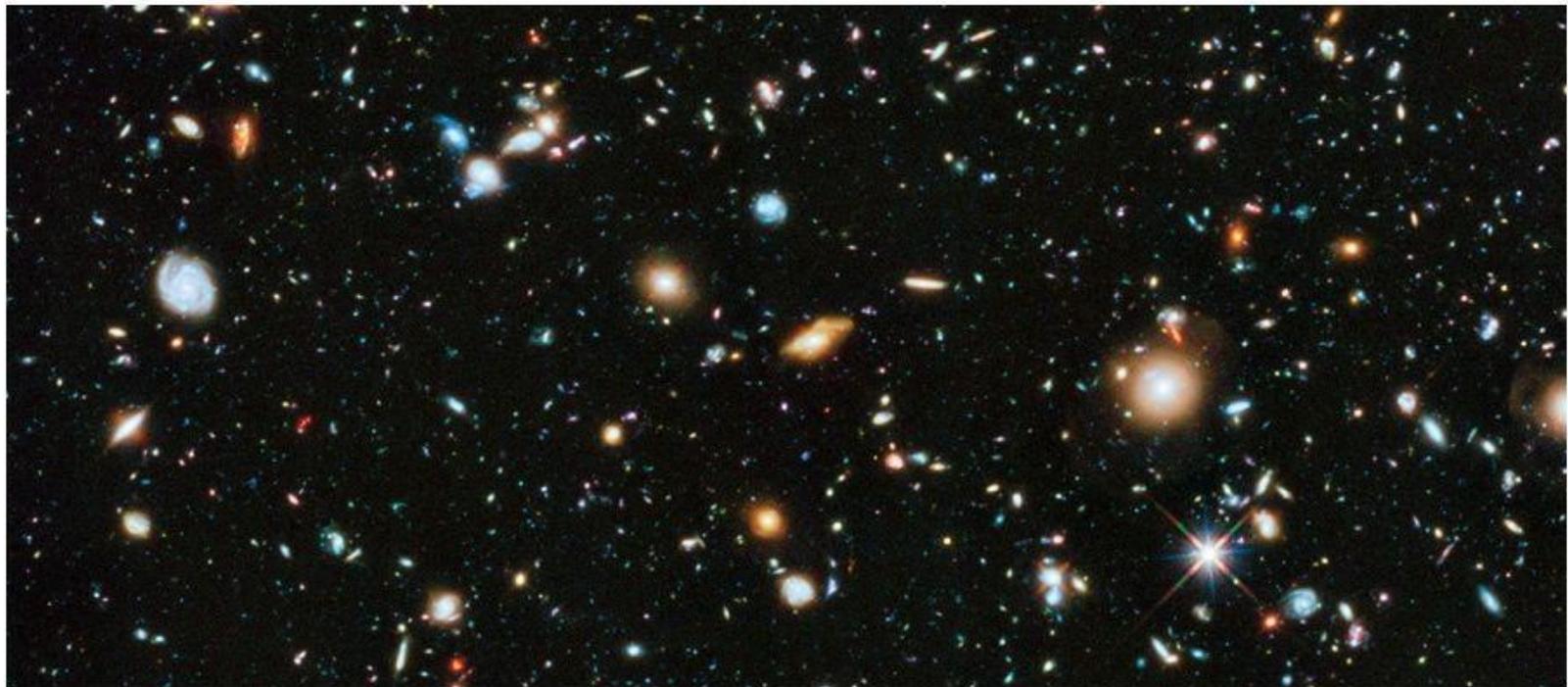
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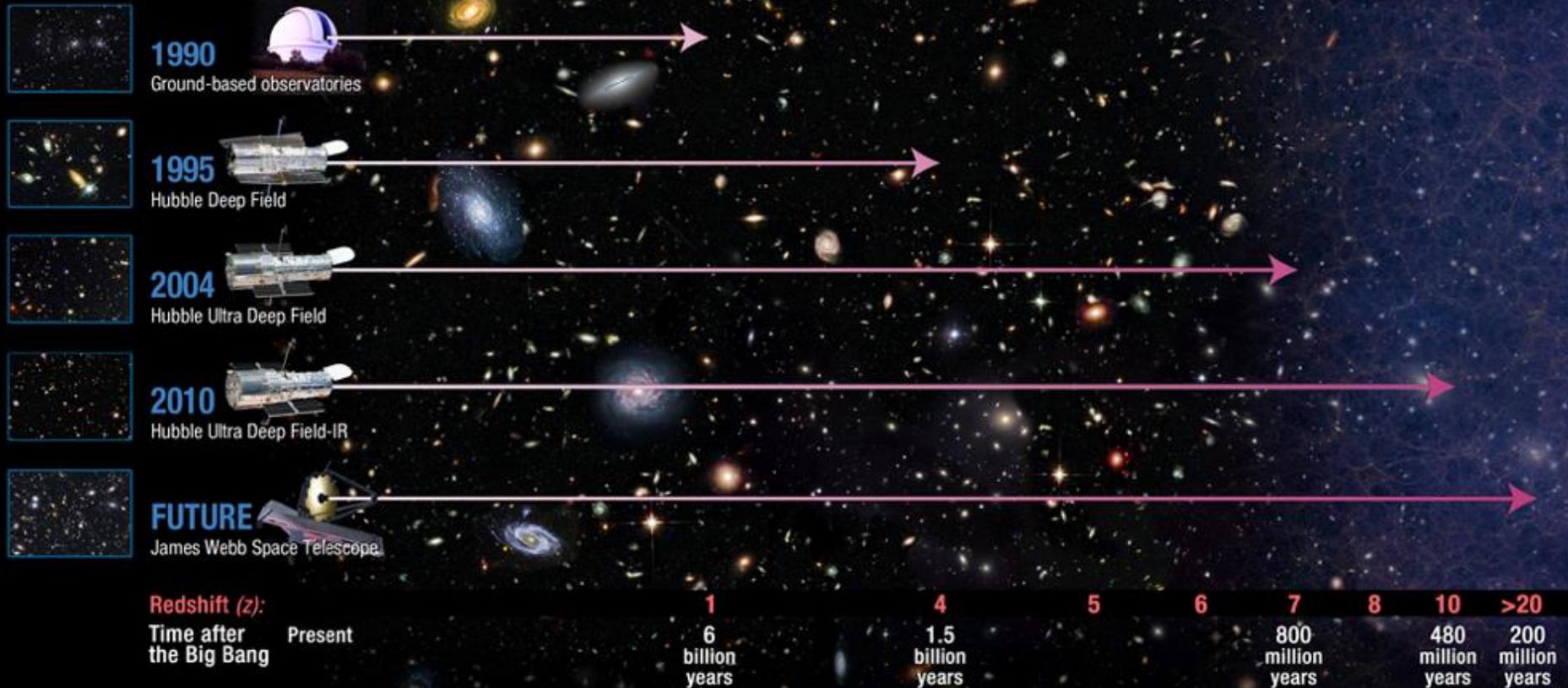
HOLY HUBBLE!

