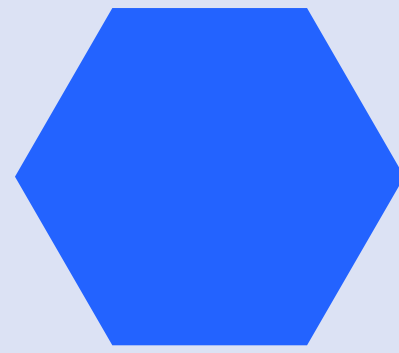


JWST UNIVERSE JWST UNIVERSE



[JWST-UNIVERSE.NET](https://www.jwst-planetarium.org/)

EXHIBITION
+IMMERSIVE EXPERIENCE
+ EDUCATIONAL PROGRAMME

JWST Universe – the world's first exhibition, immersive experience and educational programme about the groundbreaking space telescope mission.



Universiteit
Leiden
The Netherlands



SRON

JWST Universe has been developed by Science Now in partnership with Leiden University, NOVA and SRON.

Explore the images that gave humanity a new view of the Universe. Experience the achievements of the JWST Space Telescope mission from a whole new perspective. JWST Universe is a must-see for anyone who ever wondered about the greatest cosmic mysteries.

THE EXHIBITION

The first edition of JWST Universe in a form of exhibition premiered on the 26th of April at the Old Observatory in Leiden, The Netherlands. It remains open to the public until the end of this year.

Step into a world where art and science merge, where the mysteries of the Universe are unveiled through an ecosystem of formats. Welcome to JWST Universe, an extraordinary exhibition that transports you beyond the confines of Earth and into the vastness of space.



ECOSYSTEM OF FORMATS

1. Photographic exhibition

The JWST Universe photographic exhibition redefines the way we perceive images from space, elevating them to the realm of artistic masterpieces. By treating these captivating cosmic shots as works of art, the exhibition unveils the beauty and mystery of the Universe in an entirely new light. Visitors are invited to immerse themselves in a visual journey that transcends scientific exploration, evoking a profound sense of wonder and awe.

2. Immersive experience

By seamlessly integrating cutting-edge technology, captivating visuals, and interactive elements, JWST Universe offers experience that invites the viewers in the gorgeousness of space. Through this immersive journey, attendees gain a unique perspective that blends science and art, leaving them inspired and awestruck.

3. Educational program

The JWST Universe's educational program enriches the exhibition experience by integrating a range of activities centered around exploring the cosmos. Designed for all age groups, this comprehensive package offers engaging workshops, interactive sessions, and hands-on playful learning opportunities that complement the exhibition. From young learners to seasoned enthusiasts, every guest can find a learning opportunity.














CHAPTERS OF THE EXHIBITION

TECHNOLOGICAL MARVEL

JWST is one of the most complicated machines ever constructed. As it rattled up and off a launchpad in South America on Christmas Day 2021, the telescope was packaged up into a fraction of its final size. The eighteen gold-plated hexagonal mirrors were attentively folded into a glistening origami. The delicate yet rigorously produced foil was coiled and waiting to be unravelled into a tennis court-sized sunshield. The four light capturing instruments, some of the most complex ever created, were secured and waiting for the 1.5 million kilometre voyage through space.

JWST's journey to its final position five times farther out than the moon was a nerve-racking period for astronomers and admirers across the world. The space telescope is the product of 100 million hours of human craft, and 10 billion dollars of investment. It carried with it the promise of a completely unique view of the cosmos, a view that could revolutionise our understanding of how the Universe works.

The idea for JWST began more than 25 years ago, and required 1,200 scientists, engineers and administrators from 14 countries around the world to make it a reality. Scientists in the Netherlands played a large part in developing JWST, particularly with one of the telescope's powerful instruments, the Mid-Infrared Instrument (MIRI). Led by Leiden University professor, Ewine van Dishoeck, the Dutch-based team was responsible for designing, constructing and testing the optical technology at the heart of the instrument.

In building JWST, humanity has encountered and overcome a great many engineering challenges. Such an ambitious project will not only bring distant and mysterious objects more clearly into view, but the technology developed for JWST may go on to solve problems in many other areas of human endeavour.



