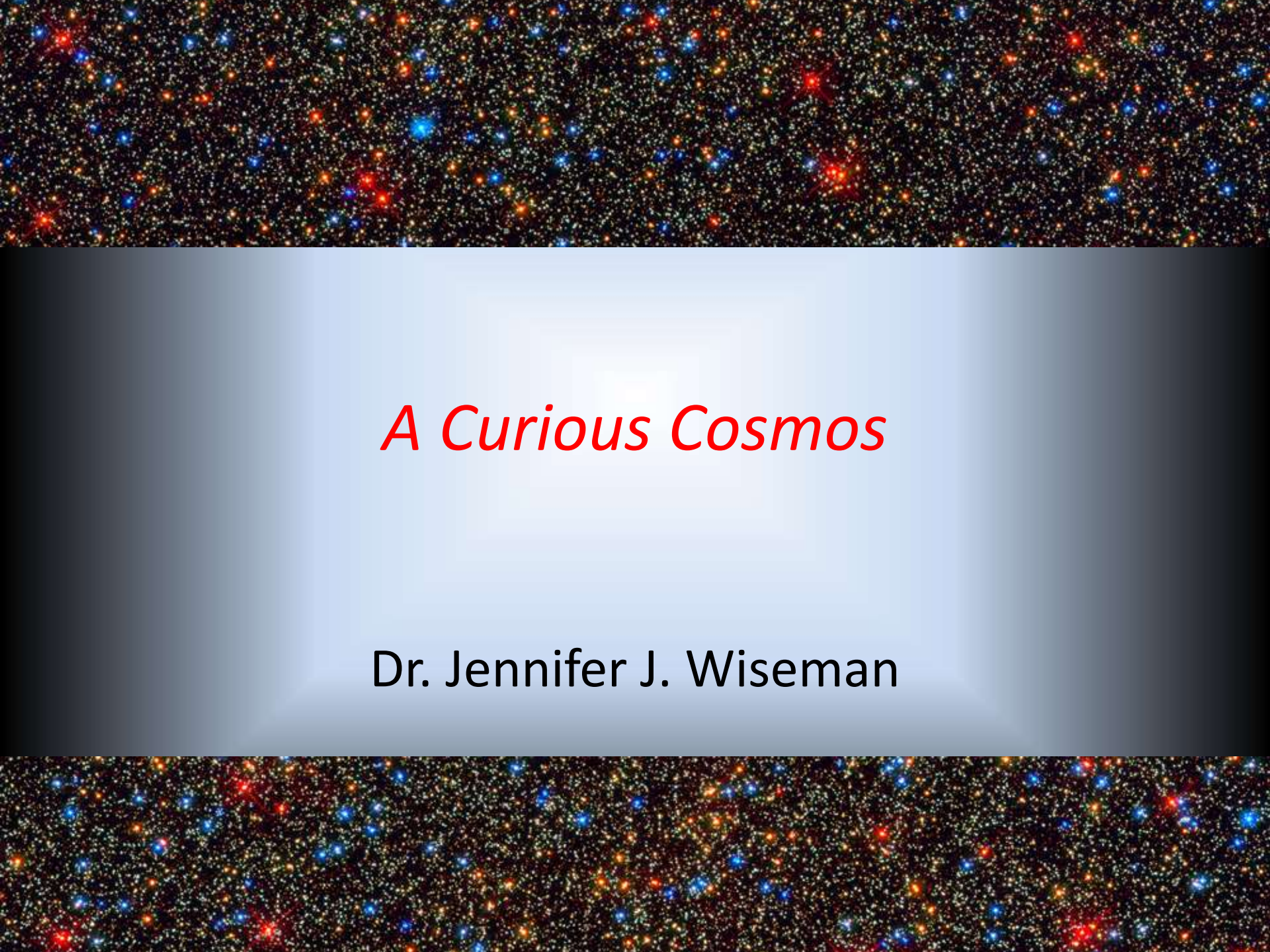
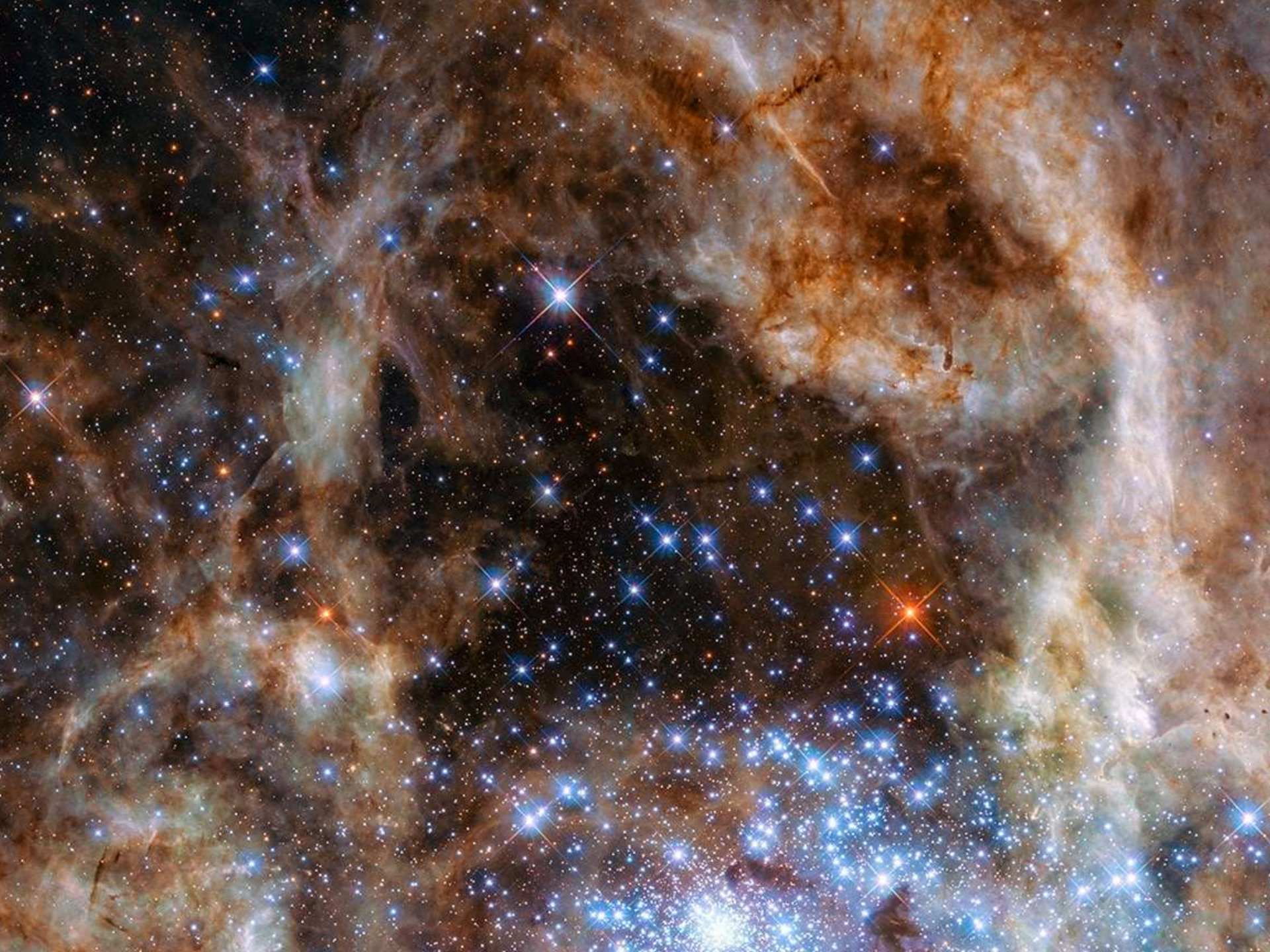
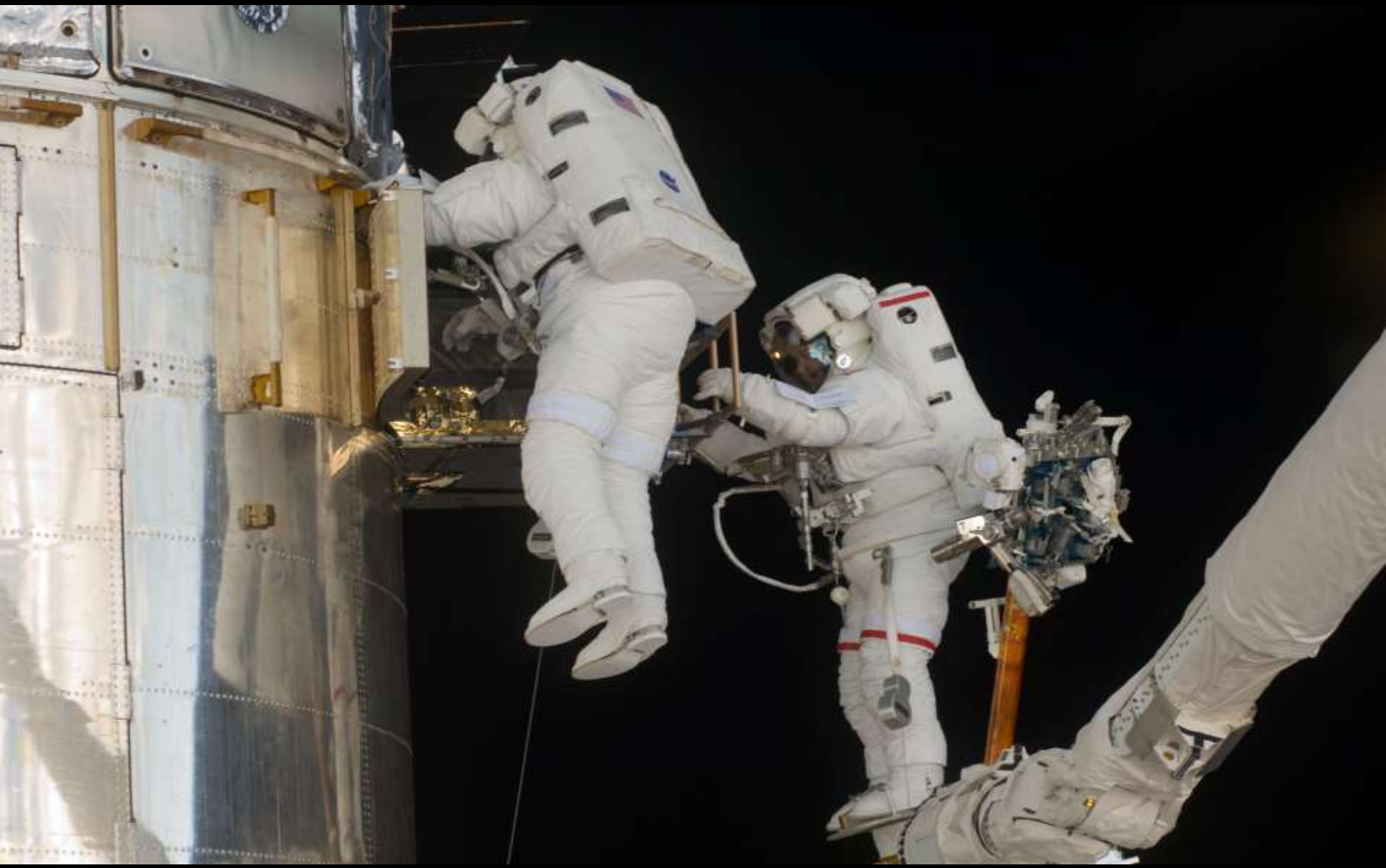
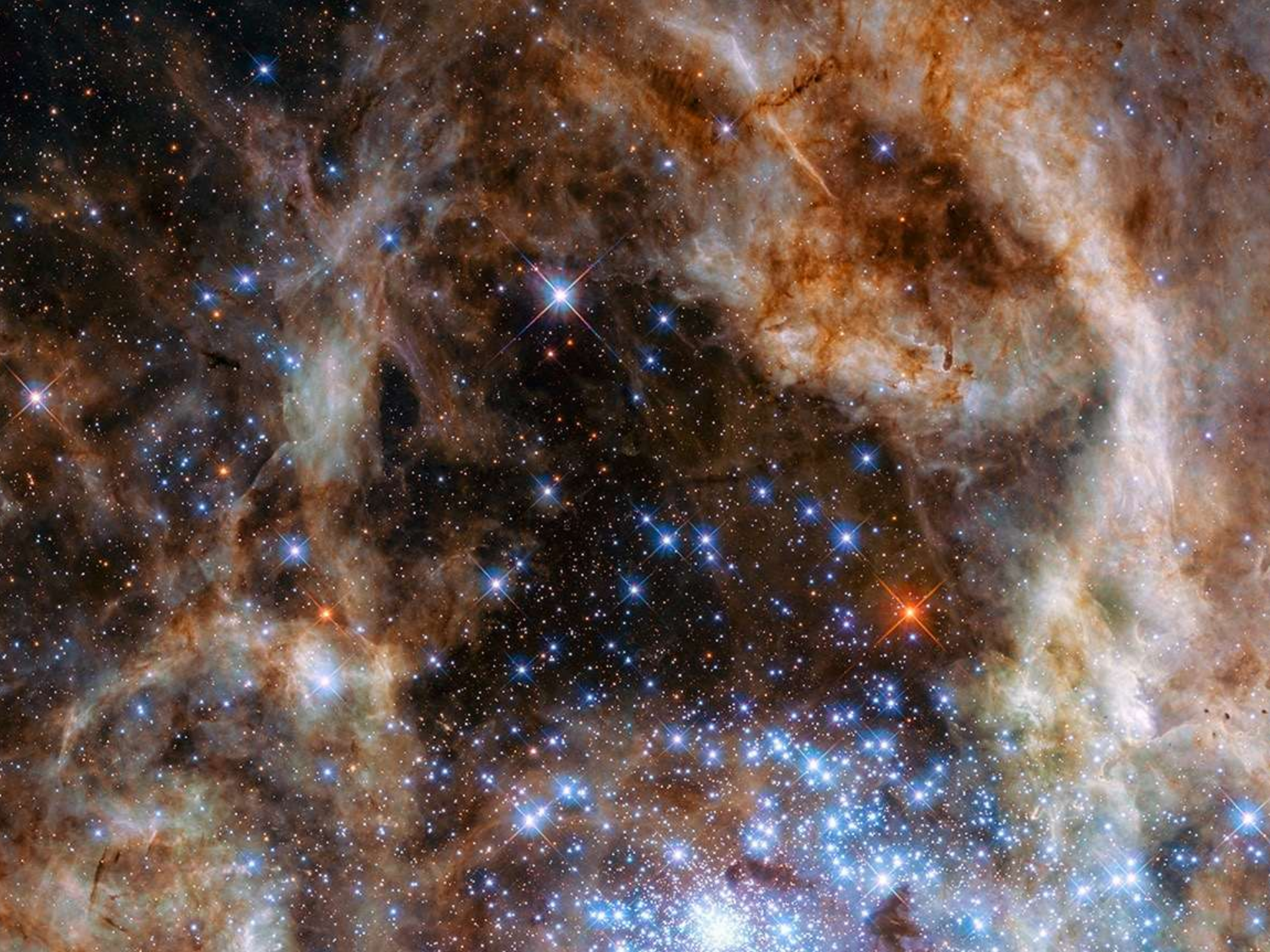