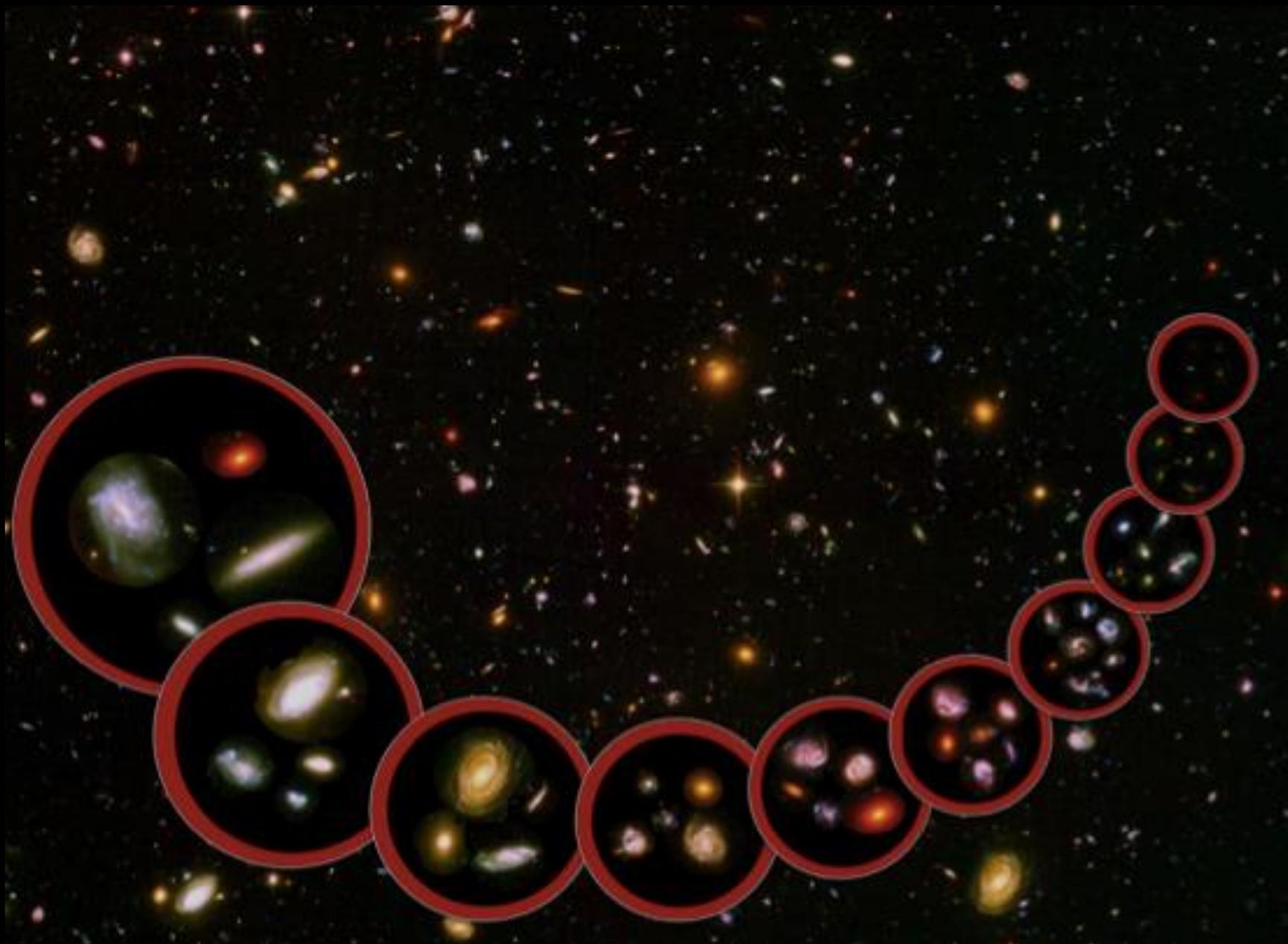


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Looking Deep Into Space and Time