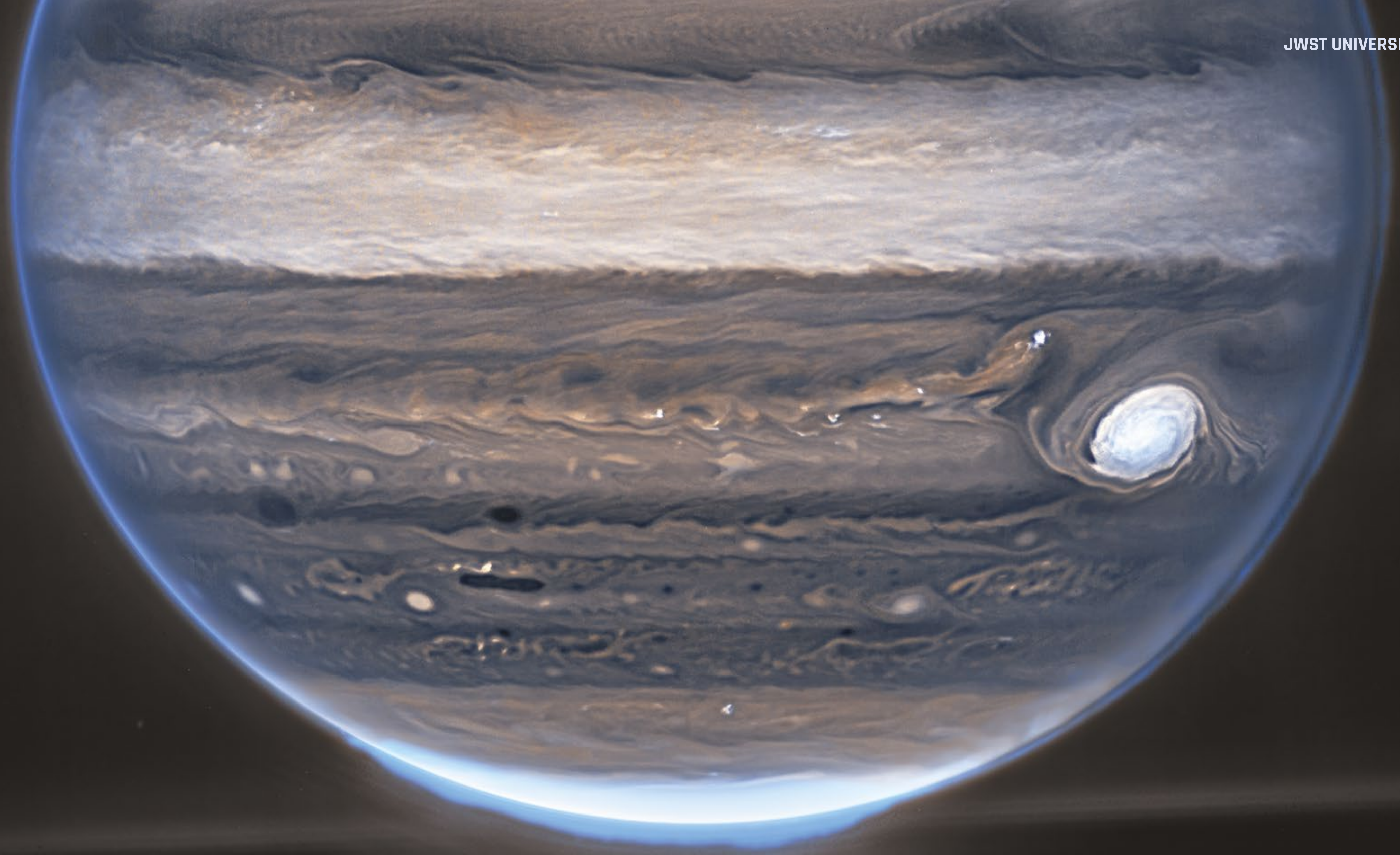


In 1992, astronomers made the first discovery of a planet orbiting around another star. Since then, the catalogue of these extra-solar planets - or 'exoplanets' - has exploded, with over 5,000 now confirmed. In this huge population of other worlds, we find wonderful diversity, from rocky Earth-like planets to gas giants that would dwarf even Jupiter. But there remain gaps in our understanding of these alien realms, gaps that JWST now begins to fill.

