Lewes Astronomical Society

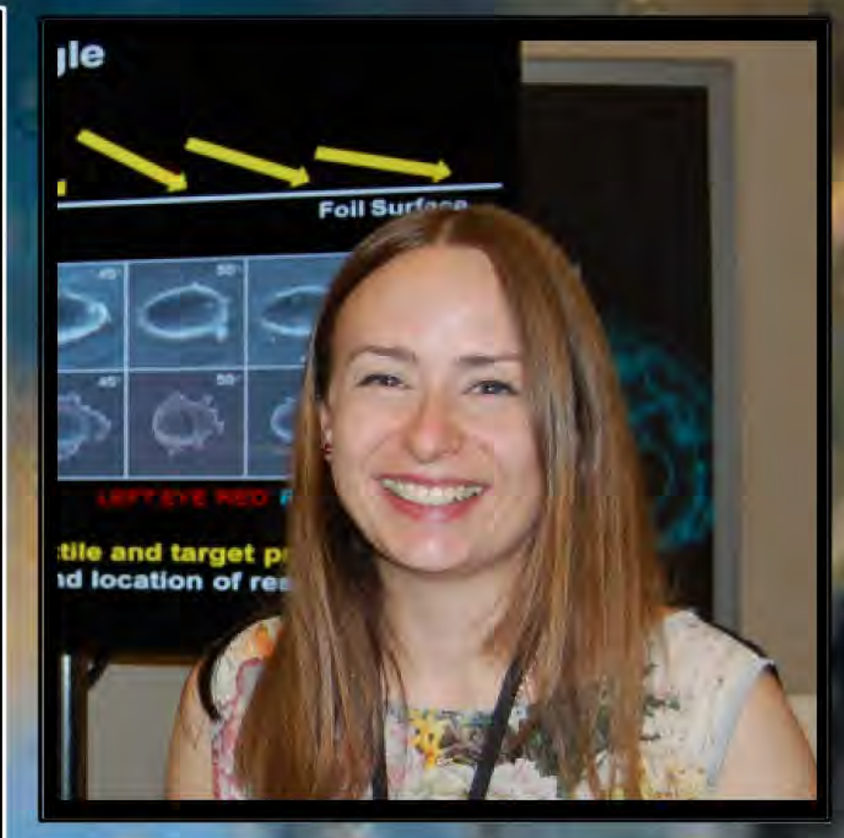
June Newsletter 2025

Contents

LAS - Upcoming Events

AGM plus a talk on Impacts in the Solar System
Penny Wozniakiewicz

4th June 2025
Doors open at 7pm for 7:30 start
Subud Centre, Lewes, BN7 2DS



Penny will introduce the fundamental process of impact cratering which has shaped Earth's landscape and even influenced (both positively and negatively) life on our planet over the course of its history. The geologically active nature of the Earth destroys evidence of these impacts over time and today only 190 confirmed impact craters have been identified. Some of the most striking examples will be described before looking out to space at craters on other planets and moons. Impacts not only occur on all bodies, but at all scales and we will therefore also consider the resulting impact hazard posed by dusty particles that pervade our solar system - although the atmospheres of planets like Earth offer protection from these particles by slowing them down or burning them up, airless bodies and indeed spacecraft are constantly at risk of impact by high speed dust. She will also consider some of the ways we are trying to study impacts, with a focus on the experimental research using the two stage light gas gun being performed by her group at the University of Kent.

Everyone welcome. Non-members £4

Summer Solstice 2025
Outdoor Event

21st June 2025
Malling Down Nature Reserve

Once again, we are holding a free and informal gathering on the Lewes downland to celebrate the Summer Solstice, which this year falls on Saturday 21st June. Weather permitting, we will have the opportunity to enjoy breathtaking views of the Ouse Valley as the sun goes down. See our Summer Solstice webpage for full details.

Harvey's Brewery Tour

4th July 2025
Harvey's Brewery, Lewes BN7 2JW

Following the sell-out success of this social event last summer, we have arranged another evening tour at Harvey's Brewery in Lewes. Steeped in tradition, Harvey's is the oldest independent brewery in Sussex. Experience an engaging 90-minute private guided tour around the wonderful historic building and then enjoy tasting a variety of beers to conclude the evening, all included with your ticket. £12 for members, £15 for non-members. Adults only. See our Harvey's Brewery Tour webpage for full details.