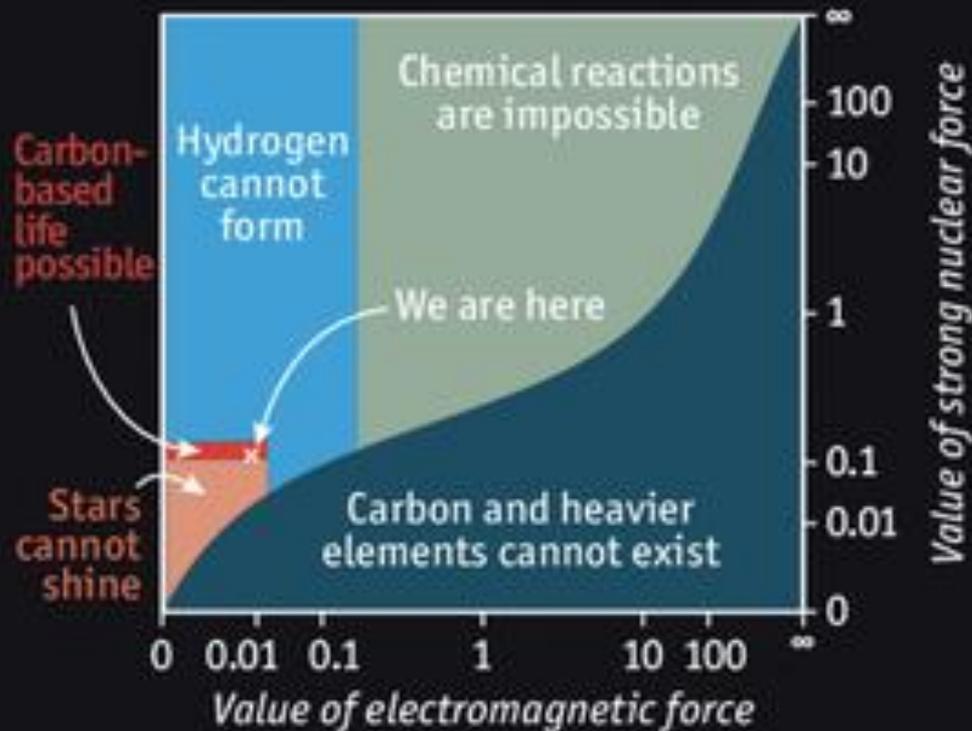
Hubble Probes the Early Universe





The Goldilocks zone

Consequences of varying physical constants



Source: Luke Barnes, University of Sydney

The Universe has developed over time and continues to mature and change, with the production of stars, heavier elements, and planets, providing conditions needed for life to thrive (on at least one planet!)

The Universe has developed over time and continues to mature and change, with the production of stars, heavier elements, and planets, providing conditions needed for life to thrive (on at least one planet!)

=> Purpose ?

Does the Universe Have a Purpose?



Unlikely.

Lawrence M. Krauss is Professor of Physics and Astronomy at Case Western Reserve University.



Yes.

David Gelernter is a professor of computer science at Yale and a National fellow at the American Enterprise Institute.



Perhaps.

Paul Davies is a physicist, cosmologist, and astrobiologist. He is the director of the Beyond Center at Arizona State University.



No.

Peter William Atkins is a Fellow and professor of chemistry at Lincoln College, Oxford.



Indeed.

Nancey Murphy is Professor of Christian Philosophy at Fuller Theological Seminary.



Yes.

Owen Gingerich is Professor Emeritus of Astronomy and of the History of Science at Harvard University and a senior astronomer emeritus at the Smithsonian Astrophysical Observatory.



Very Likely.

Bruno Guiderdoni is an astrophysicist and the Director of the Observatory of Lyon, France.



No.

Christian de Duve is a biochemist. He received the 1974 Nobel Prize in Physiology and Medicine.



Yes.

John F. Haught is Senior Fellow, Science & Religion, at the Woodstock Theological Center, Georgetown University.



Not Sure.

Neil deGrasse Tyson is an astrophysicist and the Director of New York City's Hayden Planetarium.



Certainly.

Jane Goodall is the founder of the Jane Goodall Institute and a UN Messenger of Peace.



I Hope So.

Elie Wiesel is the Andrew W. Mellon Professor in the Humanities and University Professor at Boston University.

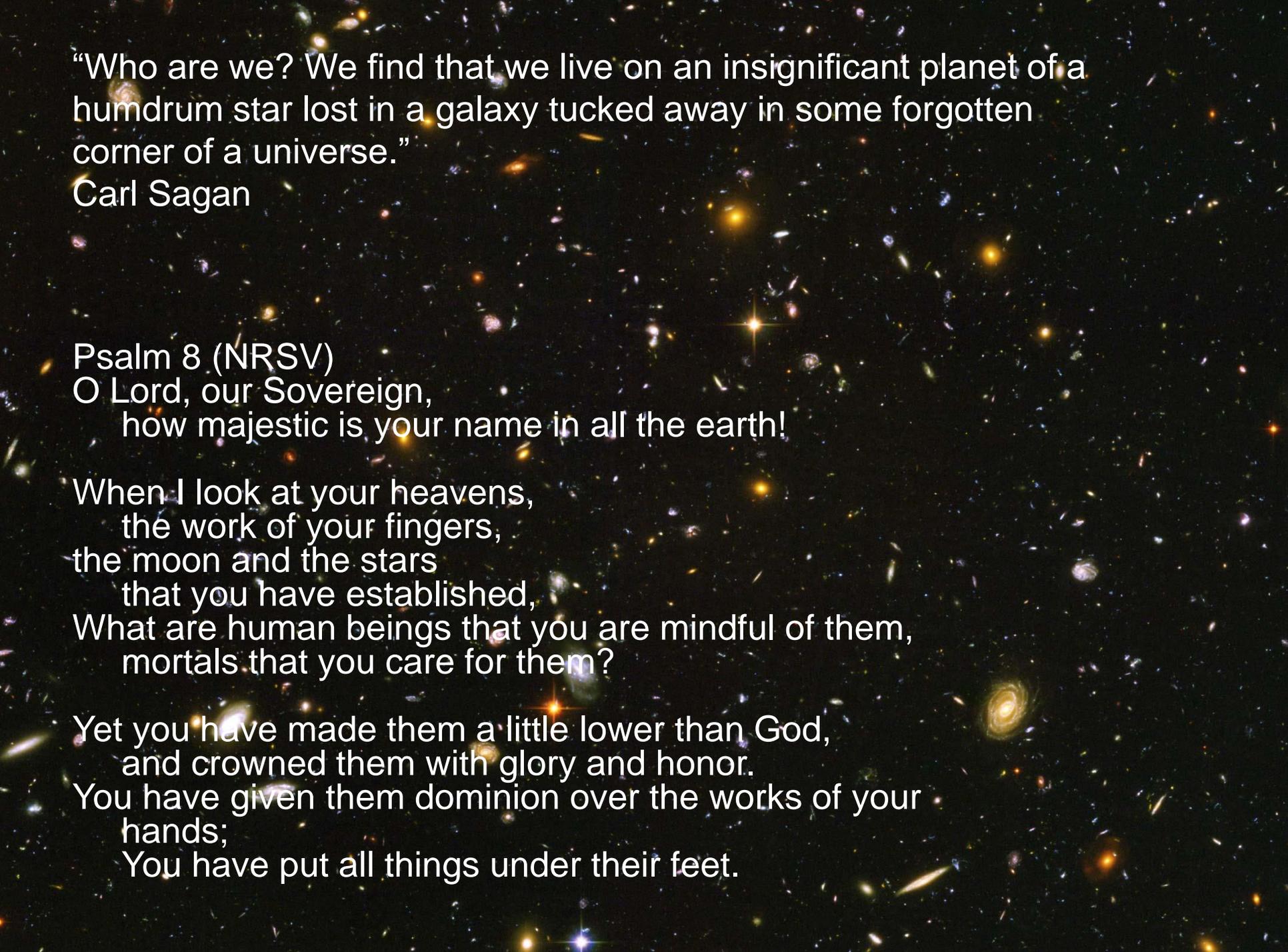
***“It would not be surprising if it should turn out that the origin and destiny of the energy in the universe cannot be completely understood in isolation from the phenomena of life and consciousness... And the design of the inanimate universe may not be as detached from the potentialities of life and intelligence as scientists of the twentieth century have tended to suppose.” --
Freeman Dyson, physicist***