A Curious Cosmos

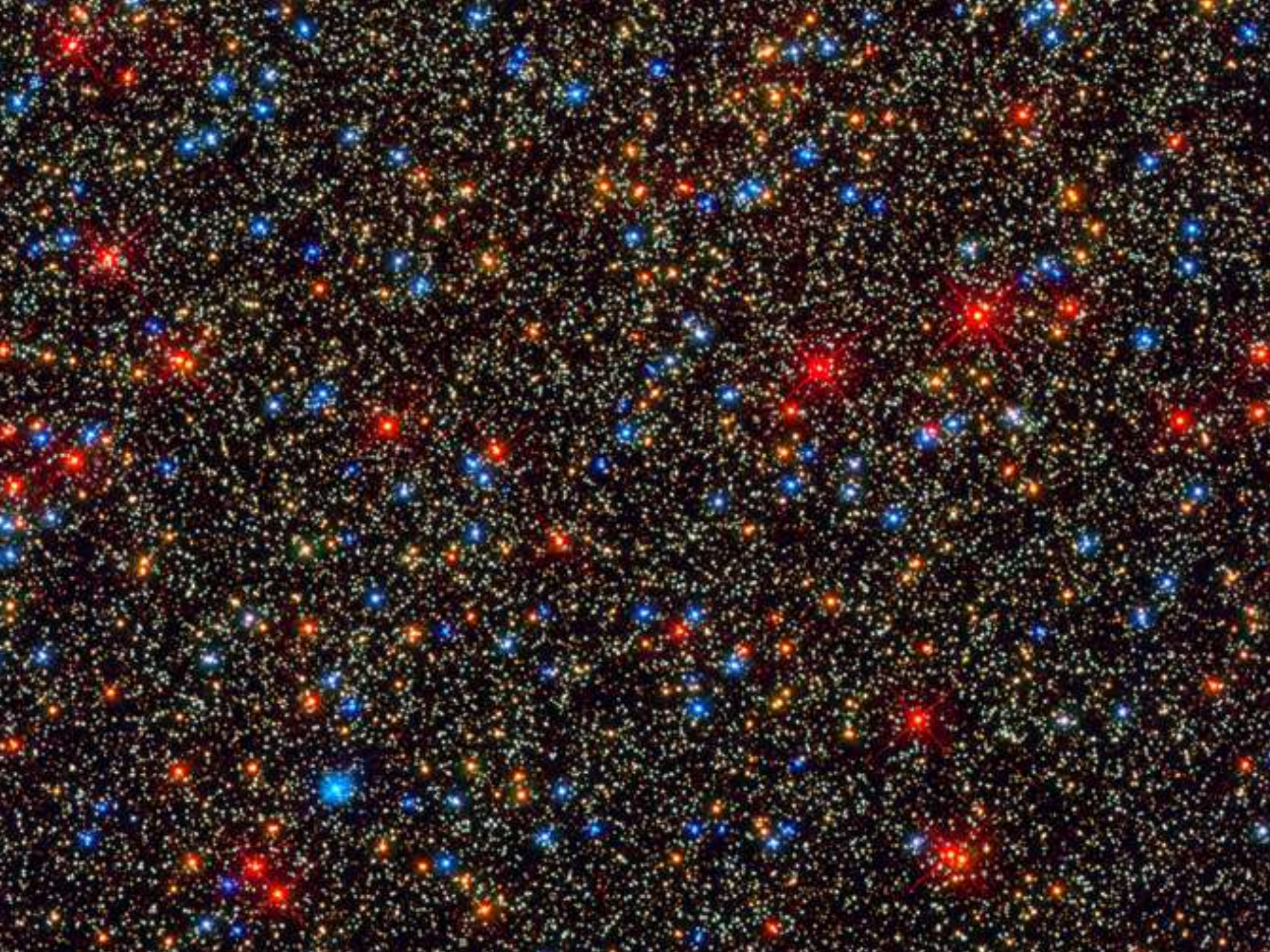
Dr. Jennifer J. Wiseman







NASA



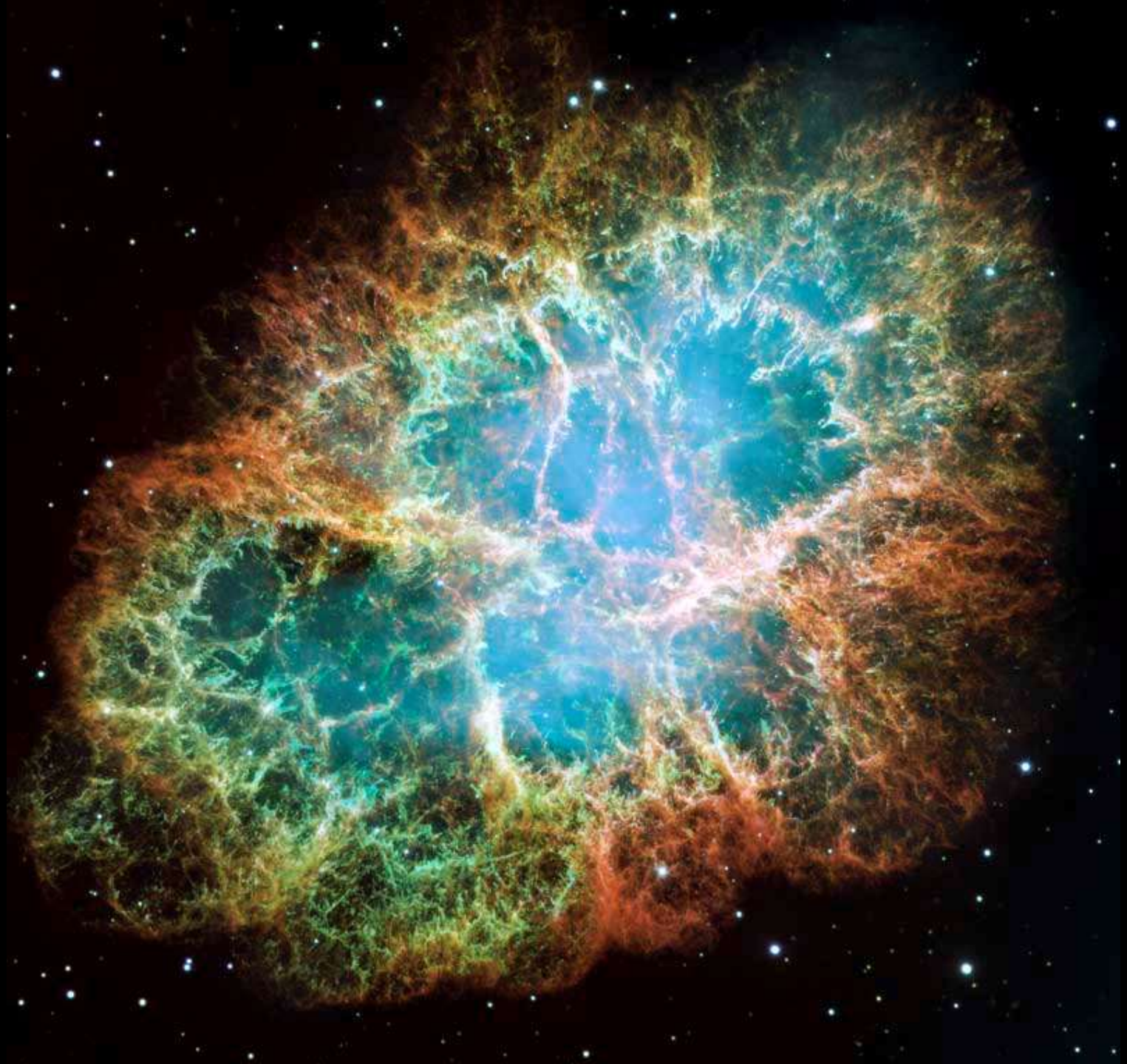
Orion Nebula ▪ M42 *HST* ▪ ACS/WFC

NASA, ESA, M. Robberto (STScI), and the HST Orion Nebula Team STScI-PRC06-01a

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

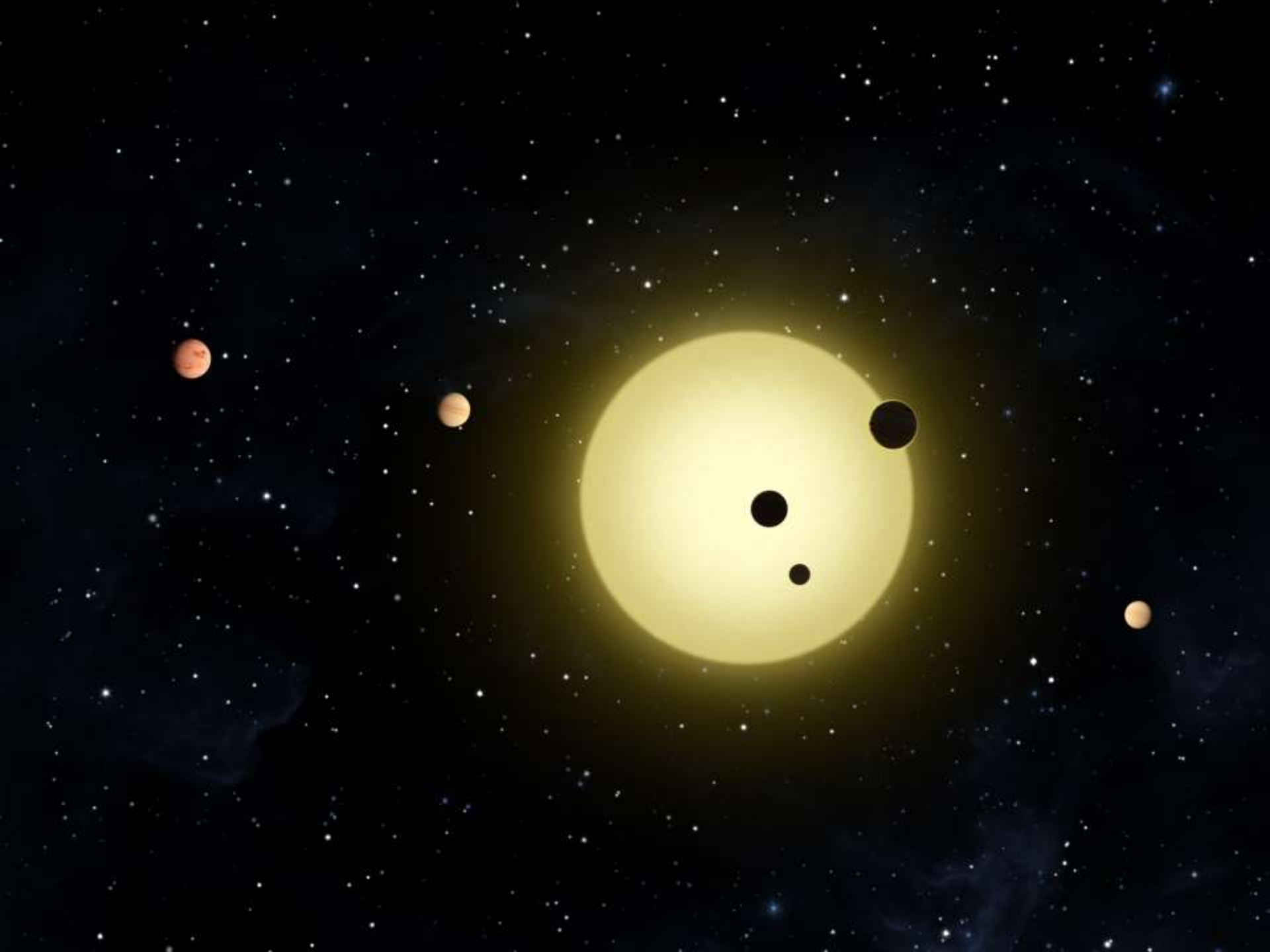
And so did medieval scholars.

The year 1584

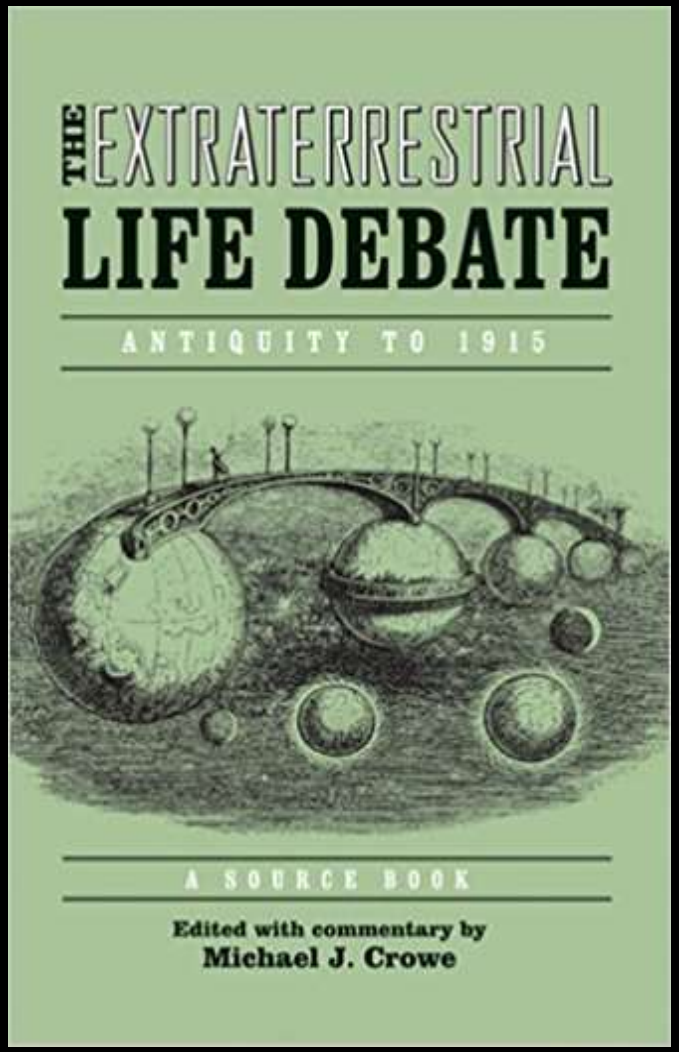