LAS News

Solar Observation Session - Judith Pyett

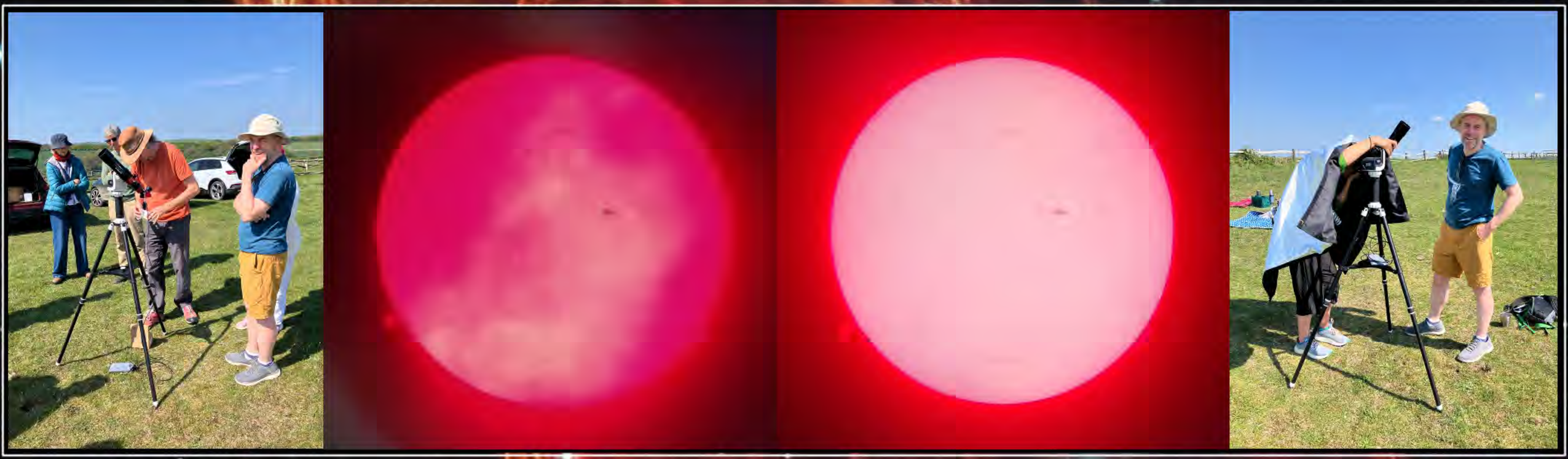
After a week of clear skies and hot sunny days, we decided to hold an impromptu solar observing session in the heart of Lewes.

On the morning of Saturday, 3rd May, we set up on Cliffe Bridge, hoping to take advantage of yet another bright, sunny day.

It was a perfect opportunity to put our new solar telescope to the test—a recent acquisition made possible by a generous grant from Lewes Town Council. Spirits were high as we anticipated another day of excellent visibility, but nature had other plans. Clouds began to roll in, turning our observing session into a game of patience, catching glimpses of the Sun whenever the clouds allowed.

Despite the patchy weather, a few dozen curious shoppers paused their Saturday routines to peer through the telescope. Those who caught a view were treated to some stunning sights, including a massive sunspot near the centre of the solar disc—larger than Earth itself—and a couple of striking prominences around the solar limb.

The reactions were well worth the effort—everyone who managed a look was thrilled by this unexpected cosmic detour. We are planning to host a few more solar viewing sessions over the summer, so keep an eye on our website and social media for upcoming dates. We hope to see you there!



The left and right images show our solar telescope, in use at the Old Racecourse. The middle images showcase the solar images taken during the 3rd of May Cliffe Bridge event. Credit: Kate Land and Behnood Bandi

First Meeting at Subud Community Centre

We are always looking to expand the society and to take on new members and, thanks to the joint efforts of our wonderful committee and our enthusiastic members, our membership has increased to the point that we now require larger premises for the monthly meetings.

While the Town Hall has been our base for monthly meetings for many years, it ironically does not come with an infinite amount of space. In fact, if our entire membership had decided to show up for one meeting, we would have had to start stacking people on top of each other.

For this reason, LAS monthly meetings have now moved to the Lewes Subud Community Centre, located near to the Pells Pool; a location which will provide us with far more room for our members.

Our first meeting at Subud took place on the 7th of May and featured a talk on early British rocketry from Richard Butchers, as well as a talk introducing galaxies from Dr Kate Land. The evening was a great success, and we look forward to many more fantastic meetings to come in our new home.