IS THERE PURPOSE IN BIOLOGY?



THE COST OF EXISTENCE
AND THE GOD OF LOVE

DENIS ALEXANDER

A deep space photograph showing a vast field of galaxies and stars against a black background. The galaxies are scattered across the frame, some appearing as bright, glowing clouds of gas and dust, while others are more distant and faint. The stars are numerous, with some showing prominent diffraction spikes. The overall scene is a rich, multi-colored tapestry of cosmic light.

“Who are we? We find that we live on an insignificant planet of a humdrum star lost in a galaxy tucked away in some forgotten corner of a universe.”

Carl Sagan

Psalm 8 (NRSV)

O Lord, our Sovereign,
how majestic is your name in all the earth!

When I look at your heavens,
the work of your fingers,
the moon and the stars
that you have established,
What are human beings that you are mindful of them,
mortals that you care for them?

Yet you have made them a little lower than God,
and crowned them with glory and honor.
You have given them dominion over the works of your
hands;
You have put all things under their feet.

Jesus, the Word made flesh, who dwelt among us!

In the beginning was the Word, and the Word was with God, and the Word was God... **Through him all things were made**; without him nothing was made that has been made. ⁴ **In him was life**, and that life was the light of all mankind...

¹⁴ **The Word became flesh and made his dwelling among us.** We have seen his glory, the glory of the one and only Son, who came from the Father, full of grace and truth...

¹⁸ No one has ever seen God, but the one and only Son, who is himself God and is in the closest relationship with the Father, has made him known. (from John 1)



Galileo Image

How Do We Respond To This Amazing
Universe?

How Should We?

We give praise!

And feel humility, awe.

We care for our own planet and all its
inhabitants as good stewards

We explore and learn!

The Universe always holds
New Discoveries, New Mysteries, New
Surprises, New Questions...

Curiosity drives discovery...

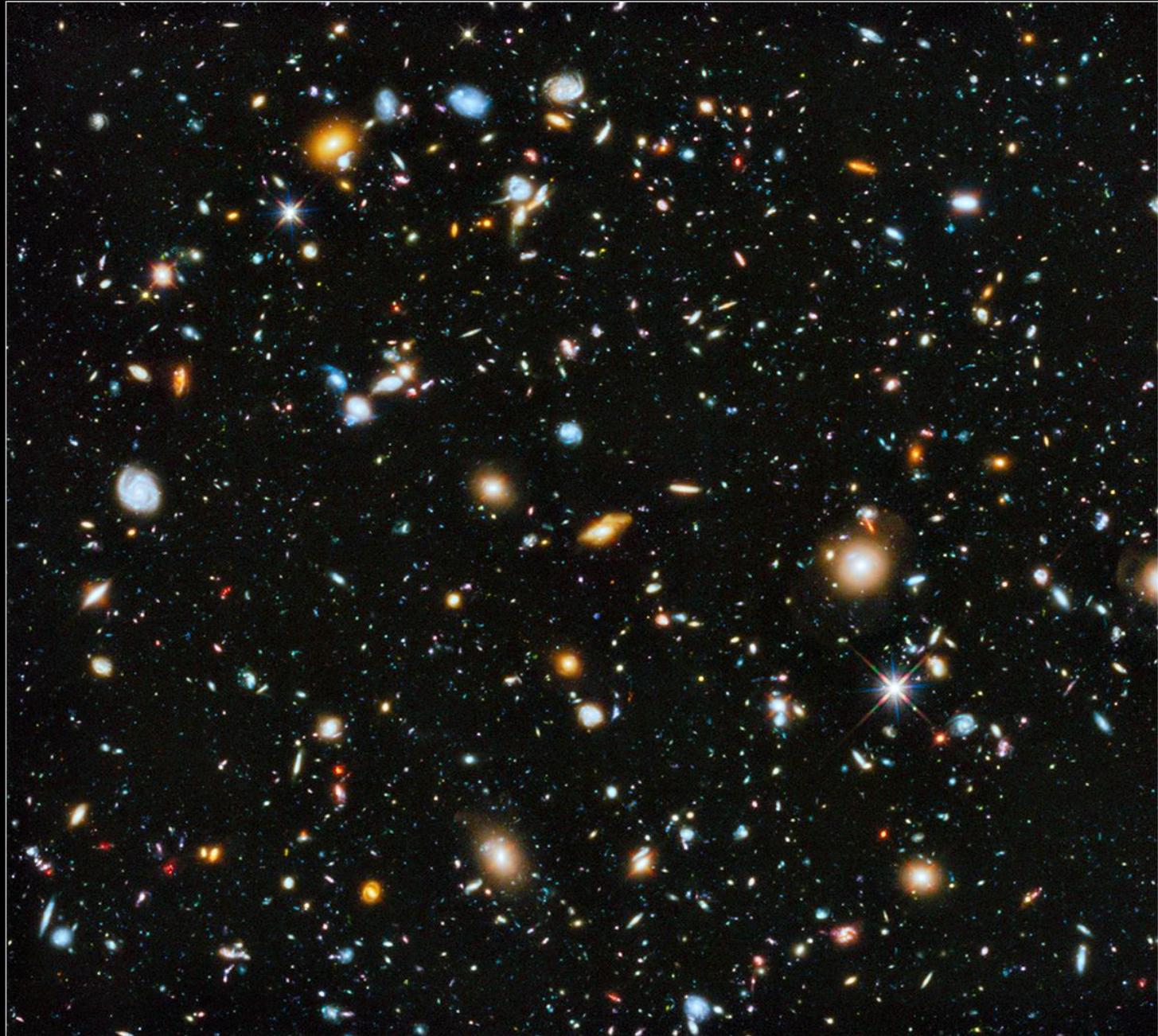
What is Dark Matter?