"There are countless suns and countless earths all rotating around their suns in exactly the same way as the seven planets of our system . . . The countless worlds in the universe are no worse and no less inhabited than our Earth”

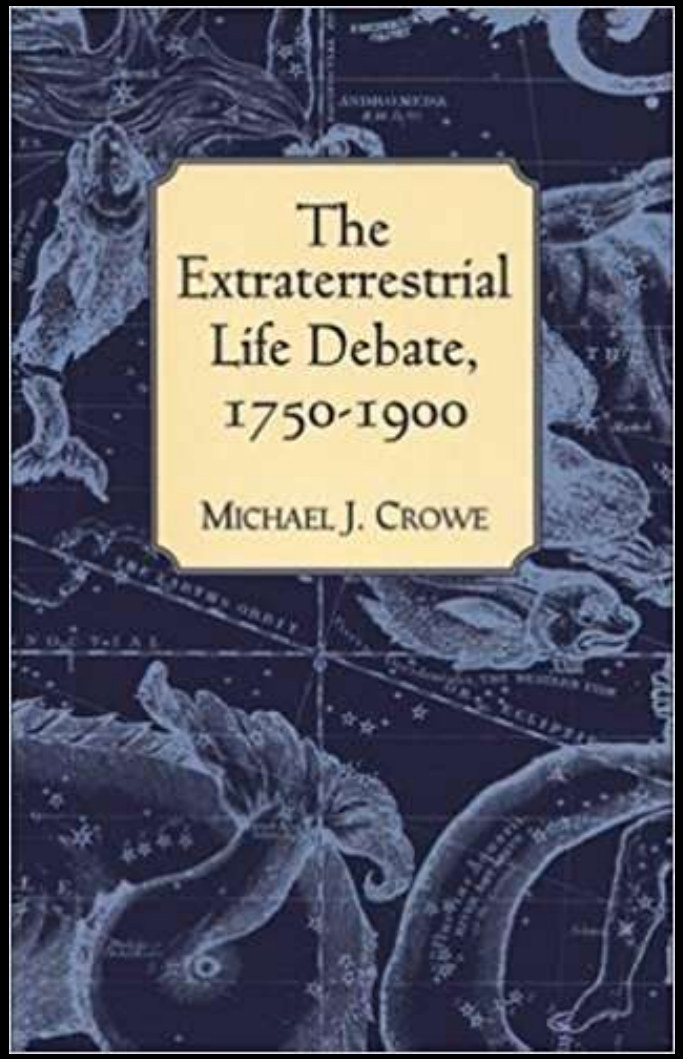
Giordano Bruno
in De L'infinito
Universo E Mondi

A BRVNO
IL SECOLO DA LUI DIVINATO
QVI
DOVE IL ROGO ARSE



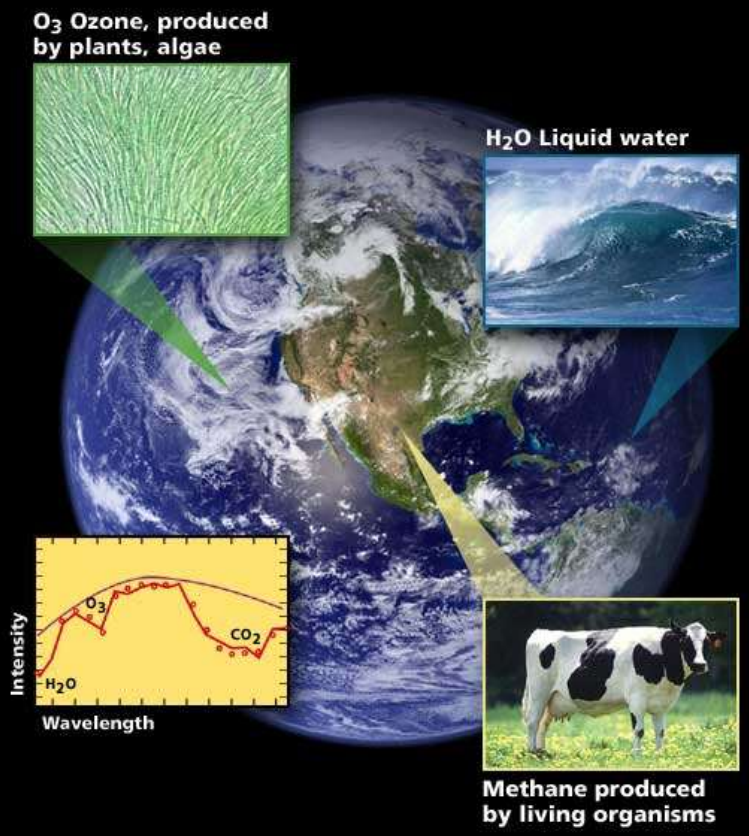
Michael Crowe: Extraterrestrial Life Debate Sourcebooks





And how will we know a planet supports life?