LAS News

Annual General Meeting

June 2025

Our AGM this year will take place on Wednesday 4th June at the Subud Centre in Lewes at 7:30pm, just before our final talk of this season. Everyone is welcome to attend both the short AGM and the talk about cosmic dust by Dr Penny Wozniakiewicz (non-members £4). As a democratic organisation, our society members are invited to participate in the electoral process during the AGM. Please be advised that the following LAS members will be standing for election at the AGM:

- Stephen Wilkins (President)
- Robert Massey (Chair)
- Jane Penny (Secretary)
- Catherine Jackson (Treasurer)
- Kate Land (Outreach Officer / Vice Chair)
- Judith Pyett (Membership Secretary)
- Steven Ward (Web Developer)
- Paul Whitmarsh (Events Coordinator)
- Sarah Carson (Newsletter Editor)
- Behnood Bandi (Universities Liaison Officer)
- Carina Garland (Diversity & Inclusivity Officer)
- Jordan Bookham (Social Media Manager)

While the above people have put themselves forward for the listed roles, we are a democratic society and would like to emphasise that the positions are open for other people to be nominated. A vote at our AGM will determine who should fill the role.

We are always looking to expand our friendly team. If you are a society member interested in nominating yourself or another member for a position (existing or new) on the committee, we really want to hear from you.

Candidates can be nominated at start of the AGM itself, but we would prefer you to send your nomination by email to committee@lewesas.org.uk no later than 24 hours before the AGM.

We are a diverse and inclusive organisation, and recognise that all of our members have skills and experience that can be usefully applied on our committee.

If you're keen to help shape our future, please see our Committee Membership page to learn more about serving on our committee. You can also serve on the committee under a non-specific role, or volunteer your time without becoming a committee member to help out with events and/or meetings.

Back to Basics Astronomy

What is a Galaxy? Part 1

At the most recent LAS meeting, on the 7th of May, Dr. Kate Land gave a short presentation on the subject of galaxies.

During her talk, Kate touched on what defines a galaxy, as well as exploring different galaxy formations and how these are impacted by the presence of dark matter.

Kate has kindly provided her slides from the presentation for inclusion in the newsletter. These are provided along with a short recap of the topics covered.

What is a Galaxy?

Spiral Galaxy, NGC 4414
CREDIT: NASA, Hubble Space Telescope

- A gravitationally bound system of
  - Stars (~100 billion)
  - Gas
  - Dust
  - Dark Matter

  + planets, black holes, etc.
- They come in many shapes and sizes
- Most are 10 to 13.6 billion yrs old
- They gather in groups and clusters, making even larger structures

2

As explained in the above slide, a galaxy is like a huge city filled with stars, gas, planets, black holes, dust, and dark matter.

Since the big bang, galaxies have evolved both together and separately, sometimes existing in their own empty void in space and, other times, interacting with each other to influence formation and lifespan, sometimes merging to become even more massive galaxies.

The most ancient and distant galaxies can tell us about the early universe and how conditions had to be just right to allow for the formation of stars and planets. Newer galaxies can shed light on the evolution of our own Milky Way, granting us the tools to unravel the mysteries of how our Solar System formed and how life began on Earth.

Back to Basics Astronomy

What is a Galaxy? Part 2

Galaxy Morphology (aka Shape)

* Spiral Galaxies make up approximately two-thirds of all known galaxies. Both our own Milky Way galaxy and our closest neighbour, Andromeda, are spiral galaxies. They are characterised by a central bulge and long, curved spiral arms that spin out from the centre. These centres are filled with younger stars, gas and dust, and act as stellar nurseries, birthing new stars to the galaxy. The whole galaxy spins, with stars and gas moving in orbits around a central Supermassive Black Hole.

* Barred Spiral Galaxies are a subtype of spiral galaxies with a straight bar of stars stretching through the middle, instead of curving out from the core. The bars rotate with the galaxy and help to move gas toward the centre, helping to feed the central black hole and to trigger star formation. It is thought that the bars represent a later stage in a galaxy's life, meaning that barred spiral galaxies are galaxies that have moved past their formative years and are entering full maturity. Both the Milky Way and Andromeda fit into this subtype of spiral galaxy.

* Elliptical galaxies are smooth, stretched-out galaxies with no spiral arms and a round or oval shape. These are mainly made up of older stars, due to very little gas or dust being present to birth new ones. It is thought that these galaxies may form from collisions between galaxies, and that the shape is smoothed out during the process of mergers. The galaxies can either be small or enormous, with some of the largest known galaxies presenting as ellipticals.

