Contents

In the News

Story 1:
Ice, Ice Everywhere, Says New Study on Ceres

Story 2:
Mars Rock-Ingredient Stew Seen as Plus for Habitability

Story 3:
Astronomers discover dark past of planet-eating 'Death Star'

Departments

The Night Sky
ISS Sighting Opportunities
Space Calendar
NASA-TV Highlights
Food for Thought
Space Image of the Week
1. Ice, Ice Everywhere, Says New Study on Ceres

As the single-largest body in the Asteroid Belt, Ceres has long been a source of fascination to astronomers. In addition to being the only asteroid large enough to become rounded under its own gravity, it is also the only minor planet to be found within the orbit of Neptune. And with the arrival of the Dawn probe around Ceres in March of 2015, we have been treated to a steady stream of scientific finds about this protoplanet.

The latest find, which has come as something of a surprise, has to do with the composition of the planet. Contrary to what was previously suspected, new evidence shows that Ceres has large deposits of water ice near its surface. This and other evidence suggests that beneath its rocky, icy surface, Ceres has deposits of liquid water that could have played a major role in its evolution.

This evidence were presented at the 2016 American Geophysical Union meeting, which kicked off on Monday, Dec. 12th, in San Fransisco. Amid the thousands of seminars that detailed the biggest findings made during the past year in the fields of space and Earth science – which included updates from the Curiosity mission – members of the Dawn mission team shared the results of their research, which were recently published in Science.

Titled “Extensive water ice within Ceres’ aqueously altered regolith: Evidence from nuclear spectroscopy”, the mission team’s study details how data gathered by Dawn’s Gamma Ray and Neutron Detector (GRaND) determined the concentrations of hydrogen, iron and potassium in Ceres crust. In so doing, it was able to place constraints on the planet’s ice content, and how the surface was likely altered by liquid water in Ceres’ interior.

In short, the GRaND instrument detected high levels of hydrogen in Ceres’ uppermost structure (10% by weight), which appeared most prominently around the mid-latitudes. These readings were consistent with broad expanses of water ice. The GRaND data also showed that rather than consisting of a solid ice layer, the ice was likely to take the form of a porous mixture of rocky materials (in which ice fills the pores).
Previously, ice was thought to only exist within certain cratered regions on Ceres, and was thought to be the result of impacts that deposited water ice over the course of Ceres’ long history. But as Thomas Prettyman – the principal investigator of Dawn’s GRaND instrument – said in a NASA press release, scientists are now rethinking this position:

“On Ceres, ice is not just localized to a few craters. It’s everywhere, and nearer to the surface with higher latitudes. These results confirm predictions made nearly three decades ago that ice can survive for billions of years just beneath the surface of Ceres. The evidence strengthens the case for the presence of near-surface water ice on other main belt asteroids.”

The concentrations of iron, potassium and carbon detected by the GRaND instrument also supports the theory that Ceres’ surface was altered by liquid water in the interior. Basically, scientists theorize that the decay of radioactive elements within Ceres created enough heat to cause the protoplanet’s structure to differentiate between a rocky interior and icy outer shell – which also allowed minerals like those observed to be deposited in the surface.

Similarly, a second study produced by researchers from the Max Planck Institute for Solar Research examined hundreds of permanently-shadowed craters located in Ceres’ northern hemisphere. According to this study, which appeared recently in Nature Astronomy, these craters are “cold traps”, where temperatures drop to less than 110 K (-163 °C; -260 °F), thus preventing all but the tiniest amounts of ice from turning into vapor and escaping.

Within ten of these craters, the researcher team found deposits of bright material, reminiscent to what Dawn spotted in the Occator Crater. And in one that was partially sunlit, Dawn’s infrared mapping spectrometer confirmed the presence of ice. This suggests that water ice is being stored in Ceres darker craters in a way that is similar to what has been observed around the polar regions of both Mercury and the Moon.

Where this water came from (i.e. whether or not it was deposited by meteors) remains something of a mystery. But regardless, it shows that water molecules on Ceres could be moving from warmer mid-latitudes to the colder, darker polar regions. This lends further weight to the theory that Ceres might have a tenuous water vapor atmosphere, which was suggested back in 2012-13 based on evidence obtained by the Herschel Space Observatory.