Look for evidence of oxygen



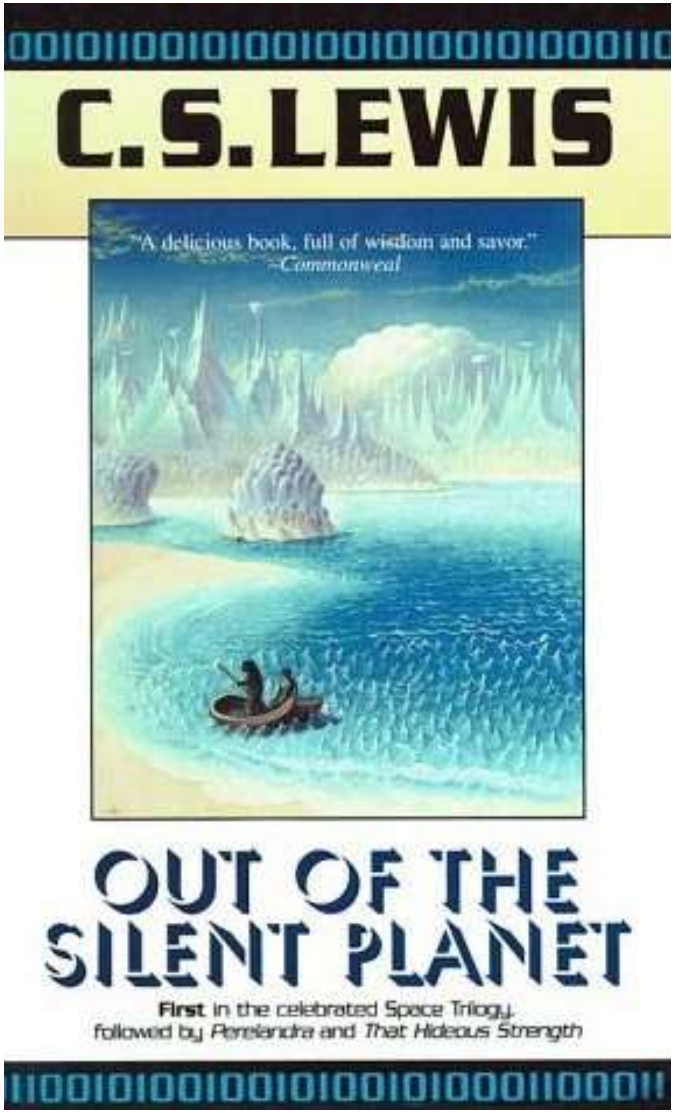
Look for liquid water

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

Look for signs of biological activity (methane)

and rule out other explanations.

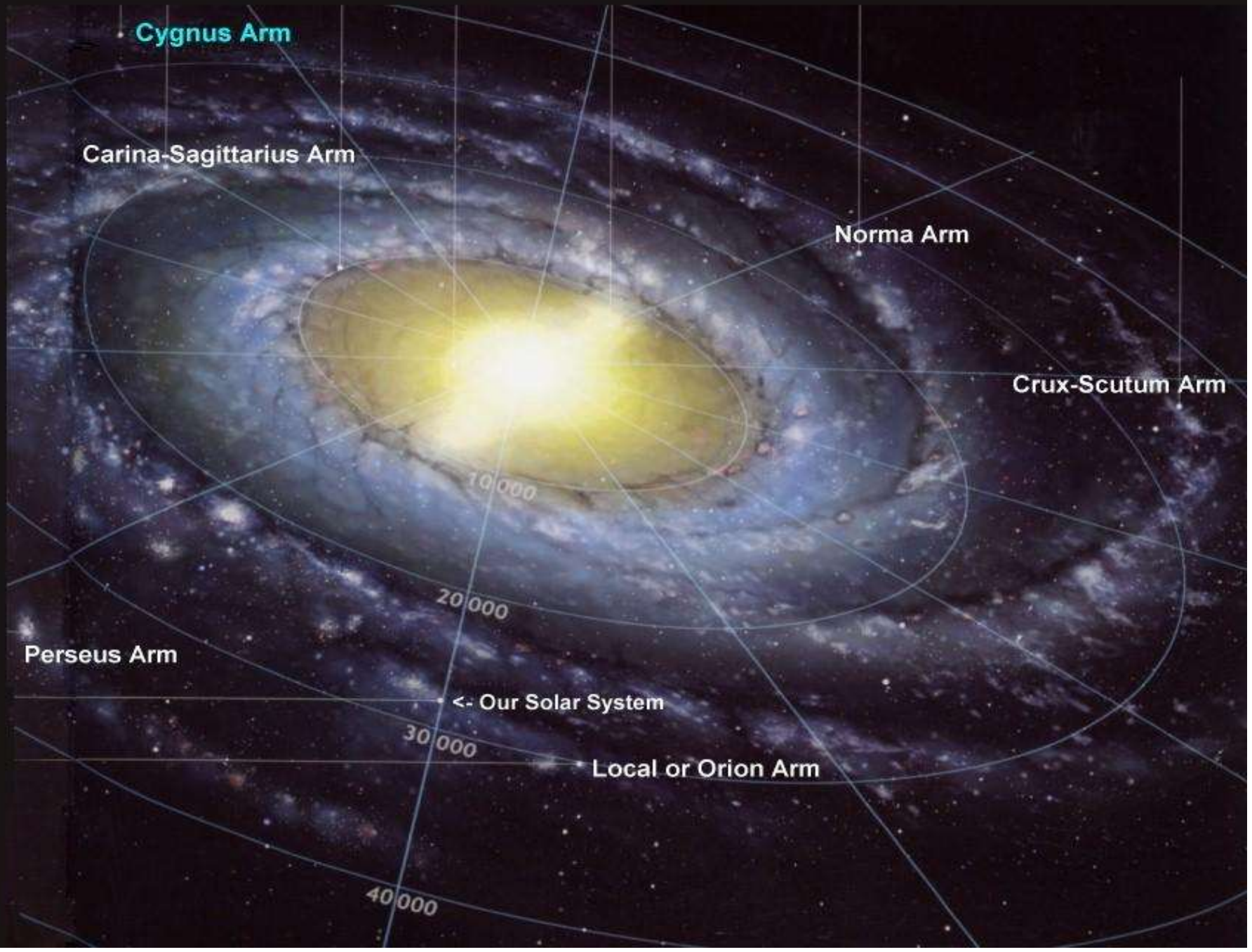
C.S. Lewis wrote about the spiritual state of possible life elsewhere…



Spiral Galaxy NGC 1309

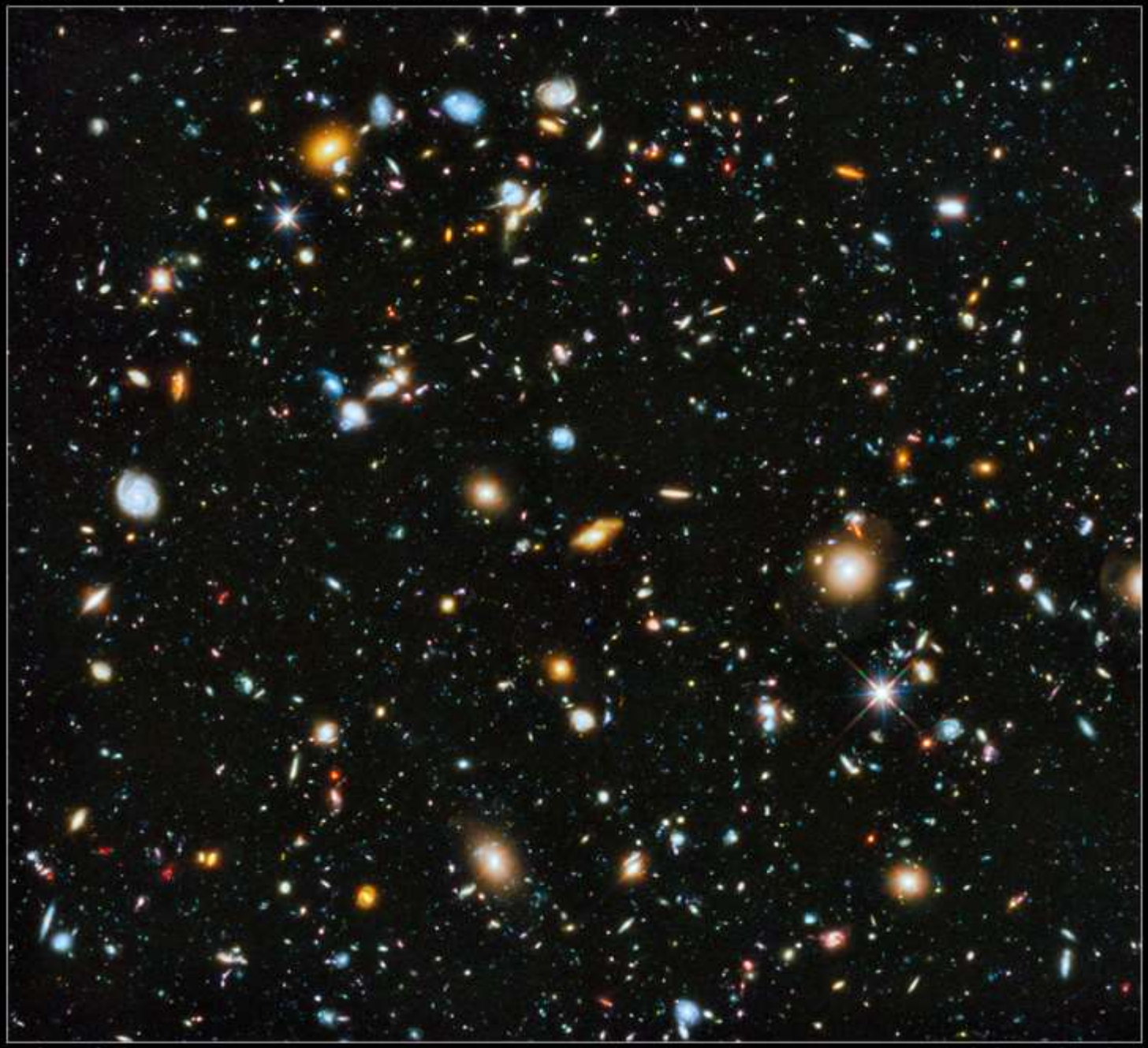
Hubble Heritage

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


Cygnus Arm
Carina-Sagittarius Arm
Norma Arm
Crux-Scutum Arm
10 000
20 000
Perseus Arm
<- Our Solar System
30 000
Local or Orion Arm
40 000