* Irregular galaxies have no clear shape in the form of spiral arms or round form. They present as a messy, uneven blob of stars, gas, and dust, in which they are very rich. This abundance of materials means that they have lots of new star formation, and many are thought to be young galaxies that are still forming. Others may have once been spiral or elliptical galaxies that were disrupted by collisions, or the gravitational tug of nearby galaxies. They are often smaller than the previous galaxy types.

* Peculiar galaxies are the oddballs of the galactic world. With stars, gas, and dust stretched and twisted into unique shapes, they often show signs of collisions or interactions with other galaxies. They can have odd colours, bright spots, and unusual motion, with active black holes going through intense feeding frenzies. These frenzies are caused by collisions and mergers, as the black holes are knocked off-centre and fuelled with huge amounts of gas and dust, causing them to shine brightly. Some peculiar galaxies can be caused by their active black holes, as giant jets of energy and particles are shot out into space, disturbing the shape.

Back to Basics Astronomy

What is a Galaxy? Part 3

Observing Galaxies

Centaurus A (NGC 5128)
CREDIT: ESO

Sombrero Galaxy (NGC 4594)
CREDIT: NASA

5

Observing Galaxies

We use the whole electromagnetic spectrum to understand what is going on in galaxies.

Jets seen with x-rays and radiowaves

Centaurus A (NGC 5128)
CREDIT: ESO

Dust ring seen with infrared

Sombrero Galaxy (NGC 4594)
CREDIT: NASA

6

Galaxies are visible across a broad spectrum of light. While we can observe them in visible light, using traditional telescopes like Hubble to detect galaxy shapes, star clusters, and colours, we may also observe in the following wavelengths which are invisible to the naked eye.

* Infrared: By using telescopes such as Spitzer and the James Webb Space Telescope, we can see through the dust that blocks visible light to observe cooler objects, such as young stars and galactic structure.

* Ultraviolet: Telescopes such as Hubble can search in UV for hot, young stars and active star-forming regions., allowing us to study galaxies which are filled with new stars.

* X-rays: In order to study the violent and high-energy side of galaxies, we can use telescopes such as Chandra and XMM-Newton to reveal super-hot gas, black holes, exploding stars, and galaxy collisions.

* Radio waves: By detecting cold hydrogen gas, jets from black holes, and galactic structure, we can map galactic motion and hidden features. Telescopes such as the Very Large Array (VLA), and LOw Frequency ARray (LOFAR) are instrumental in observing these features through radio waves.

* Gamma Rays: Using the Fermi Gamma-ray Space Telescope, we can observe supernovae and Active Galactic Nuclei (AGN) to study the most energetic parts of the universe.

Back to Basics Astronomy

What is a Galaxy? Part 4

Rotation Curves (for the dark stuff)

Galaxies rotate, and the rotation speed tells you how much mass there is. This way we know there is a lot of “dark matter” in galaxies.

A simulated galaxy without dark matter

… and one with dark matter

Rotation curves:

This matches observations

7

The above slide explains how dark matter can be deteced by measuring the rotation speed and, therefore, the mass of a galaxy. Without dark matter, galaxies would look more like the image on the left. The fact that our observations match the image on the right suggests that there is more mass contained within galaxies than we are able to account for by only taking visible matter into account.

Hubble Ultra Deep Field
CREDIT: NASA, HST

On this slide, we look at the Hubble Ultra Deep Field image.This snapshot provides a view of nearly 10,000 galaxies of various ages, sizes, shapes, and colours. These colours tell us how distant the galaxies are and, therefore, how ancient. The most distant galaxies appear as red and date back to when the universe was only 800 million years old. The larger and brighter galaxies with well-defined shapes are much closer to us, and we observe them as they were when the universe was 1 billion years old.

Compact Galaxy Groups in Leo: Hickson 44

During the 1950s, the Palomar Observatory Sky Survey (POSS) photographed large areas of the night sky and recorded them onto glass photographic plates. These plates captured very detailed images of stars and galaxies, allowing astronomers to closely study the photographed objects. These images have now been digitised to allow more detailed study.

In the 1970s, Canadian astronomer, Paul Hickson, used the plates to search for groups of galaxies. His first results were published in 1982, with the final catalogue of 100 galaxy groups published in 1994. These 100 compact groups of galaxies are called the Hickson Compact Groups and include the famous Stephan's Quintet. The galaxies are much closer together than usual; in tight clusters that exert gravitational force on each other, resulting in collisions and mergers. Due to the interactions between these compact groups of galaxies, they may look distorted or twisted.