What is Dark Energy?

Are there other planets like Earth?

Is there Life beyond Earth?



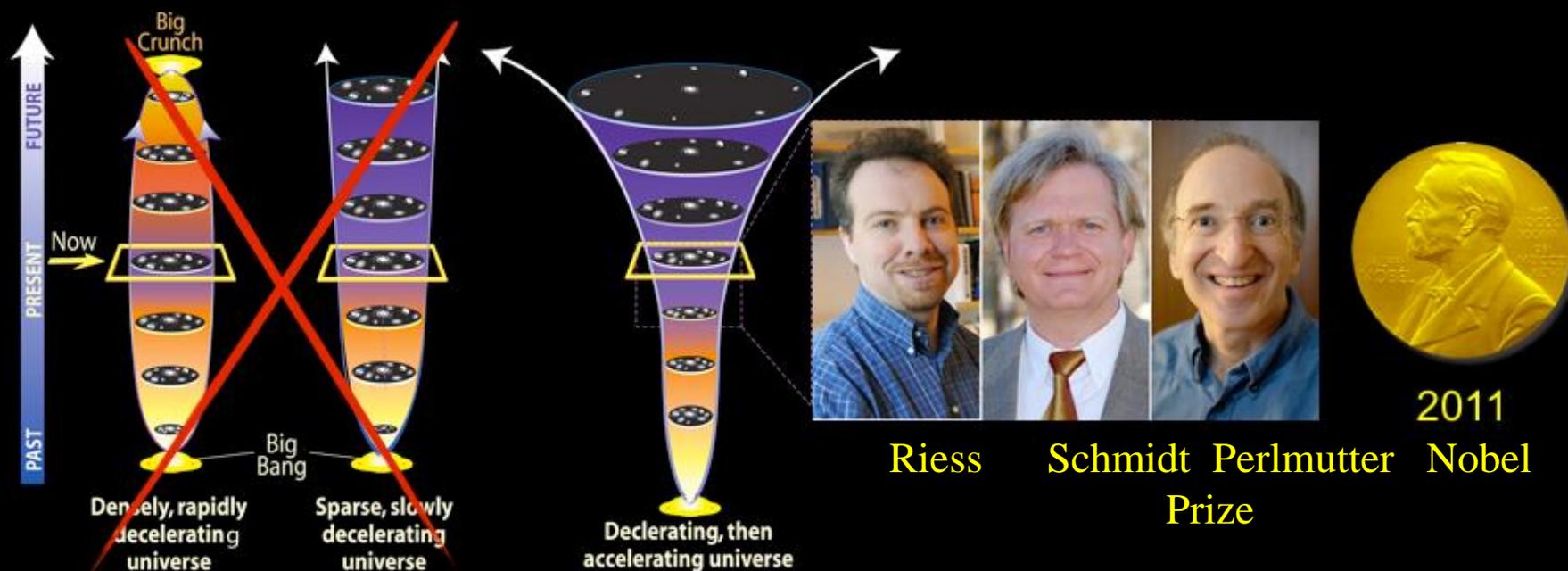


The Expansion of the Universe is Accelerating

!!

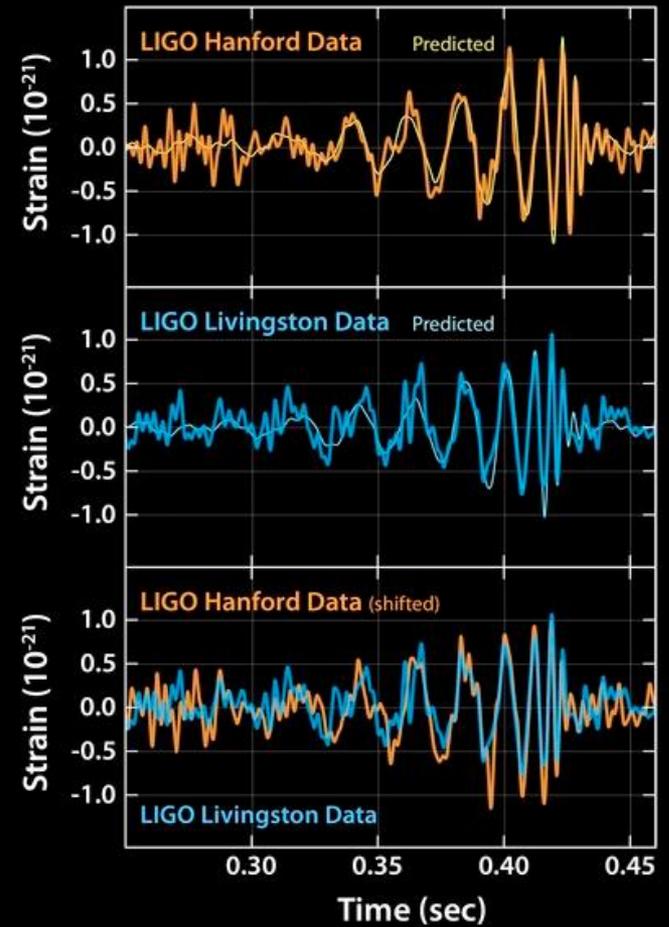
- Telescopes on the ground and in space (Hubble!) have played key roles in detecting the acceleration of the expanding universe and in the continuing study of “Dark Energy” (DE)

An accelerating Universe!