Hubble Ultra Deep Field 2014

HST • ACS • WFC3



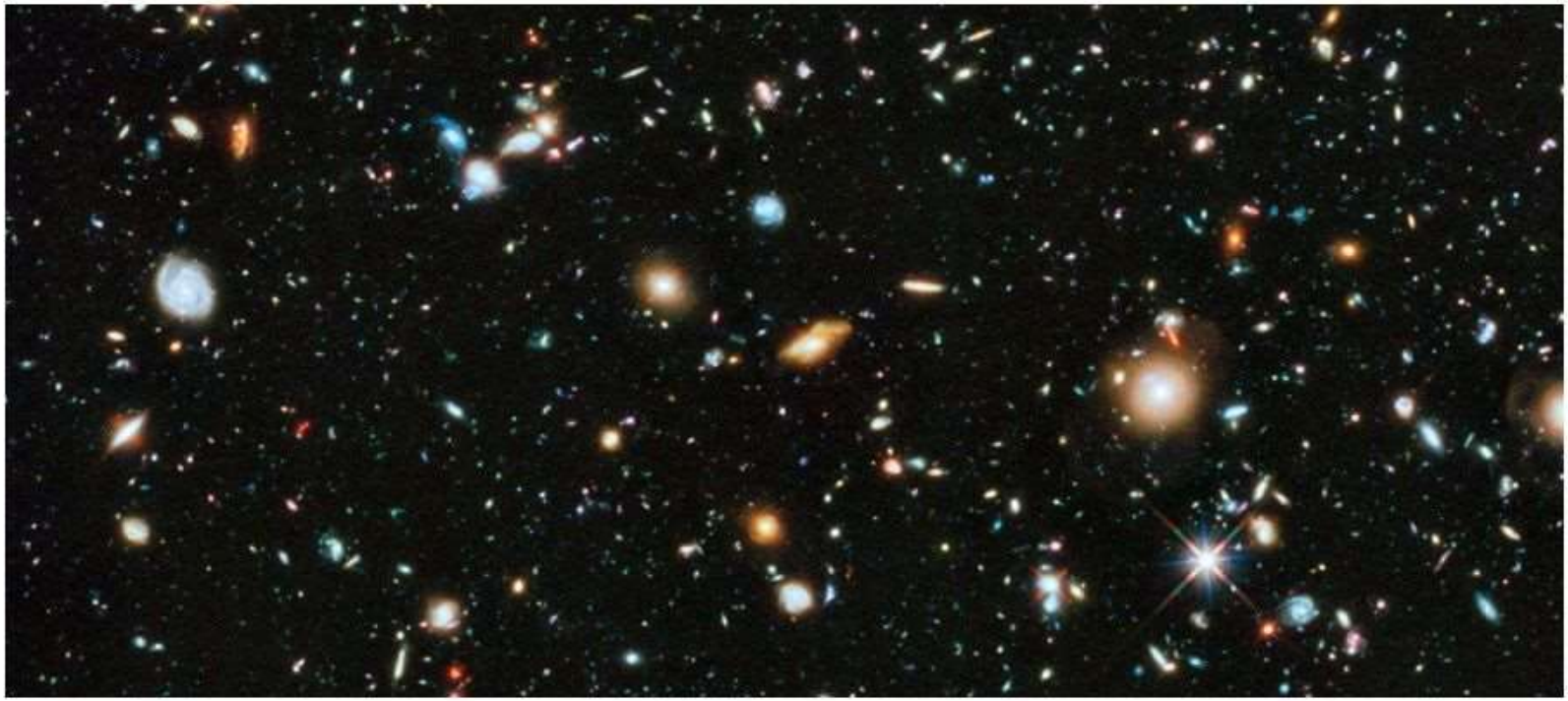
NASA and ESA

STScI-PRC14-27a

June 3, 2014

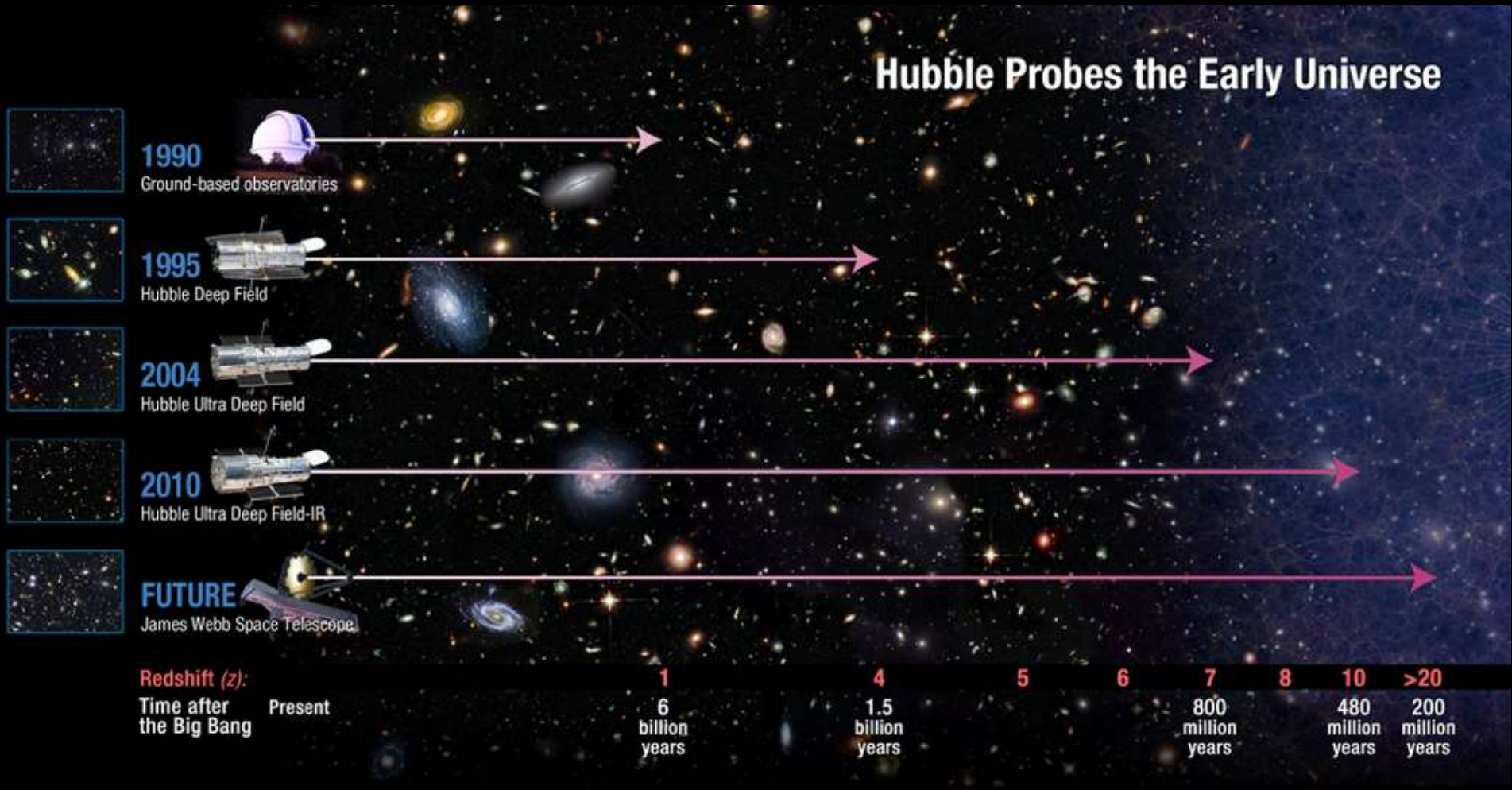
THE HUFFINGTON POST

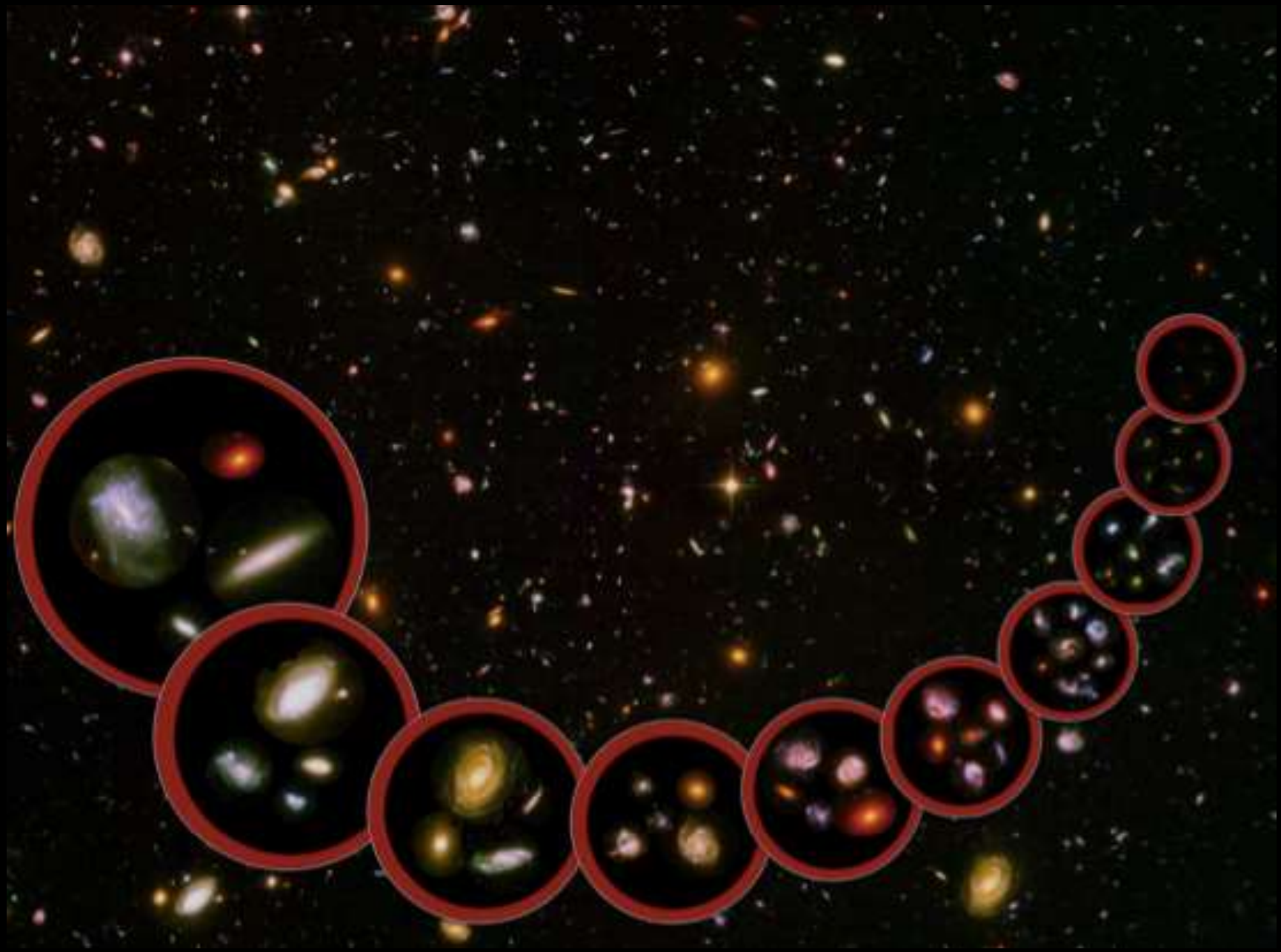
HOLY HUBBLE!

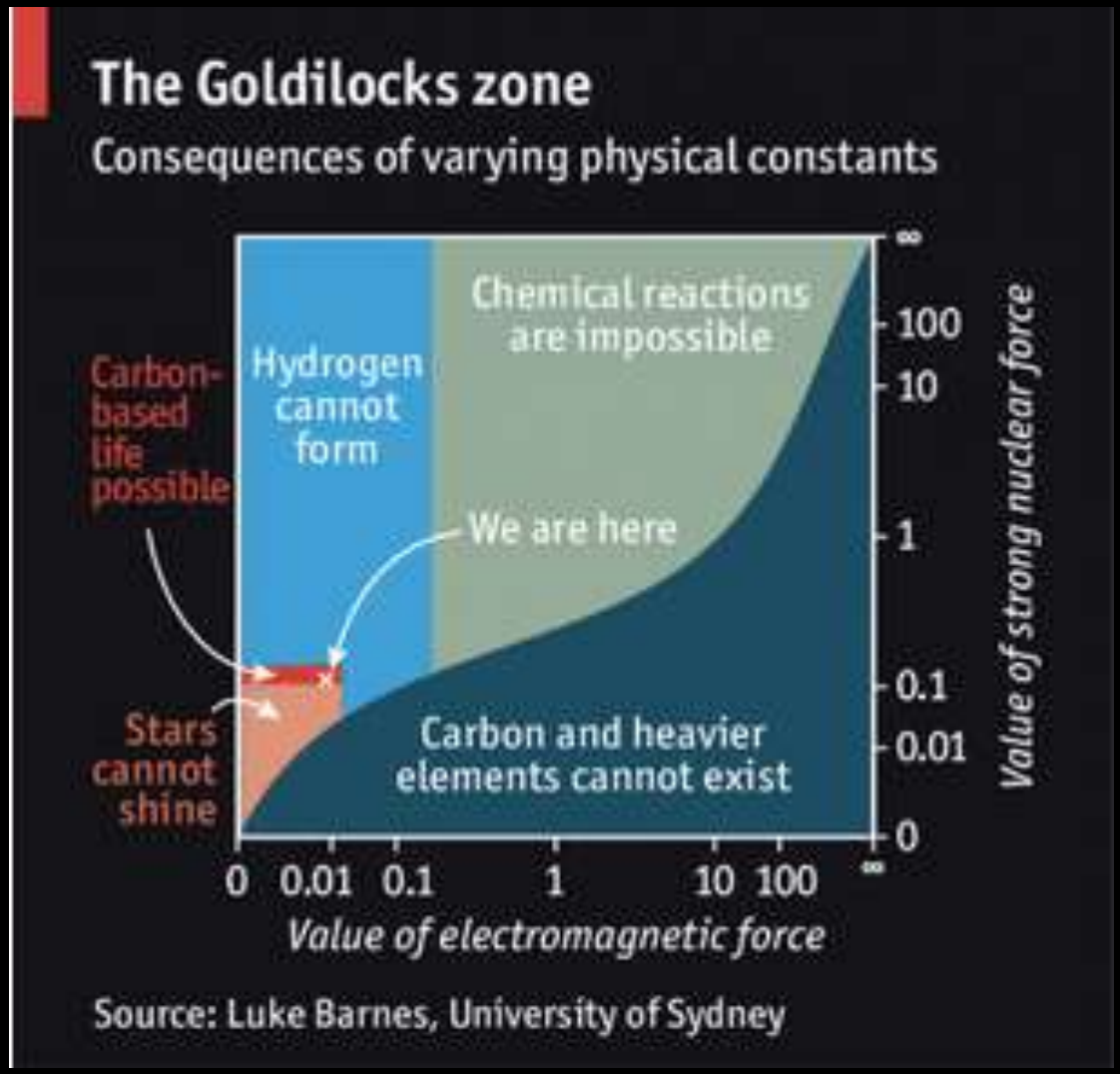


Comments | Shares (1,321) | Spaceflight

Looking Deep Into Space and Time







Economist.com

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.