The four prominent galaxies within the above skyscape are known as Hickson 44: a galaxy group approximately 100 million light-years distant, toward the constellation Leo. In the centre are two spiral galaxies, NGC 3190 and NGC 3187. The spiral to the lower right corner is NGC 3185 and to the top left sits the elliptical NGC 3193. This image shows distortion and enhanced star formation, evidencing the gravitational tug towards an eventual merger.

Credit: Jiang Wu

Distant World May Hold Clues to Alien Life Part 1

By Jordan Bookham

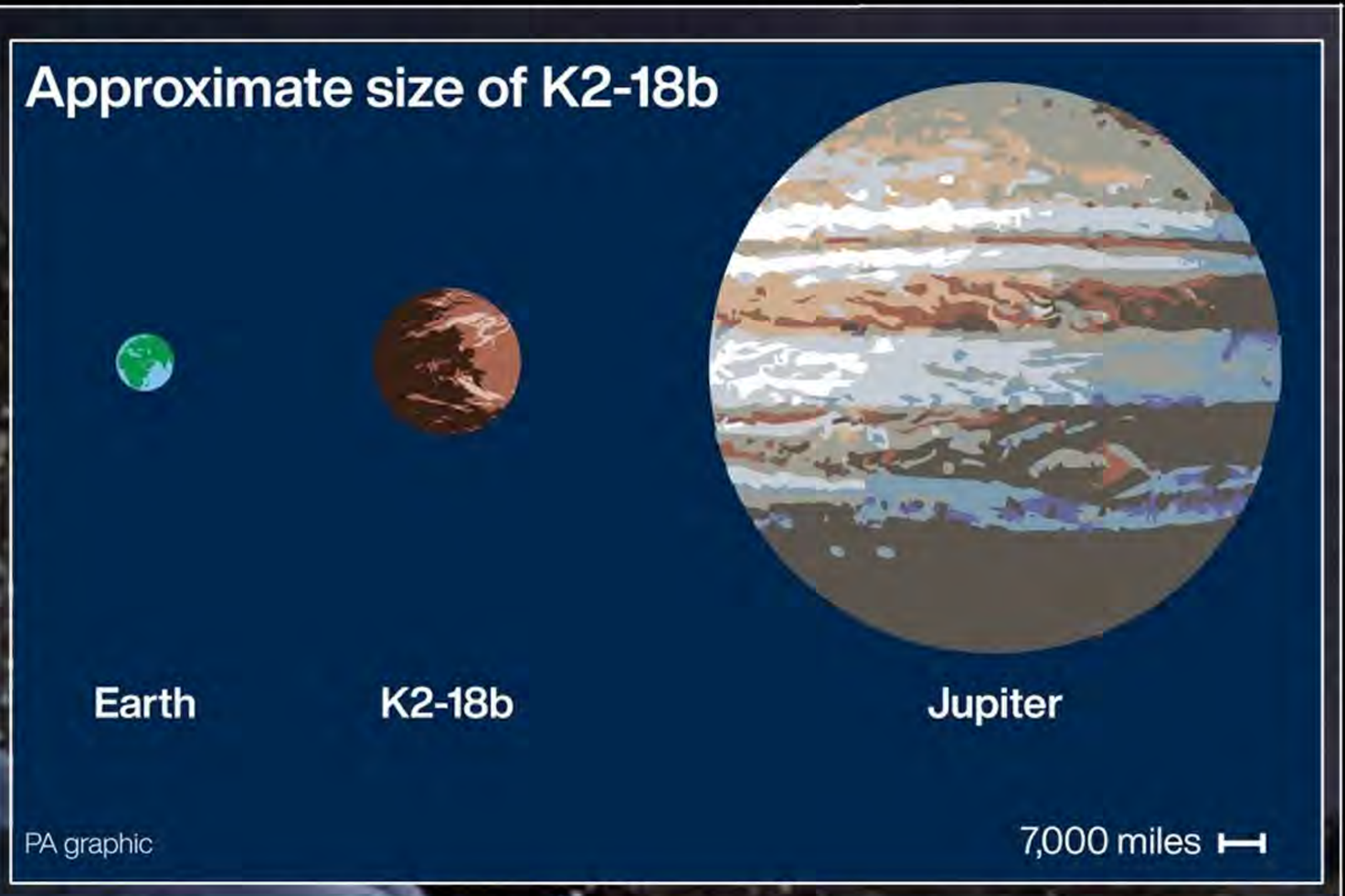
This week, I've been diving into the fascinating case of K2-18b, a planet located 124 light-years away in the constellation Leo. It's stirring up serious excitement among scientists. Why? Because this far-off world might be one of our best bets yet in the search for alien life.