Exoplanets are hard to find, and even harder to study. Astronomers need light from an object to gleam any insights into its nature, but exoplanets are enormously outshone by their host star, and imaging them often results in data awash with unwanted starlight. This means we are often forced to use tricky techniques with our telescopes to indirectly measure their presence, in a cosmic game of hide and seek. With JWST's suite of cutting edge instruments, the game begins to turn in our favour.

One tool that JWST has at its disposal is a coronagraph. A coronagraph sits in front of the camera, blocking light from the star - similar to how the moon blocks the sun during an eclipse. With the starlight precisely blocked, the much dimmer exoplanets can peep out from behind the glare. Combine a coronagraph with JWST's incredible sensitivity, and suddenly exoplanets 10,000 times dimmer than we have seen before become visible.

Planets are the hidden theatres in our Universe where some of the most fascinating stories play out. Stories of complex chemistry, roaring pattern-filled weather, tumultuous geology, and perhaps even the most compelling story of all, life. With JWST, astronomers hope to map out the full array of worlds lying out among the stars; and through its piercing gaze, we may learn about the origins of our own planet and the life that thrives on its surface.





In the first few hundred million years after the Big Bang, the Universe was devoid of features; full of formless gas and absent of starlight. Though it still changed and evolved as it expanded into its youth, the era of glittering cosmic wonders came only with the birth of the very first stars, and the formation of the primordial galaxies. Their light could then stream freely through space. But light can only travel so fast, and the Universe is so vast that the light from these first cosmic inhabitants is still arriving at us today. JWST is primed to collect that light, transporting us back to the very beginning of time with its data.

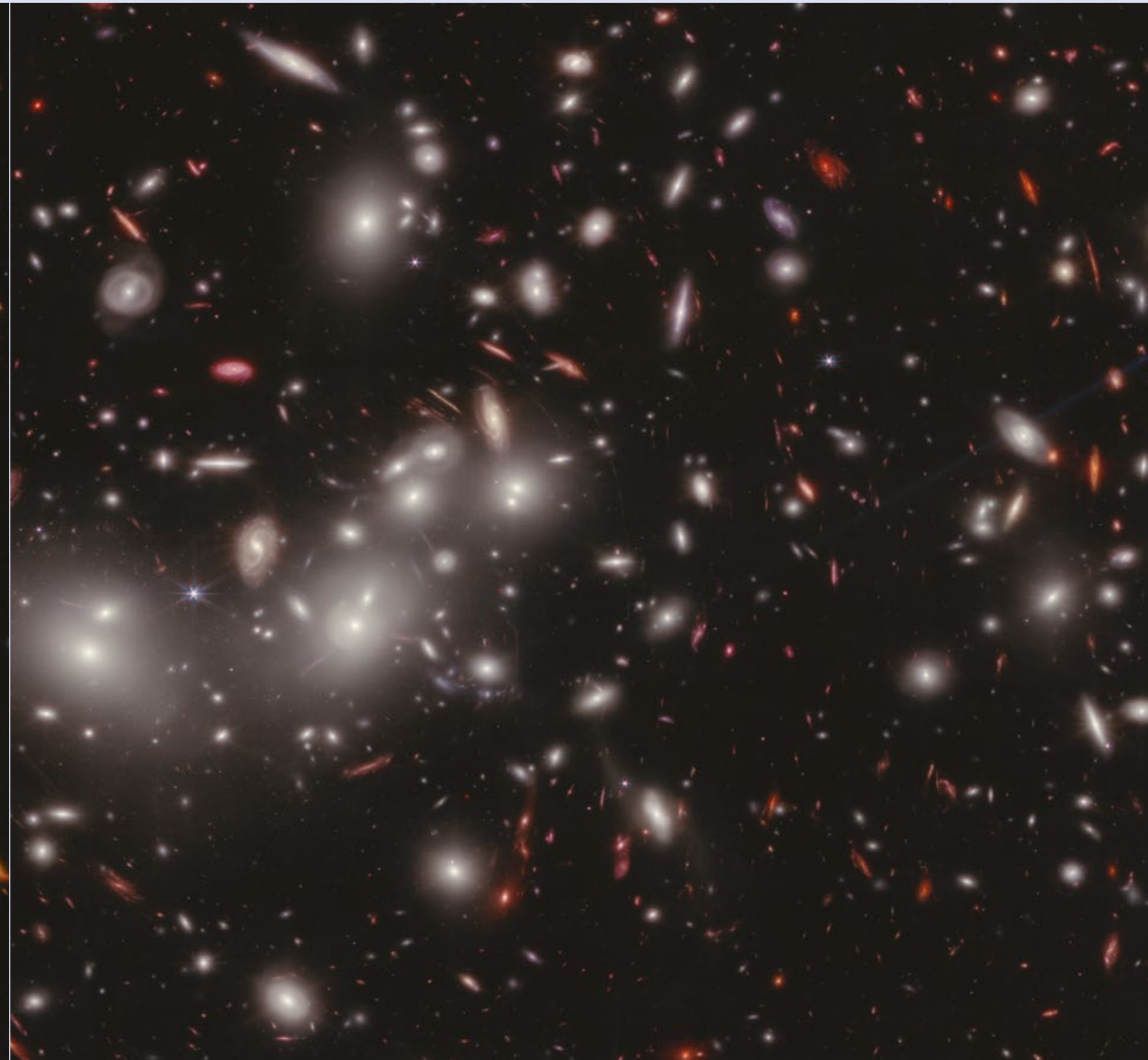
JWST is the ideal tool for studying the early universe. Its advanced instruments and mirrors are designed to capture infrared light - colours beyond the red end of the visible spectrum, which our eyes cannot see. This is the reason behind the telescope's iconic golden sheen; gold reflects 99% of infrared light, allowing the hexagonal mirrors to maximise the light pouring into the sensors.