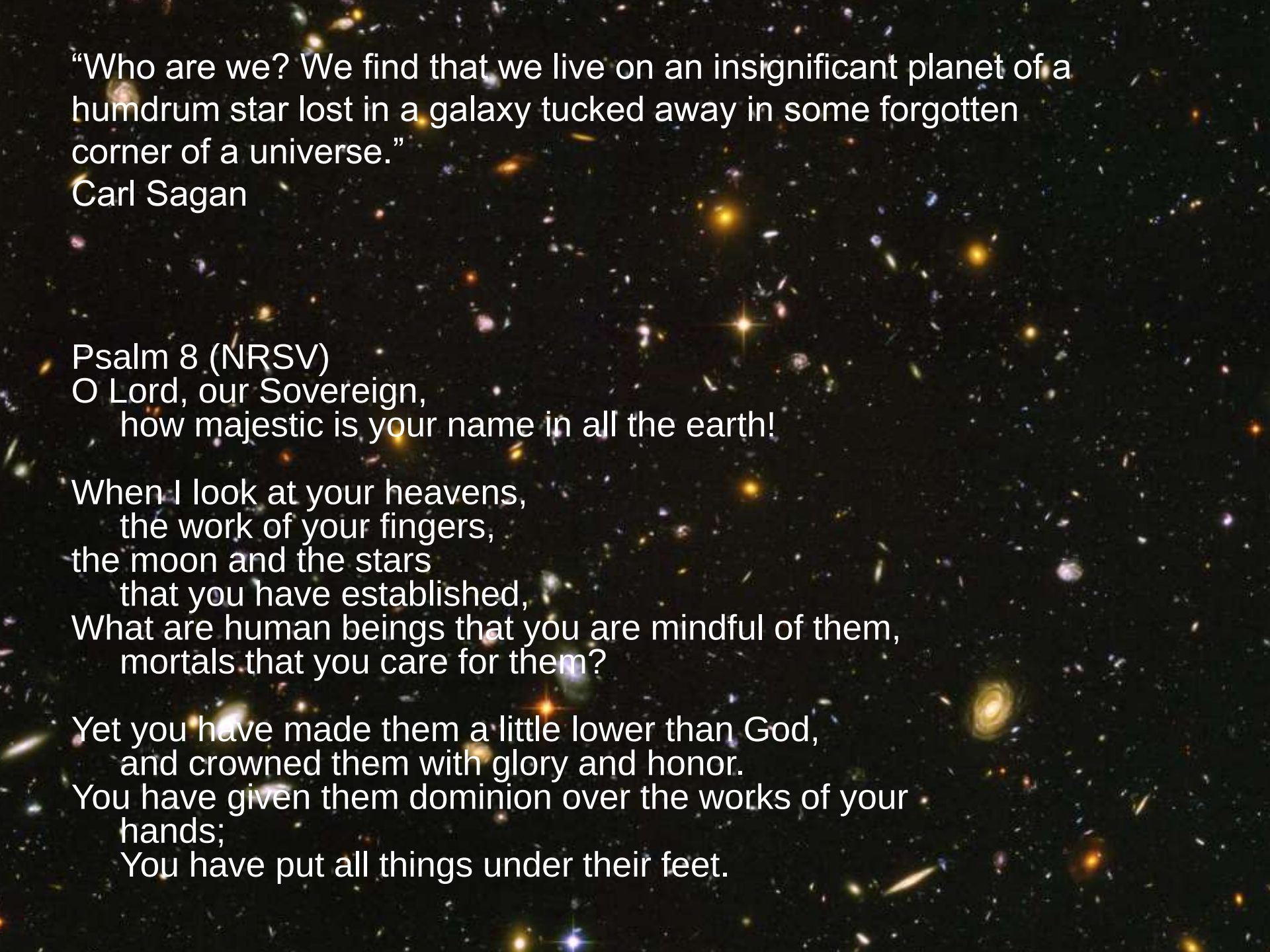
www.templeton.org/purpose

“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



“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?

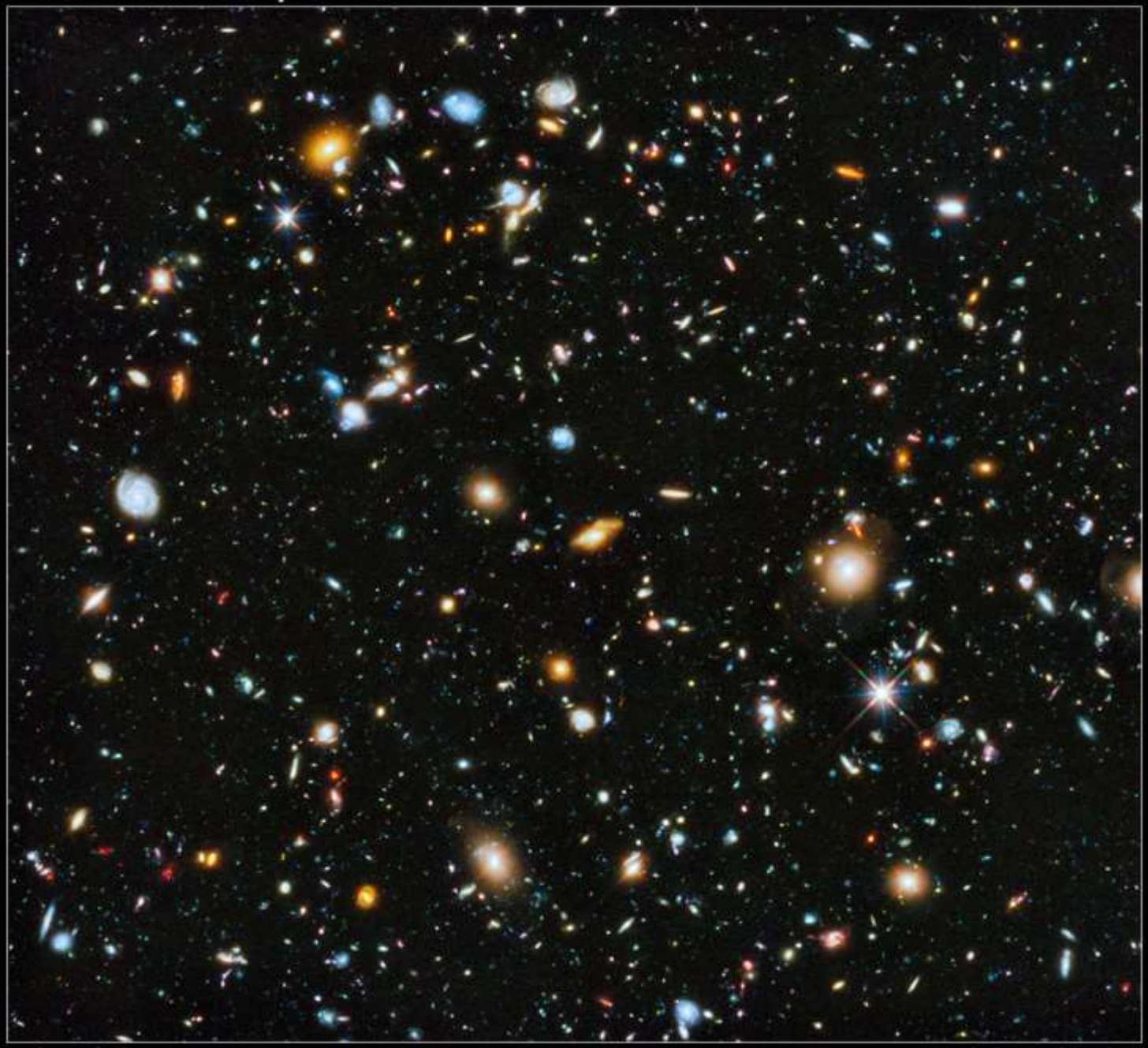
Are there other planets like Earth?

Is there Life beyond Earth?

?