All of this adds up to Ceres being a watery and geologically active protoplanet, one which could hold clues as to how life existed billions of years ago. As Carol Raymond, deputy principal investigator of the Dawn mission, also explained in the NASA press release:

“These studies support the idea that ice separated from rock early in Ceres’ history, forming an ice-rich crustal layer, and that ice has remained near the surface over the history of the solar system. By finding bodies that were water-rich in the distant past, we can discover clues as to where life may have existed in the early solar system.”

Back in July Dawn began its extended mission phase, which consists of it conducting several more orbits of Ceres. At present, it is flying in an elliptical orbit at a distance of more than 7,200 km (4,500 mi) from the protoplanet. The spacecraft is expected to operate until 2017, remaining a perpetual satellite of Ceres until the end.

Source: Universe Today

Return to Contents
2. Mars Rock-Ingredient Stew Seen as Plus for Habitability

NASA's Curiosity rover is climbing a layered Martian mountain and finding evidence of how ancient lakes and wet underground environments changed, billions of years ago, creating more diverse chemical environments that affected their favorability for microbial life.

Hematite, clay minerals and boron are among the ingredients found to be more abundant in layers farther uphill, compared with lower, older layers examined earlier in the mission. Scientists are discussing what these and other variations tell about conditions under which sediments were initially deposited, and about how groundwater moving later through the accumulated layers altered and transported ingredients.

Effects of this groundwater movement are most evident in mineral veins. The veins formed where cracks in the layers were filled with chemicals that had been dissolved in groundwater. The water with its dissolved contents also interacted with the rock matrix surrounding the veins, altering the chemistry both in the rock and in the water.

"There is so much variability in the composition at different elevations, we've hit a jackpot," said John Grotzinger, of Caltech in Pasadena, California. He and other members of Curiosity's science team presented an update about the mission Tuesday, Dec. 13, in San Francisco during the fall meeting of the American Geophysical Union. As the rover examines higher, younger layers, researchers are impressed by the complexity of the lake environments when clay-bearing sediments were being deposited, and also the complexity of the groundwater interactions after the sediments were buried.

'Chemical Reactor'

"A sedimentary basin such as this is a chemical reactor," Grotzinger said. "Elements get rearranged. New minerals form and old ones dissolve. Electrons get redistributed. On Earth, these reactions support life."

Whether Martian life has ever existed is still unknown. No compelling evidence for it has been found. When Curiosity landed in Mars' Gale Crater in 2012, the mission's main goal was to determine whether the area ever offered an environment favorable for microbes.

The crater's main appeal for scientists is geological layering exposed in the lower portion of its central mound, Mount Sharp. These exposures offer access to rocks that hold a record of environmental conditions from many stages of early Martian history, each layer younger than the one beneath it. The mission succeeded in its first year, finding that an ancient Martian lake environment had all the key chemical ingredients needed for life,
plus chemical energy available for life. Now, the rover is climbing lower on Mount Sharp to investigate how ancient environmental conditions changed over time.

"We are well into the layers that were the main reason Gale Crater was chosen as the landing site," said Curiosity Deputy Project Scientist Joy Crisp of NASA's Jet Propulsion Laboratory, in Pasadena, California. "We are now using a strategy of drilling samples at regular intervals as the rover climbs Mount Sharp. Earlier we chose drilling targets based on each site's special characteristics. Now that we're driving continuously through the thick basal layer of the mountain, a series of drill holes will build a complete picture."

Four recent drilling sites, from "Oudam" this past June through "Sebina" in October, are each spaced about 80 feet (about 25 meters) apart in elevation. This uphill pattern allows the science team to sample progressively younger layers that reveal Mount Sharp's ancient environmental history.

This pair of drawings depicts the same location at Gale Crater on at two points in time: now and billions of years ago. Water moving beneath the ground, as well as water above the surface in ancient rivers and lakes, provided favorable conditions for microbial life, if Mars has ever hosted life.

Changing Environments

One clue to changing ancient conditions is the mineral hematite. It has replaced less-oxidized magnetite as the dominant iron oxide in rocks Curiosity has drilled recently, compared with the site where Curiosity first found lakebed sediments. "Both samples are mudstone deposited at the bottom of a lake, but the hematite may suggest warmer conditions, or more interaction between the atmosphere and the sediments," said Thomas Bristow of NASA Ames Research Center, Moffett Field, California. He helps operate the Chemistry and Mineralogy (CheMin) laboratory instrument inside the rover, which identifies minerals in collected samples.