Infrared is the best way to study objects in the early Universe because their light has been 'redshifted'. This means the light waves have been stretched as they have moved through the expanding Universe, becoming redder and redder. What were once colours we could see with our eyes, now lie in the infrared, and the realm of JWST.

In peering back at these most ancient stars and galaxies, JWST is observing the seeds of all that we see around us today. Through the lens of time, it can witness the birth of the first stars, and the formation of the earliest galaxies as they swirl around supermassive black holes. Until now, the darkest period of our Universe's history has been a mystery, but JWST may finally bring it into the light.



Object: LEDA 204664 **Distance:** 1 billion light-years **Instrument:** NIRCam
Filters: Red: F150W2, Yellow: F200W, Cyan: F277W, Blue: F335M



Object: Pandora's Cluster **Distance:** 3.5 billion light-years **Instrument:** NIRCam
Filters: Blue: F115W+F150W, Green: F200W+F277W, Red: F356W+F444W



Gazing up at the stars, you could be convinced that they have always appeared how they are today. Unchanging beacons from the depths of space, twinkling in our night sky. This is anything but true. Stars are dynamic engines that power the cosmos with their energy and light. Seen with JWST, stars appear crowned with six spikes of light; but they bring us more than just beautiful images, they bring new knowledge.

Every star begins life in a violent transformation, and over millions or billions of years, they go through a series of stages that ultimately leads to their death. Most stars are conceived inside nebulae; huge clouds of gas and dust, many light-years across. The dust in these great clouds is impenetrable to visible light telescopes, like the Hubble Space Telescope. But infrared light - JWST's target colours - can seep through.

What goes into stars - and what comes out of them - is important for understanding how the composition of the Universe and the objects within it changes. JWST can isolate the presence of particular elements and molecules using its powerful spectrographs, that split light up into very precise colours. By searching for the absence of certain colours, astronomers can identify the substance that absorbed it. This provides insights into how a star's atmosphere evolves, and what they release into space as they explode in magnificent supernovae.

Stars are the alchemists of the Universe, they transform simple matter into larger elements that create the diversity we see in the planets, and in life on Earth. With JWST, astronomers hope to document every stage of stellar life; from the fiery death throes of massive stars to the swirling chaos of fledgling stars as planets coalesce around them.



Object: Chameleon 1 **Distance:** 630 light-years
Instrument: NIRCam **Filters:** Orange: F150W, Blue: F410M



Object: Southern Ring Nebula **Distance:** 2,000 light-years **Instrument:** NIRCam
Filters: Red: F470N + F405N, Yellow: F356W, Green: F212N, Cyan: F187N, Blue: F090W





GALAXIES THROUGH TIME

Almost every image in this exhibit contains at least one galaxy. Whether it's the main focus of the image or emerging from the dark background as a ghostly, cosmic apparition, JWST proves that our Universe is simply brimming with galaxies. But as you browse, you'll notice that no two are alike. In fact, there appears to be an endless gallery of galaxies, all sculpted into different shapes. There are formless ellipticals, swirling spirals, and wobbly irregulars. These forms represent the differing evolutions of galaxies, evolution that continues even today.