Hubble Ultra Deep Field 2014

HST • ACS • WFC3

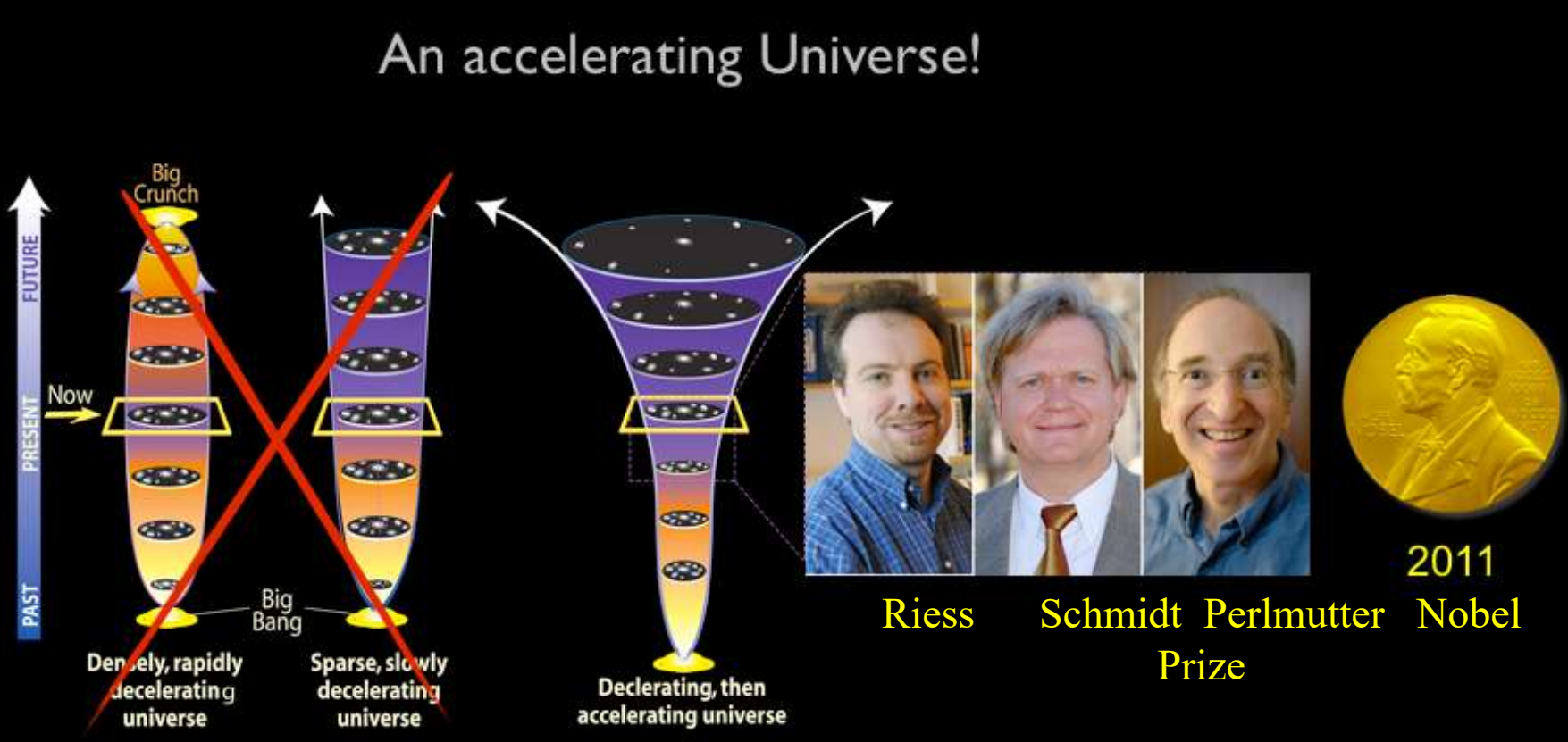


NASA and ESA

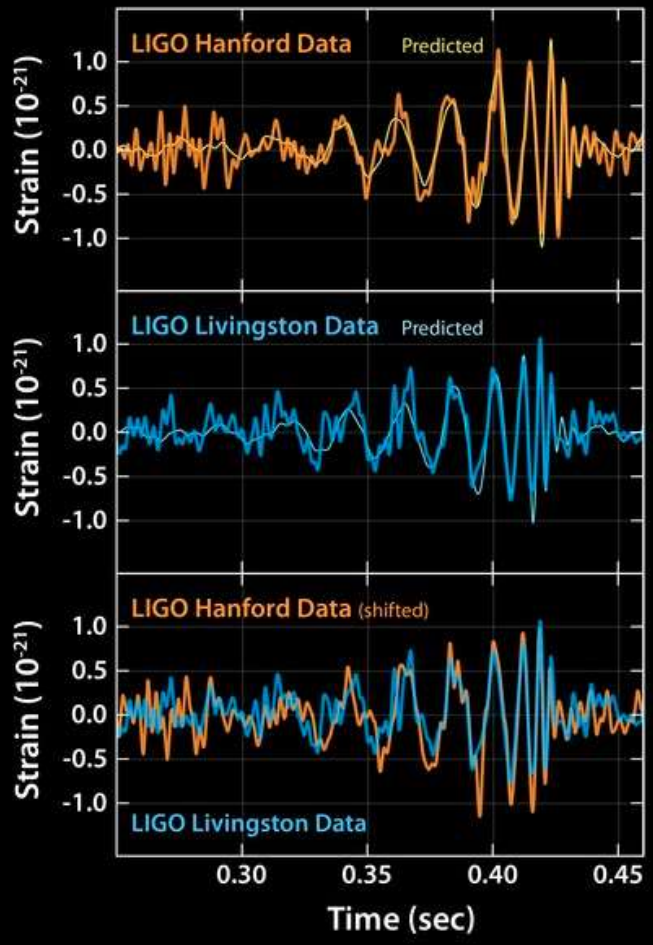
STScI-PRC14-27a

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)

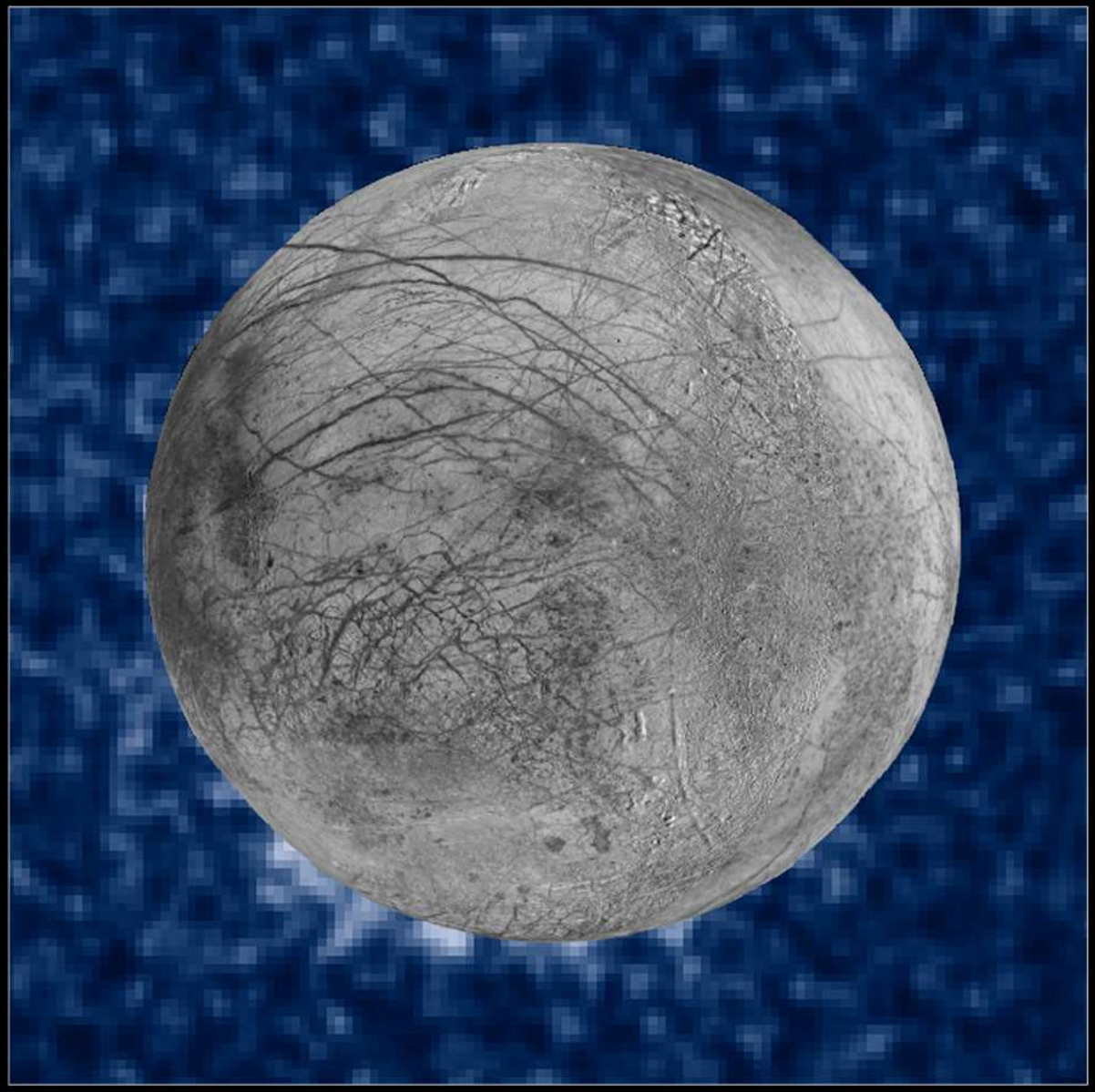


Gravitational Waves Detected!



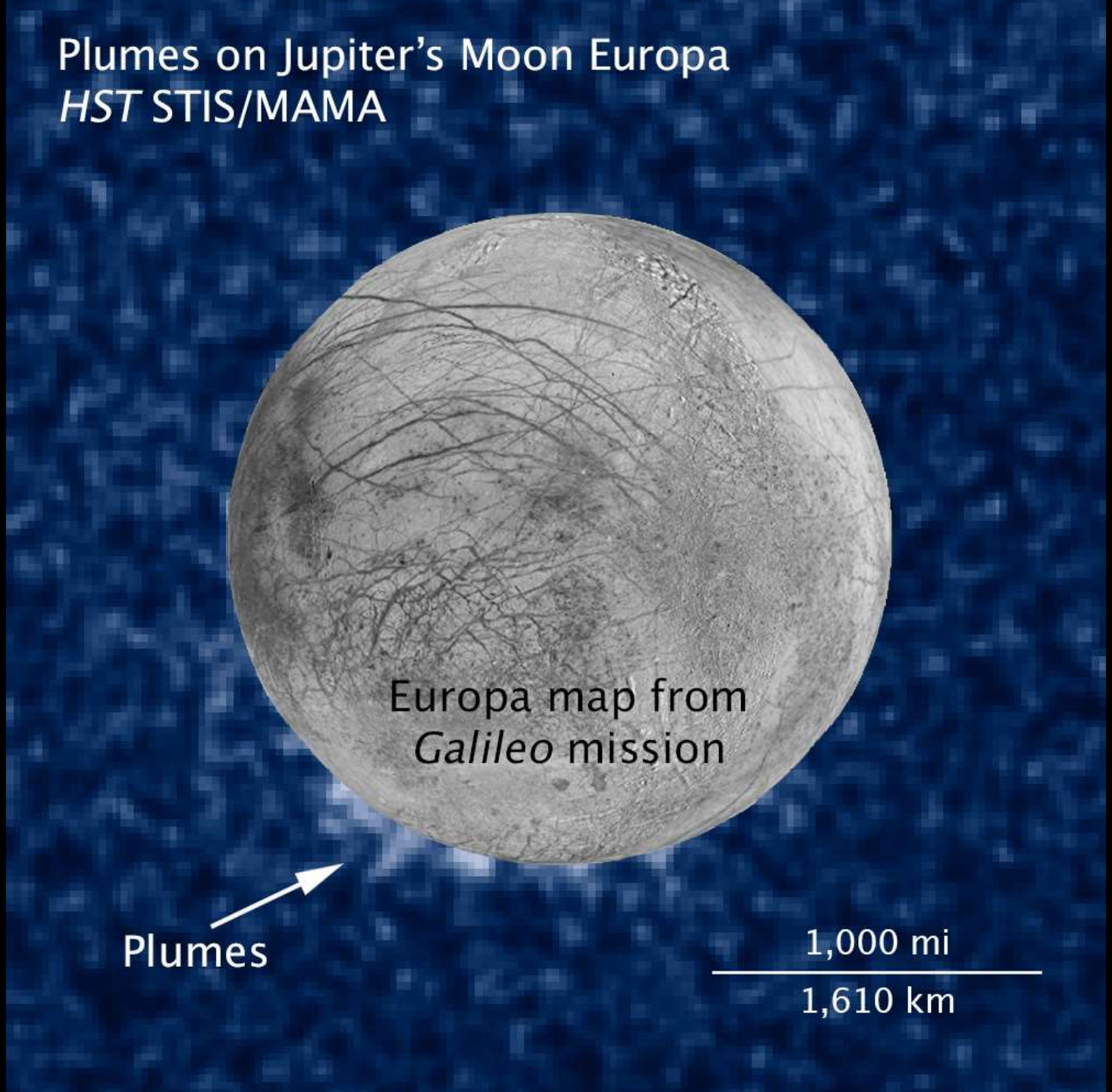
Europa Plumes

HST STIS ▪ *Galileo*



NASA, ESA, and W. Sparks (STScI)

STScI-PRC16-33a


Plumes on Jupiter's Moon Europa
HST STIS/MAMA
Europa map from
Galileo mission
Plumes
1,000 mi
1,610 km

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 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)