Chemical reactivity occurs on a gradient of chemical ingredients' strength at donating or receiving electrons. Transfer of electrons due to this gradient can provide energy for life. An increase in hematite relative to magnetite indicates an environmental change in the direction of tugging electrons more strongly, causing a greater degree of oxidation in iron.

Another ingredient increasing in recent measurements by Curiosity is the element boron, which the rover's laser-shooting Chemistry and Camera (ChemCam) instrument has been detecting within mineral veins that are mainly calcium sulfate. "No prior mission has detected boron on Mars," said Patrick Gasda of the U.S. Department of Energy's Los Alamos National Laboratory, Los Alamos, New Mexico. "We're seeing a sharp increase in boron in vein targets inspected in the past several months." The instrument is quite sensitive; even at the increased level, boron makes up only about one-tenth of one percent of the rock composition.

'Dynamic System'
Boron is famously associated with arid sites where much water has evaporated away -- think of the borax that mule teams once hauled from Death Valley. However, environmental implications of the minor amount of boron found by Curiosity are less straightforward than for the increase in hematite.

Scientists are considering at least two possibilities for the source of boron that groundwater left in the veins. Perhaps evaporation of a lake formed a boron-containing deposit in an overlying layer, not yet reached by Curiosity, then water later re-dissolved the boron and carried it down through a fracture network into older layers, where it accumulated along with fracture-filling vein minerals. Or perhaps changes in the chemistry of clay-bearing deposits, such as evidenced by the increased hematite, affected how groundwater picked up and dropped off boron within the local sediments.

"Variations in these minerals and elements indicate a dynamic system," Grotzinger said. "They interact with groundwater as well as surface water. The water influences the chemistry of the clays, but the composition of the water also changes. We are seeing chemical complexity indicating a long, interactive history with the water. The more complicated the chemistry is, the better it is for habitability. The boron, hematite and clay minerals underline the mobility of elements and electrons, and that is good for life."

Source: NASA
Astronomers discover dark past of planet-eating 'Death Star'

An international team of scientists, including researchers from the University of Chicago, has made the rare discovery of a planetary system with a host star similar to Earth's sun. Especially intriguing is the star's unusual composition, which indicates it ingested some of its planets.

"It doesn't mean that the sun will 'eat' the Earth any time soon," said Jacob Bean, assistant professor of astronomy and astrophysics at UChicago and co-author of an Astronomy & Astrophysics article on the research. "But our discovery provides an indication that violent histories may be common for planetary systems, including our own."

Unlike the artificial planet-destroying Death Star in the movie "Star Wars," this natural version could provide clues about how planetary systems evolve over time.

Astronomers discovered the first planet orbiting a star other than the sun in 1995. Since then, more than two thousand exoplanets have been identified. Rare among them are planets that orbit a star similar to Earth's sun. Due to their extreme similarity to the sun, these so-called solar twins are ideal targets for investigating the connections between stars and their planets.

Bean and his colleagues studied star HIP68468, which is 300 light years away, as part of a multi-year project to discover planets that orbit solar twins. It's tricky to draw conclusions from a single system, cautioned Megan Bedell, a UChicago doctoral student who is co-author of the research and the lead planet finder for the collaboration. She said the team plans "to study more stars like this to see whether this is a common outcome of the planet formation process."

Computer simulations show that billions of years from now, the accumulated gravitational tugs and pulls between planets will eventually cause Mercury to fall into the sun, said Debra Fischer, a professor of astronomy at Yale University who was not involved in the research. "This study of HIP68468 is a post-mortem of this process happening around another star similar to our sun. The discovery deepens our understanding of the evolution of planetary systems."

Two planets discovered

Using the 3.6-meter telescope at La Silla Observatory in Chile, the research team of scientists from several continents discovered its first exoplanet in 2015. The more recent discovery needs to be confirmed, but includes two planet candidates—a super Neptune and a super Earth. Their orbits are surprisingly close to their host star, with one 50 percent more massive than Neptune and located at a Venus-like distance from its star. The other, the first super Earth around a solar twin, is three times the Earth's mass and so close to its star that its orbit takes just three days.

"These two planets most likely didn't form where we see them today," Bedell said. Instead, they probably migrated inward from the outer parts of the planetary system. Other planets could have been ejected from the system -- or ingested by their host star.