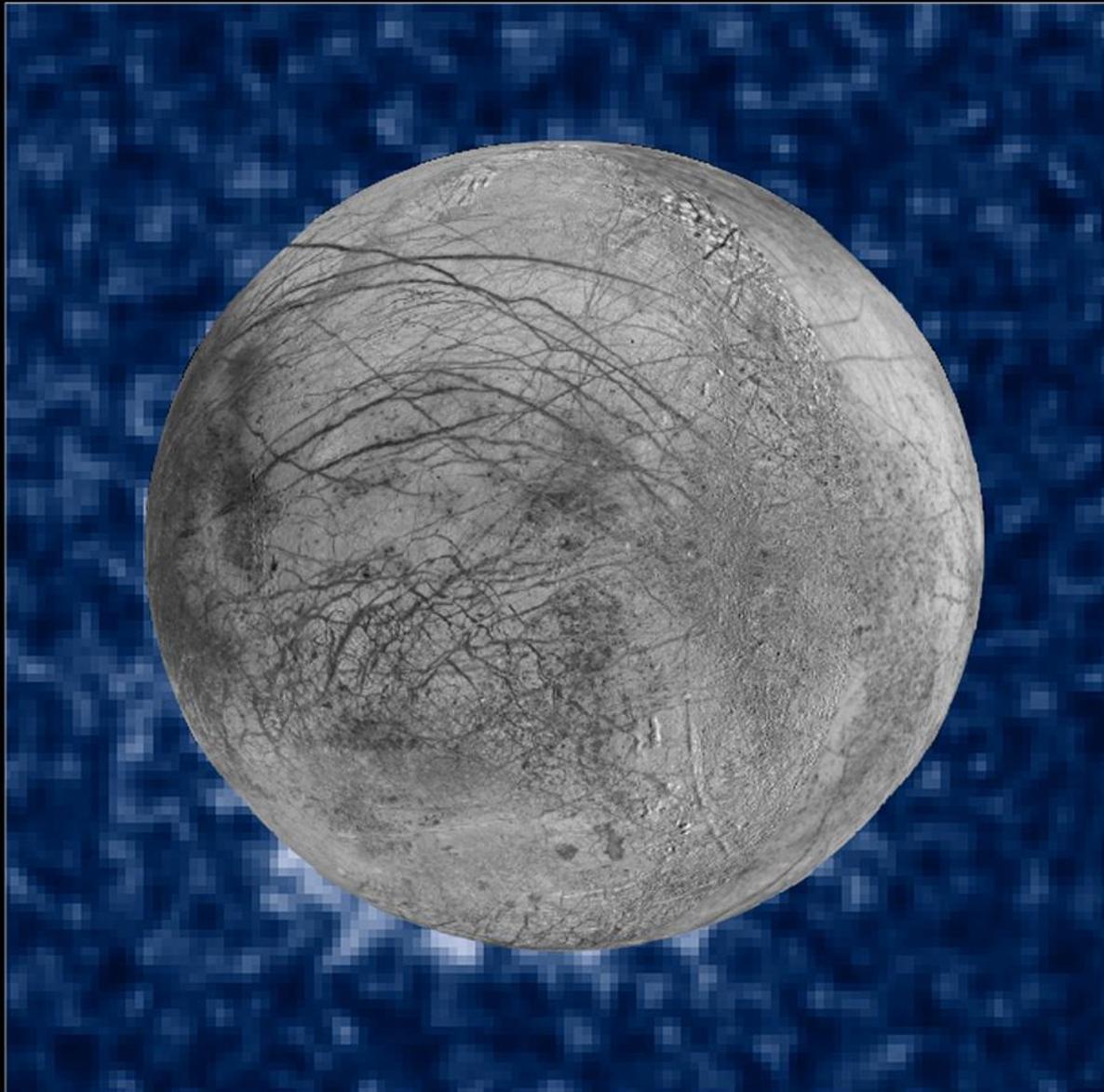
the Universe is being pushed apart, and we don't know by what..

Gravitational Waves Detected!



Europa Plumes

HST STIS ■ Galileo



Plumes on Jupiter's Moon Europa
HST STIS/MAMA



Europa map from
Galileo mission

Plumes

1,000 mi

1,610 km



A stunning astronomical image of a nebula, likely the Carina Nebula, featuring a dense cluster of stars in the center. The nebula's structure is complex, with various colors including purple, blue, orange, and red, set against a dark background filled with many bright blue stars.

The Universe
Inspires!!

*The heavens declare the glory of God;
the skies proclaim the work of his hands.*