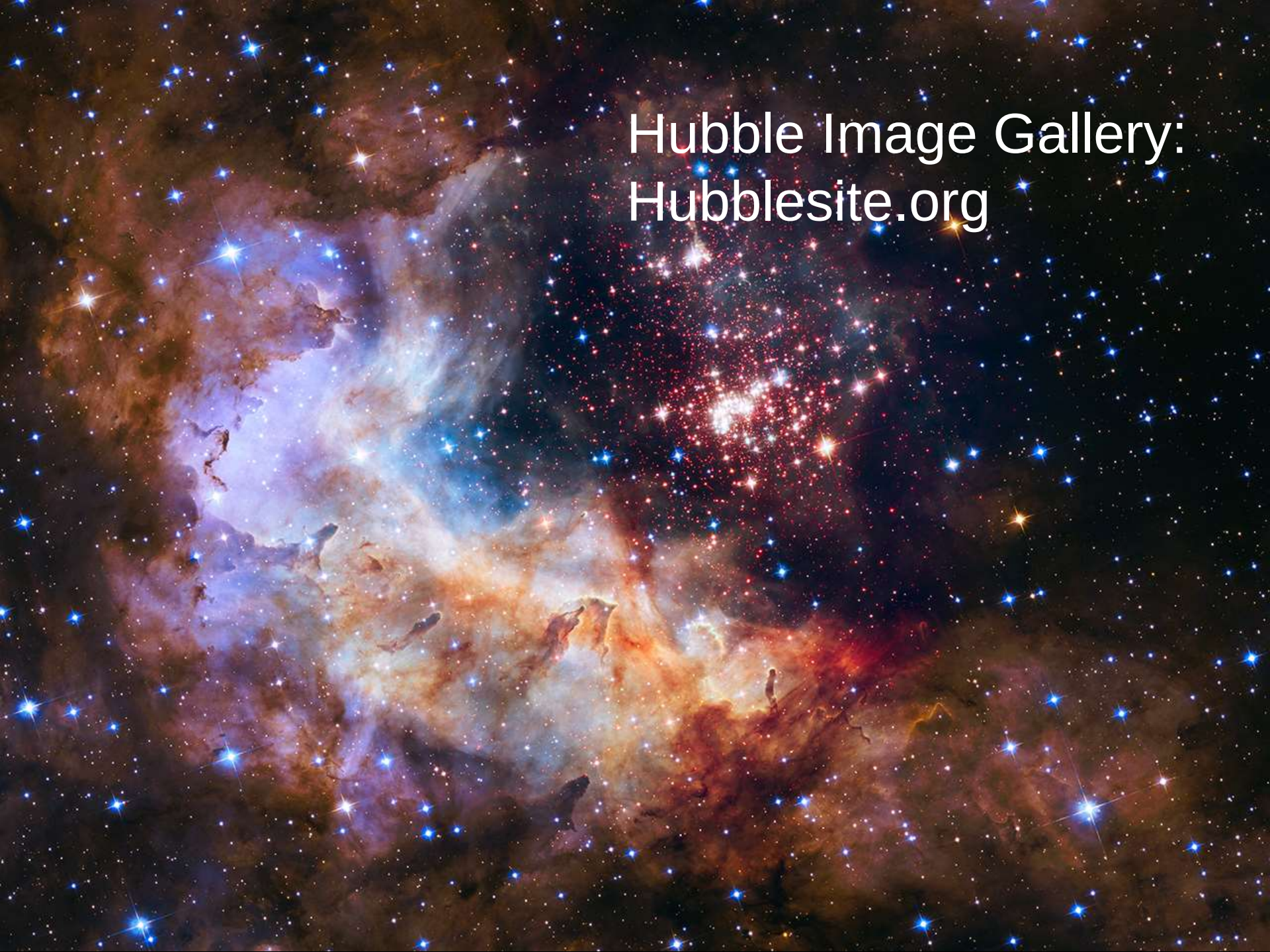
Organization: Christians in Science (CIS): (Based in U.K.; studies intersections of science and Christianity)

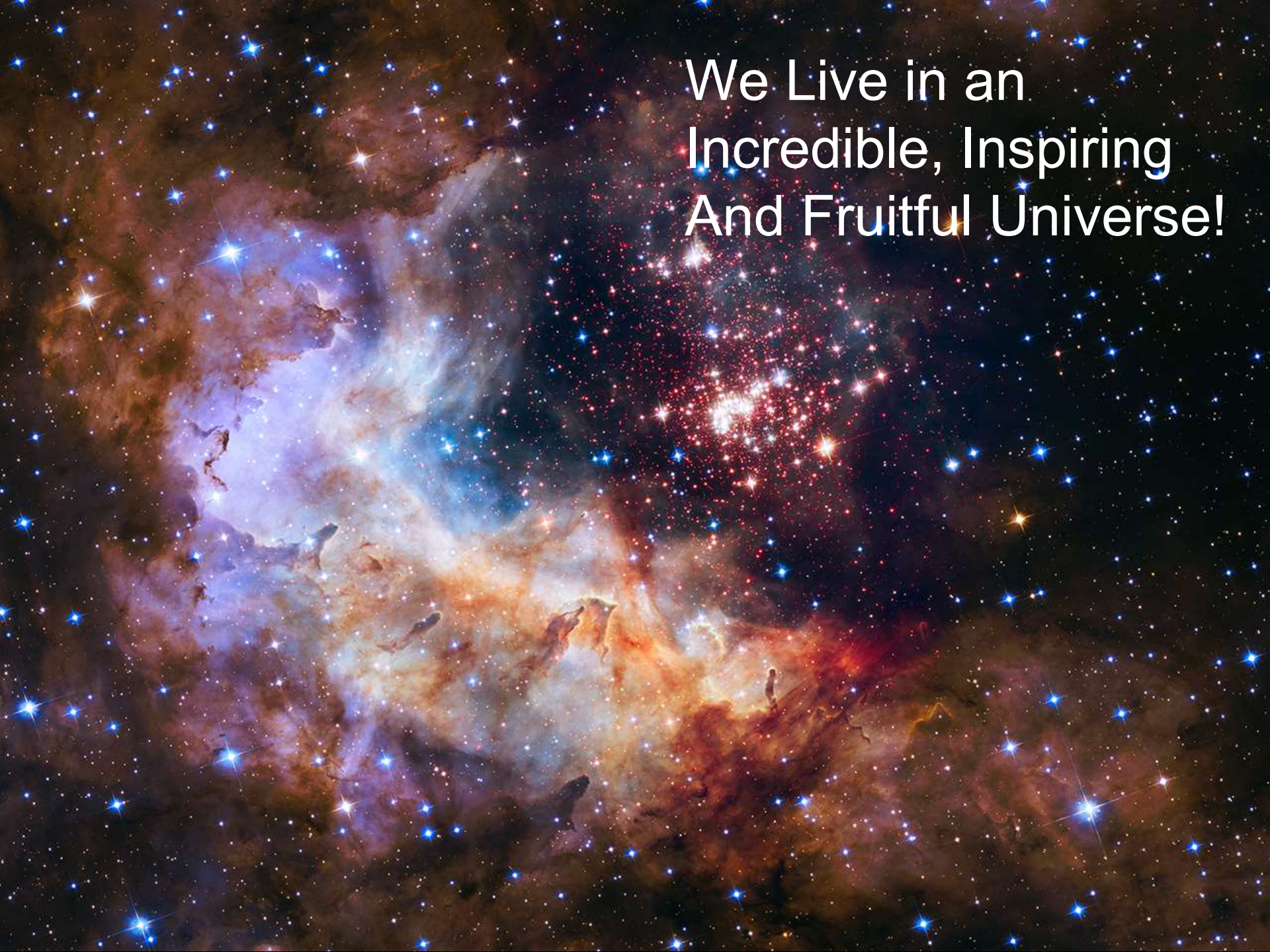
Organization: **American Scientific Affiliation (ASA): http://www.asa3.org** (a network of scientists, engineers, teachers, and science enthusiasts interested in the relationship of science and Christian faith)

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


We Live in an
Incredible, Inspiring
And Fruitful Universe!

The Lord is My Galaxy Maker

By Dr Clydette Powell

The Lord is my Galaxy Maker, I shall not want for praise.

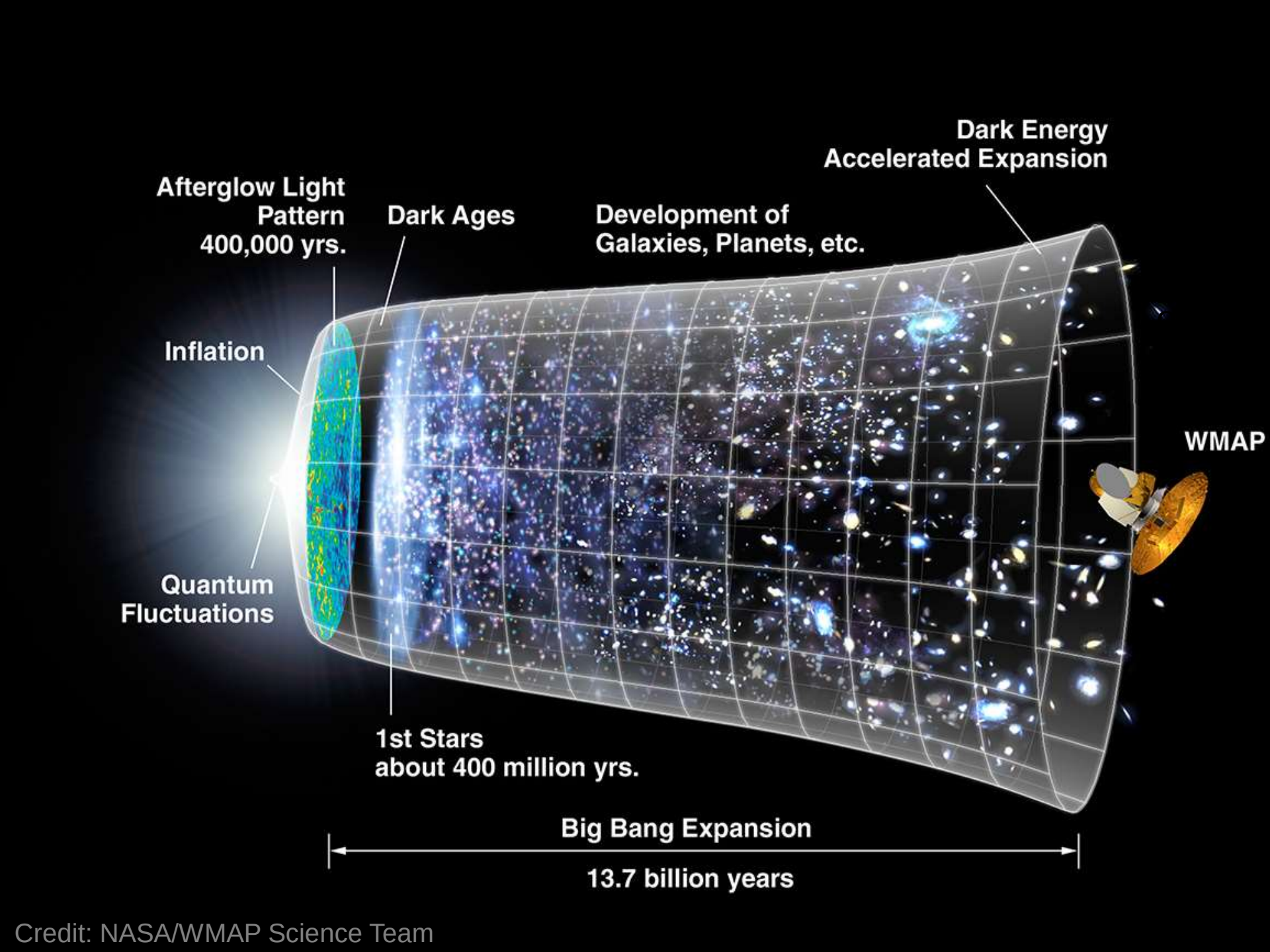
He makes me lie down in green pastures and upwards look.
He leads my gaze to behold His Heavenly glory

And thereby He restores my soul.
He leads me in colored paths of awe and wonder
For His name's sake.

Yea, though I walk
through the valley of the shadow of death,
I will fear no evil,
for He is with me;
His nebulae and star clusters- and even their interstellar gas! - comfort me
with assurance of His power and majesty.

He prepares a tapestry of stars before me
in the presence of my enemies.
He anoints my mind with the joy of speechless discovery;
My eyes overflow with tears.

Surely hallelujahs and praise shall fill
all the days of my life,
And I will dwell in His celestial house
forever.



Credit: NASA/WMAP Science Team

"Science and theology are both concerned with the search for truth. In consequence, they complement each other rather than contrast one another. Of course, the two disciplines focus on different dimensions of truth, but **they share a common conviction that there is truth to be sought**."

- *Sir John Polkinghorne, physicist and Anglican priest*