HIP68468's composition points to a history of ingesting planets. It contains four times more lithium than would be expected for a star that is 6 billion years old, as well as a surplus of refractory elements—metals resistant to heat and that are abundant in rocky planets.
In the hot interior of stars like HIP68468 and the sun, lithium is consumed over time. Planets, on the other hand, preserve lithium because their inner temperatures are not high enough to destroy the element. As a result, when a star engulfs a planet, the lithium that the planet deposits in the stellar atmosphere stands out.

Taken together, the lithium and the engulfed rocky planet material in the atmosphere of HIP68468 is equivalent to the mass of six Earths.

"It can be very hard to know the history of a particular star, but once in a while we get lucky and find stars with chemical compositions that likely came from in-falling planets," Fischer said. "That's the case with HD68468. The chemical remains of one or more planets are smeared in its atmosphere.

"It's as if we saw a cat sitting next to a bird cage," she added. "If there are yellow feathers sticking out of the cat's mouth, it's a good bet that the cat swallowed a canary."

The team continues to monitor more than 60 solar twins, looking for more exoplanets. Beyond that, the Giant Magellan Telescope under construction in Chile, for which UChicago is a founding partner, will be capable of detecting more Earth-like exoplanets around solar twins.

"In addition to finding Earth-like planets, the Giant Magellan Telescope will enable astronomers to study the atmospheric composition of stars at even greater detail than we can today," Bean said. "That will further reveal the histories of planetary systems that are subtly imprinted on their host stars."

Source: Eureka Alert
The Night Sky

Friday, December 16

• Have you ever watched a Sirius-rise? If you can find a spot with a good view down to the east-southeast horizon, watch for Sirius to come up about two fists at arm's length below Orion's Belt. It rises now sometime around 8 p.m. depending on your location.

When a star is very low, it tends to twinkle quite slowly and often in vivid colors. Sirius is bright enough to show these effects well.

Saturday, December 17

• The Pleiades cluster shines high in the southeast after dinnertime, no bigger than your fingertip at arm's length. How many Pleiads can you count with your unaided eye? Take your time and keep looking. Most people count 6. With sharp eyesight, a good dark sky, and a steady gaze, you may be able to make out 8 or 9.

• The waning gibbous Moon is nicely up in the east after about 10 p.m. The Moon at this phase looks weird to a lot of people, because we're usually not out late enough to see it at night. Look about 7° to the Moon's lower left for Regulus in Leo, a very early harbinger of the coming spring.

Sunday, December 18

• Right after dark you'll find the Pleiades high in the east, with Aldebaran and the Hyades below them. Far below these, Orion is beginning to clear the horizon. By about 9 p.m. Orion is much higher and Sirius is sparkling below it, completing this famous tall stack of December stars.

Monday, December 19

• With the Moon out of the evening sky, and the cold December air often especially clean and clear, now's a fine time try do your best on the Triangulum Galaxy, M33. It's passing very high overhead these evenings, big but dim. How much inside this ghostly galaxy can you detect and identify? See Sue French's "M33 in a 10-inch Scope" with photo, drawing, and map in the December Sky & Telescope, page 54.

Tuesday, December 20

• Last-quarter Moon (exact at 8:56 p.m. EST). The Moon rises around midnight. Once it's well up you'll see that it's in Virgo under the tail of Leo. Jupiter rises below the Moon about an hour and a half later. By dawn Wednesday morning, they're high in the south.

• You are remembered, Carl Sagan (November 9, 1934 – December 20, 1996).

Source: Sky & Telescope
ISS Sighting Opportunities

For Denver:

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Sighting information for other cities can be found at NASA’s [Satellite Sighting Information](https://nssdc.gsfc.nasa.gov/planetary/sightings.html).

NASA-TV Highlights
(all times Eastern Daylight Time)

- **3 p.m., 7 p.m., 11 p.m., Friday, December 16** - Replay of the ISS Expedition 50 Educational In-Flight Event with the Nantucket New School, Nantucket, Massachusetts and ISS Commander Shane Kimbrough of NASA (all channels)

- **4 p.m., Friday, December 16** - Live Coverage of John H. Glenn Repose at the Ohio State House in Columbus, Ohio (all channels)

- **2 p.m., Saturday, December 17** - Live Coverage of John H. Glenn Memorial Service from Ohio State University (all channels)

- **10 a.m., Monday, December 19** - ISS Expedition 50 In-Flight Event with Georgia Tech University and ISS Commander Shane Kimbrough of NASA (starts at 10:15 a.m.) (all channels)

Watch NASA TV on the Net by going to the [NASA website](https://www.nasa.gov/).  