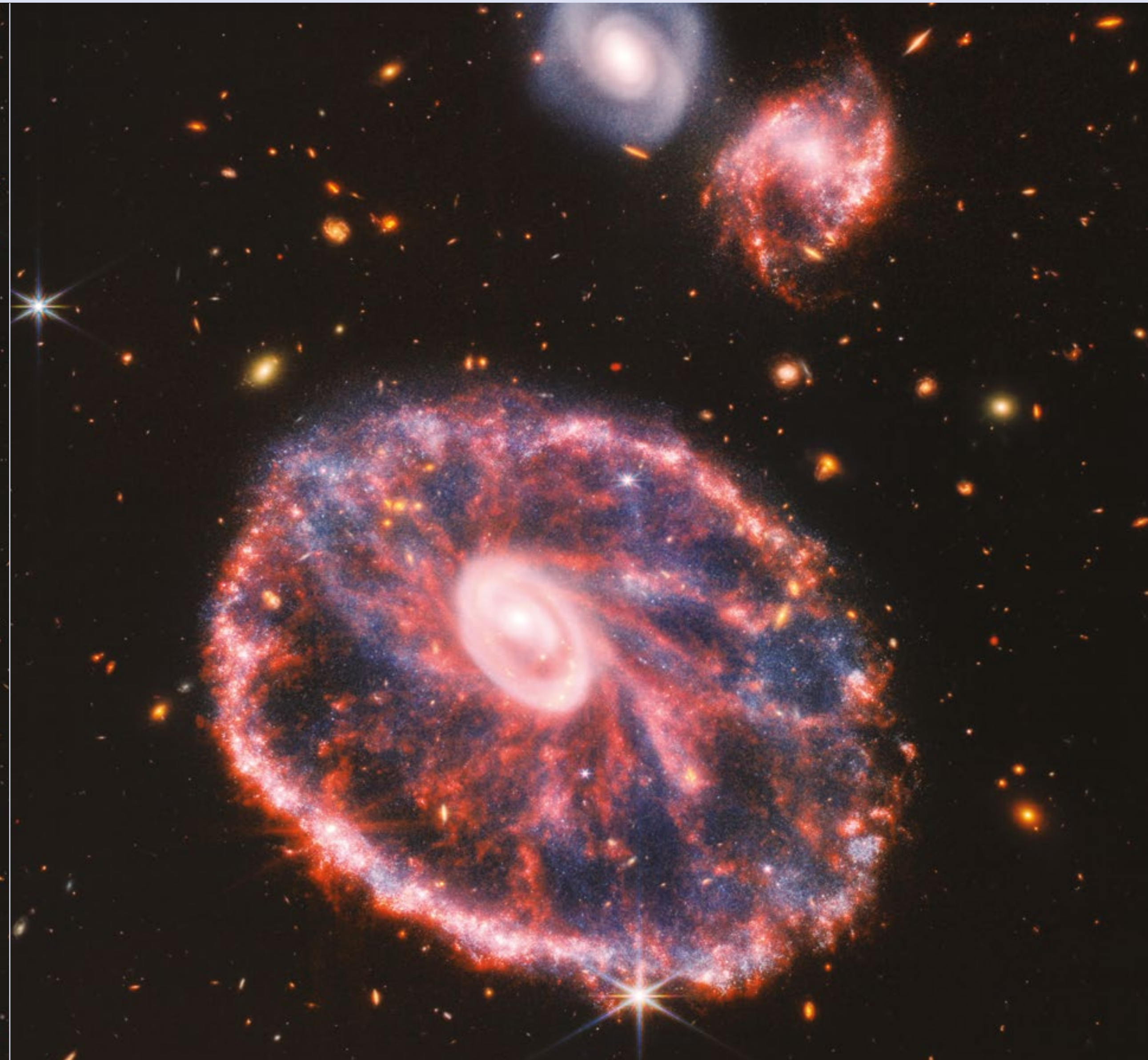
Within its first year of operation, JWST already provided us views of galaxies that astronomers of the last century could only dream of. It was around 100 years ago when American astronomer Edwin Hubble first discovered that the Milky Way was not the only galaxy in the Universe, and that many others lay beyond its borders. Since then, our observations have expanded our perception of the Universe to contain perhaps a trillion galaxies - but probably more.