*Day after day they pour forth speech;
night after night they reveal knowledge.*

*They have no speech, they use no words;
no sound is heard from them.*

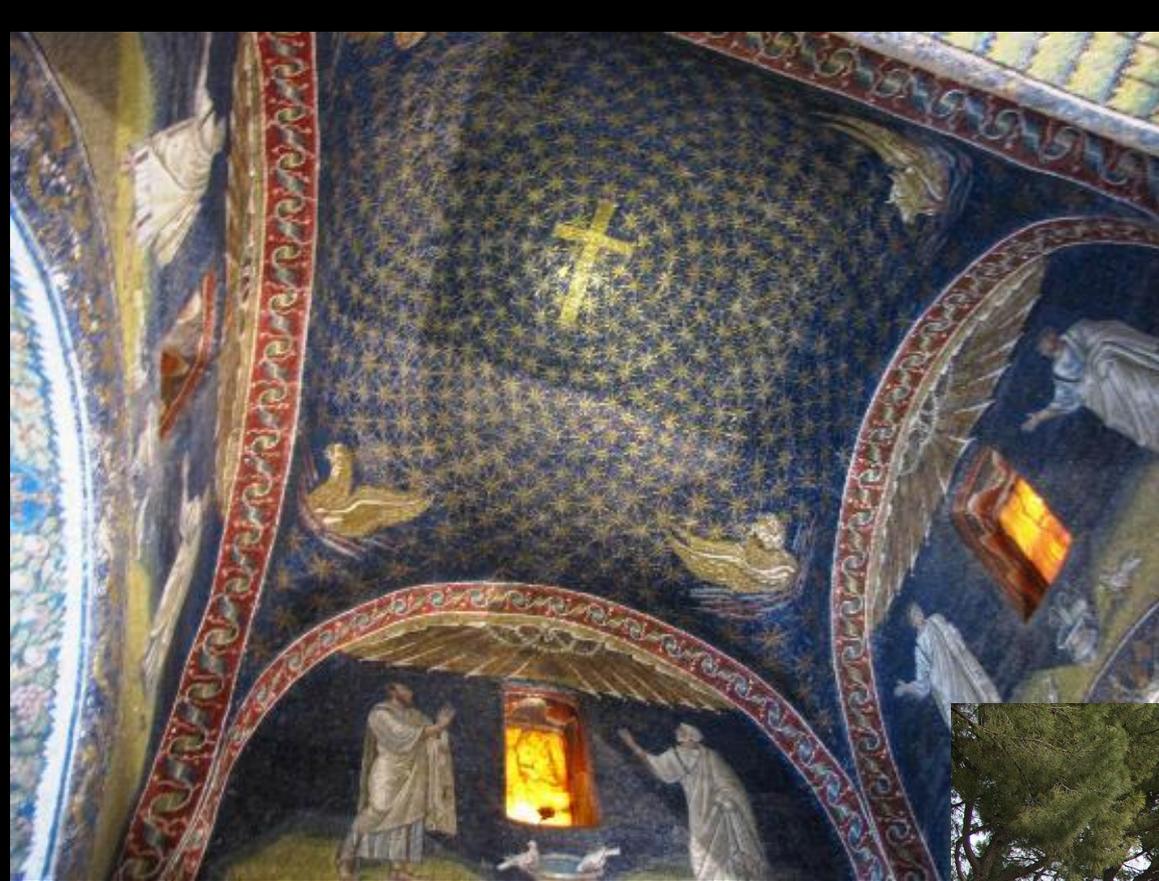
*Yet their voice goes out into all the earth,
their words to the ends of the world.*

(Psalm 19:1-4)



Mashid
F625-08

Mashid Fathi



Mausoleo di Galla Placidia

Ravenna, Italy





Mausoleo di Galla Placidia]
Cielo Stellato Cupola

Ravenna, Italy





Good Resources:

Book: **“The Language of God”**, by Francis Collins (Director of the U.S. Human Genome Project; Free Press, 2006)

Book: **“The Book of the Cosmos: Imagining the Universe from Heraclitus to Hawking”** (Editor Prof. Dennis Danielson, UBC; Perseus, 2000)

Organization: **Christians in Science (CIS)**: (Based in U.K.; studies intersections of science and Christianity)

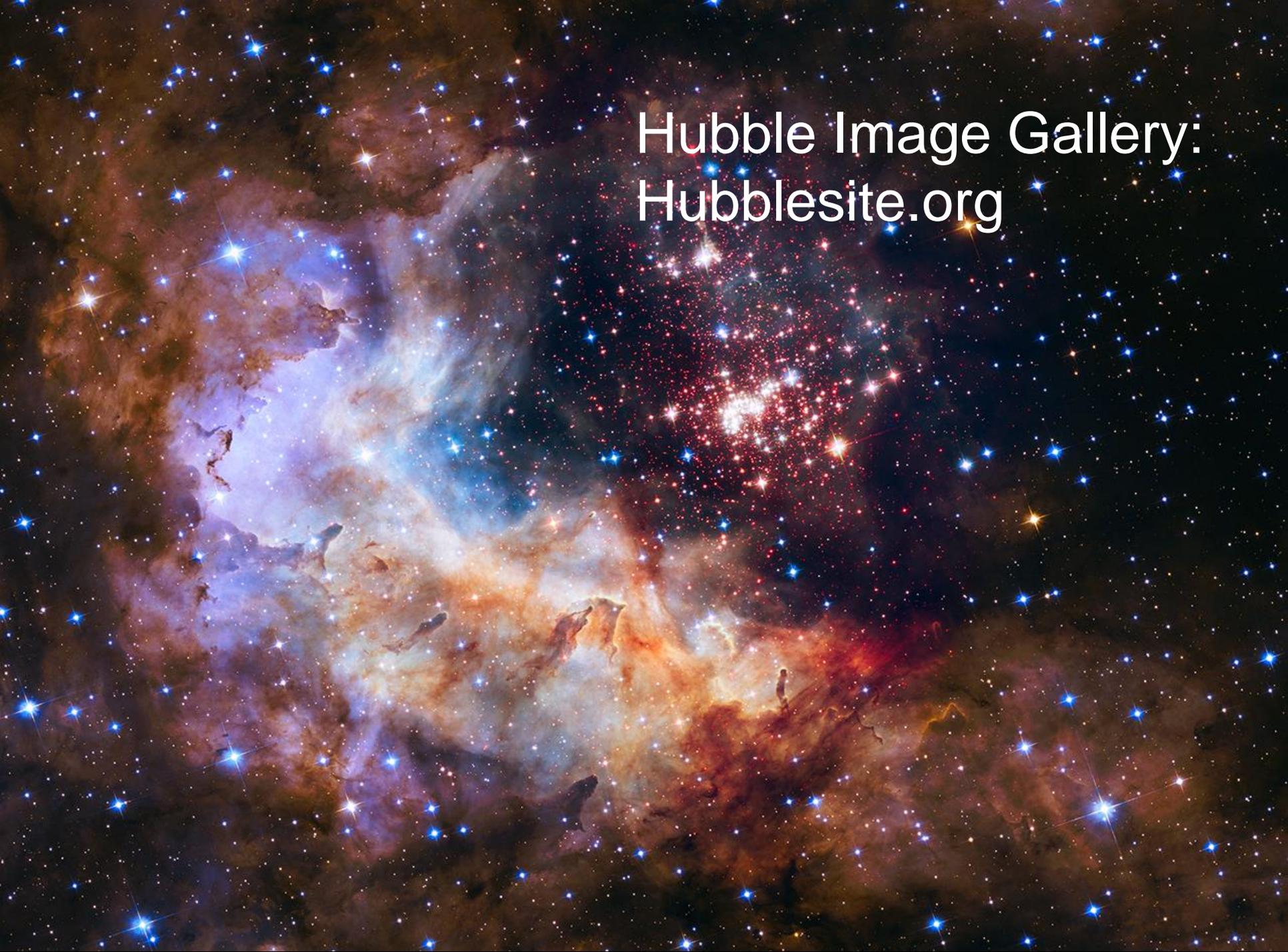
Organization: **American Scientific Affiliation (ASA)**:
<http://www.asa3.org> (a network of scientists, engineers, teachers, and science enthusiasts interested in the relationship of science and Christian faith)