Return to Contents
Space Calendar

- Dec 16 - Comet 205P-B/Giacobini Closest Approach To Earth (2.954 AU)
- Dec 16 - Asteroid 861 Aida Occults HIP 36411 (6.7 Magnitude Star)
- Dec 16 - Apollo Asteroid 2016 W1 Near-Earth Flyby (0.054 AU)
- Dec 16 - Aten Asteroid 2001 YE4 Near-Earth Flyby (0.081 AU)
- Dec 16 - Asteroid 6701 Warhol Closest Approach To Earth (1.634 AU)
- Dec 16 - Giovanni Donati's 190th Birthday (1826)
- Dec 16 - Johann Ritter's 240th Birthday (1776)
- Dec 17 - Comet 235P/LINEAR At Opposition (2.665 AU)
- Dec 17 - Asteroid 66016 (1998 QX27) Occults 55249 (5.9 Magnitude Star)
- Dec 17 - Apollo Asteroid 2016 NL15 Near-Earth Flyby (0.077 AU)
- Dec 17 - Apollo Asteroid 4581 Asciepius Closest Approach To Earth (0.331 AU)
- Dec 17 - Atira Asteroid 2010 XB11 Closest Approach To Earth (1.077 AU)
- Dec 17 - Asteroid 9963 Sandage Closest Approach To Earth (1.244 AU)
- Dec 17 - Asteroid 1071 Brita Closest Approach To Earth (1.515 AU)
- Dec 17 - Asteroid 1157 Arabia Closest Approach To Earth (2.629 AU)
- Dec 17 - Milos Tichy's 50th Birthday (1966)
- Dec 18 - Cassini, Distant Flyby of Aegaeon, Pandora, Janus & Pan
- Dec 18 - Echostar 19 Atlas 5 Launch
- Dec 18 - Apollo Asteroid 2016 XK18 Near-Earth Flyby (0.015 AU)
- Dec 18 - Asteroid 6123 Aristoteles Closest Approach To Earth (1.370 AU)
- Dec 18 - Asteroid 4636 Chile Closest Approach To Earth (1.488 AU)
- Dec 18 - Plutino 55638 (2002 VE95) At Opposition (28.609 AU)
- Dec 18 - 50th Anniversary (1966), Richard Walker's Discovery of Saturn Moon Epimetheus
- Dec 18 - Schelte Bus' 60th Birthday (1956)
- Dec 18 - 90th Anniversary (1926), Gilbert Lewis Coins The Word 'Photon'
- Dec 18 - Sir Joseph John Thomson's 160th Birthday (1856)
- Dec 19 - Tansat CZ-2D Launch
- Dec 19 - Comet 10P/Tempel At Opposition (2.475 AU)
- Dec 19 - Comet 88P/Howell At Opposition (3.360 AU)
- Dec 19 - Asteroid 268242 Pebble Closest Approach To Earth (1.144 AU)
- Dec 19 - Asteroid 1997 Leverrier Closest Approach To Earth (1.225 AU)
- Dec 19 - Asteroid 8146 Jimbel Closest Approach To Earth (1.240 AU)
- Dec 19 - Asteroid 163800 Richarndorton Closest Approach To Earth (1.254 AU)
- Dec 19 - Asteroid 1789 Dobrovolsky Closest Approach To Earth (1.483 AU)
- Dec 19 - Asteroid 6136 Gryphon Closest Approach To Earth (1.884 AU)
- Dec 19 - Webinar: Martian Environments, Facies, and Ages - Evidence for Rock-Hosted Waters
- Dec 19 - 20th Anniversary (1996), Galileo, Europa 4 Flyby
- Dec 19 - 55th Anniversary (1961), Founding of the French Space Agency (CNES)
- Dec 20 - Star One D1/ JCSat 15 Ariane 5 Launch
- Dec 20 - ERG Epsilon Launch
- Dec 20 - Asteroid 2014 Lancelot Occults HIP 664 (6.2 Magnitude Star)
- Dec 20 - Aten Asteroid 2016 GK135 Near-Earth Flyby (0.093 AU)
- Dec 20 - Asteroid 3533 Toyota Closest Approach To Earth (0.991 AU)
- Dec 20 - Asteroid 1278 Kenya Closest Approach To Earth (1.674 AU)
- Dec 20 - Webinar: Metabolisms and Niches for Terrestrial Rock-Hosted Life
- Dec 20 - Walter Adams' 140th Birthday (1876)

Source: JPL Space Calendar
Food for Thought

Einstein's Theory Just Put the Brakes on the Sun's Spin

Although the sun is our nearest star, it still hides many secrets. But it seems that one solar conundrum may have been solved and a theory originally proposed in 1905 by Albert Einstein could be at the root of it all.