Each of the galaxies you see are comprised of uncountable wonders. Within them, you'll find billions of stars and their planets scattered among dark clumps of dust, enormous clouds of gas, frighteningly large black holes, and elusive dark matter. Despite our ability to audit the contents of galaxies, we understand little about how and why they formed in this way.

JWST will further our understanding. With its sensitivity, JWST may detect light that has been warped by the gravity of dark matter, tracing its presence across the Universe. This extraordinary telescope's ability to render detailed pictures of the very distant past means we can fill out the timeline of galaxy evolution.



Object: Stephan's Quintet **Distance:** 290 million light-years **Instrument:** MIRI, NIRCam **Filters:** Red: F356W+ F444W, Orange: F1000W, Yellow: F277W + F770W,



Object: Southern Ring Nebula **Distance:** 500 million light-years **Instrument:** MIRI, NIRCam **Filters:** Red: F444W + F356W, Orange: F770W + F1000W + F1280W + F1800W, Yellow: F277W, Green: F200W, Blue: F150W + F090W

BECOME A PARTNER

We are currently looking for partners interested in hosting the exhibition at their venues. We invite you to check the ways you or your organization can get involved through an array of business models providing adaptability and flexibility. All available formats give you highly customisable options and allow you to create a bespoke experience in almost any environment.

IF YOU'RE INTERESTED GET IN TOUCH WITH US!

contact@jwst-universe.net

AVAILABLE BUSINESS MODELS:

01. TURNKEY EXHIBITION SOLUTION

We offer a comprehensive turnkey exhibition solution, customized to align with the specific parameters and conditions of your venue. Our services include:

- Project preparation and planning
- Professional execution and implementation of the exhibition, including installation
- Provision of a tailored package of promotional materials
- Access to merchandise assets
- Access to educational materials to facilitate additional workshops for various target groups
- The exhibition license, sold directly by us

With our integrated approach, we ensure a seamless experience, providing all the necessary elements for a successful and engaging exhibition at your venue.

02. EXHIBITION DESIGN PACKAGE SOLUTION

We offer site-specific exhibition design package that includes:

- Preparation of materials for the content design stage (incl. a package with photos, image captions, merchandise materials, and an educational materials)
- Site-specific schematic designs
- Detailed guidelines for arranging the space and optimizing content placement for its best impressionability
- Authors' supervision throughout the exhibition implementation process

Please note that the production and assembly of the exhibition will be the responsibility of the venues. Our package ensures a seamless collaboration, enabling you to create a captivating and impactful exhibition experience.

03. COPRODUCTION / PARTNERSHIP

We offer collaborative approach to jointly produce and present an exhibition. This model involves sharing resources, expertise, and responsibilities among the partners involved. Our services include:

- Creation of a customized project plan, ensuring seamless integration of the exhibition within the spatial constraints of your selected venue
- Comprehensive preparation of exhibition content, including curated photos, visual elements, and translations
- Optionally, exhibition production and installation services, handled by our experienced team
- Optionally, development of merchandising assets
- Optionally, creation of educational workshop materials designed for diverse target groups

Please note that under this business model, parties involved in the co-production mutually share the profits generated from ticket sales and other associated activities.

We believe coproduction model allows for the synergy of diverse perspectives, knowledge, and resources, resulting in a rewarding and more comprehensive exhibition experience.

CREDITS

As Science Now Studio, we have created this project capitalising on our rich experience in innovative edutainment projects, including art installations and immersive experiences for Expo 2020 Dubai or projects for the European Space Agency (“Ambition” sci-fi short film and campaign for The Rosetta Mission). Together with partners from Leiden University and NOVA we created an ecosystem of formats based on the breathtaking photos from JWST Space Telescope. The visual part of JWST Universe is enhanced by a captivating and informative narrative and educational program developed together with leading scientists – some of whom have been working on the JWST Space Telescope project.

JWST Universe is a collaborative project of Leiden University, Science Now NOVA and SRON.

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