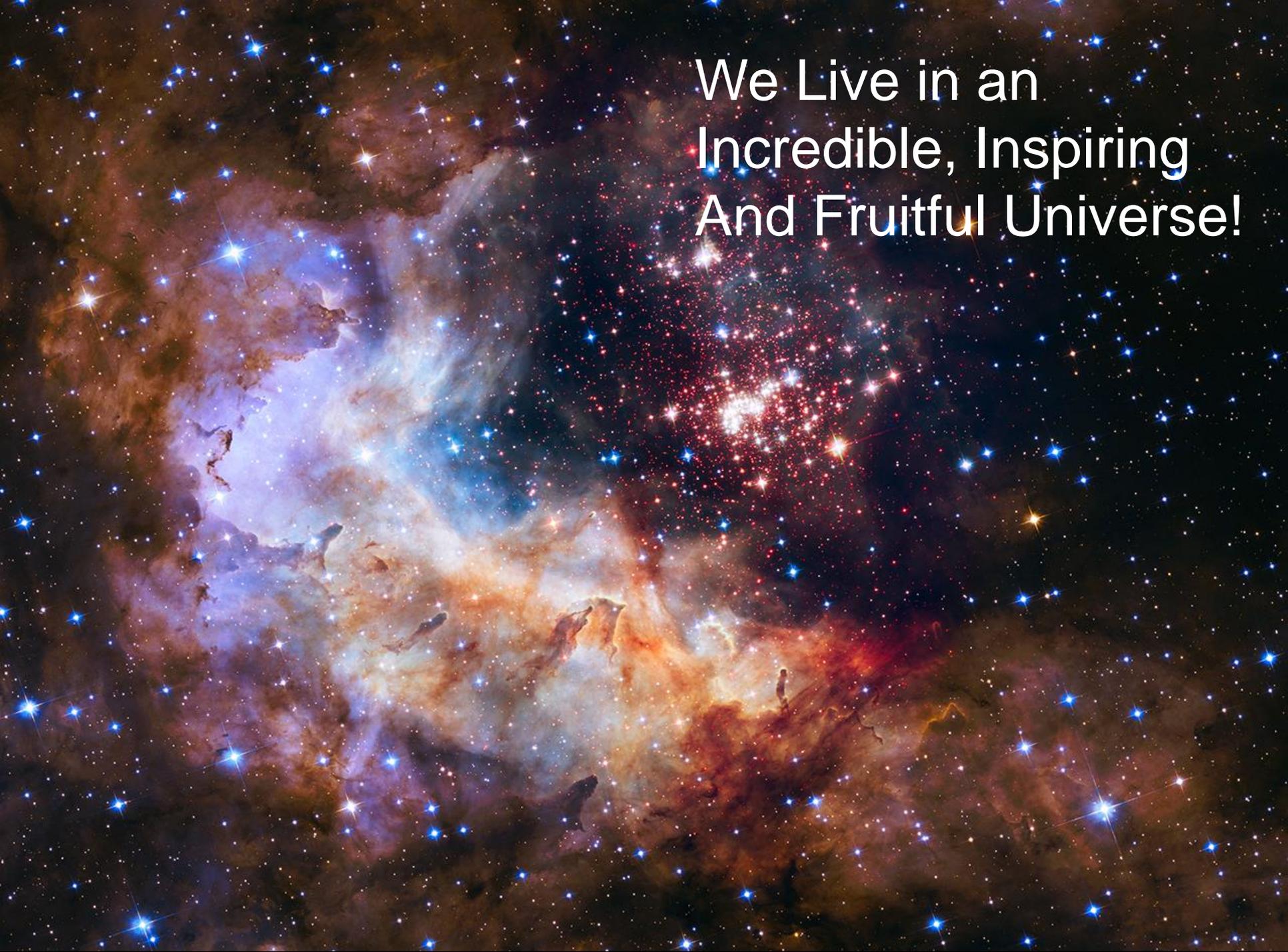
Organization: **Dialogue on Science, Ethics, and Religion (DoSER)**, **American Association for the Advancement of Science (aaas.org/doser)**

Organization: **Faraday Institute for Science and Religion**

Booklet: **When God and Science Meet** (free PDF on nae.net)

Hubble Image Gallery:
Hubblesite.org



A vibrant, multi-colored nebula with a dense field of stars in the background. The nebula features swirling clouds of gas in shades of purple, blue, orange, and red, with a bright, star-filled core. The background is a deep black space filled with numerous stars of various colors, including blue, white, and yellow.

We Live in an
Incredible, Inspiring
And Fruitful Universe!