Twenty years ago, solar astronomers realized that the uppermost layer of the sun rotates slower than the rest of the sun's interior. This is odd. It is well known the sun rotates faster at its equator than at its poles — a phenomenon known as "differential rotation" that drives the sun's 11-year solar cycle — but the fact that the sun has a sluggish upper layer has been hard to understand. It's as if there's some kind of force trying to hold it in place while the lower layers churn below it.

Now, researchers from University of Hawaii Institute for Astronomy (IfA), Brazil, and Stanford University may have stumbled on an answer and it could all be down to fundamental physics. It seems that the light our sun generates has a braking effect on the sun's surface layers.

"The sun won't stop spinning anytime soon, but we've discovered that the same solar radiation that heats the Earth is 'braking' the sun because of Einstein's Special Relativity, causing it to gradually slow down, starting from its surface," said Jeff Kuhn, of IfA Maui, in a statement.

Special relativity predicts that photons, which carry the electromagnetic force (i.e. light), also carry a tiny amount of momentum. If you have enough photons travelling away from an object, they will carry away a large amount of momentum. In the case of the sun's 4 billion year lifetime, the surface has lost a lot of momentum to photons, causing a slowdown of the uppermost 5 percent of the sun. This mechanism, called the Poynting-Robertson effect, has been observed in interplanetary dust, which feels the drag of the sun's radiation, causing it to fall from the asteroid belt into the inner solar system.
What affects dust inevitably affects the soup of super-heated gas in the sun's upper layers and, over its 5 billion year lifetime, the drag caused by photons being emitted from the sun has created a measurable and, until now, mysterious effect.

Using several years of data from NASA's Solar Dynamics Observatory (SDO), the researchers were able to measure waves traveling through the sun to precisely measure the size of the layer that is experiencing this slowdown. The technique, known as "helioseismology," is very similar to measuring the seismic waves travelling through the Earth to measure the strength of an earthquake. The material these seismic waves travel through changes the waves so seismologists can "see" underground.

Though the sun isn't a solid planet made from rock and metal, its dense plasma interior also allows waves to travel, creating oscillations on the surface that can be measured. Helioseismology therefore allows astronomers to "see" into our nearest star, revealing many details about its interior that may not be obvious on the surface. And in this case, by using helioseismology and studying the sun's magnetic field passing from space into the sun's interior, we can gauge how much of a drag Einstein's special relativity has had on the sun's surface.

"This is a gentle torque that is slowing it down, but over the Sun's 5 billion year lifetime it has had a very noticeable influence on its outer 35,000 kilometers [22,000 miles]," said Kuhn. These findings have accepted for publication in the journal Physical Review Letters and can be previewed on the arXiv pre-print service.

Using our sun as a laboratory for other stars, Kuhn's team believe that a similar effect likely happens for all stars and could have a strong influence on stellar evolution. Now solar astronomers are very interested to understand how this solar slowdown impacts the sun's magnetic field that threads through the entire solar system. As the sun's magnetism is the root cause of space weather that can trigger solar flares and coronal mass ejections that could interfere with satellites and power grids, this research could have a key role to play in our understanding of solar impacts on Earth.
Space Image of the Week

Hubble "Crane-s" in for a Closer Look at a Galaxy

In 1900, astronomer Joseph Lunt made a discovery: Peering through a telescope at Cape Town Observatory, the British–South African scientist spotted this beautiful sight in the southern constellation of Grus (The Crane): a barred spiral galaxy now named IC 5201.

Over a century later, the galaxy is still of interest to astronomers. For this image, the NASA/ESA Hubble Space Telescope used its Advanced Camera for Surveys (ACS) to produce a beautiful and intricate image of the galaxy. Hubble's ACS can resolve individual stars within other galaxies, making it an invaluable tool to explore how various populations of stars sprang to life, evolved, and died throughout the cosmos.

IC 5201 sits over 40 million light-years away from us. As with two thirds of all the spirals we see in the Universe — including the Milky Way — the galaxy has a bar of stars slicing through its center.

Image credit: ESA/Hubble & NASA

Source: NASA