Artist's impression of K2-18b. Credit: ESA/Hubble, M. Kornmesser

K2-18b is what's known as an exoplanet, a planet outside our Solar System. It's classified as a super-Earth, meaning it's both larger (about 2.6 times Earth's diameter) and more massive (around 8.6 times heavier). What really puts K2-18b on the cosmic map is that it orbits in the habitable zone of a red dwarf star. This is a region where temperatures could support liquid water, the fundamental ingredient for life as we know it.

Even more intriguingly, K2-18b may be a Hycean world, which is a relatively new planetary category proposed by scientists. These are planets with hydrogen-rich atmospheres and possibly vast, planet-wide oceans.

Imagine a massive water world covered in misty, primordial gases. Such an environment could potentially support microbial life, especially if the oceans are warm and chemically active.



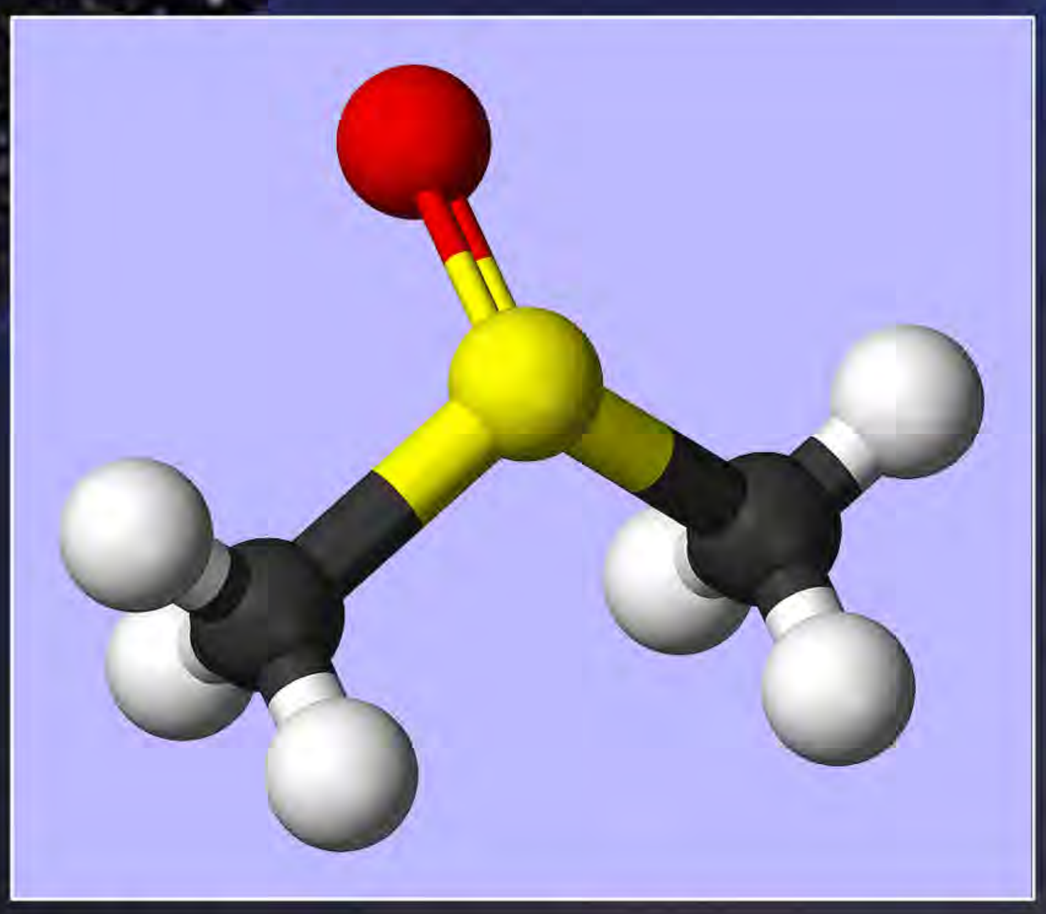
Size comparison of K2-18b to Earth and Jupiter. Credit: PA Graphics

Here's where things get even more interesting.

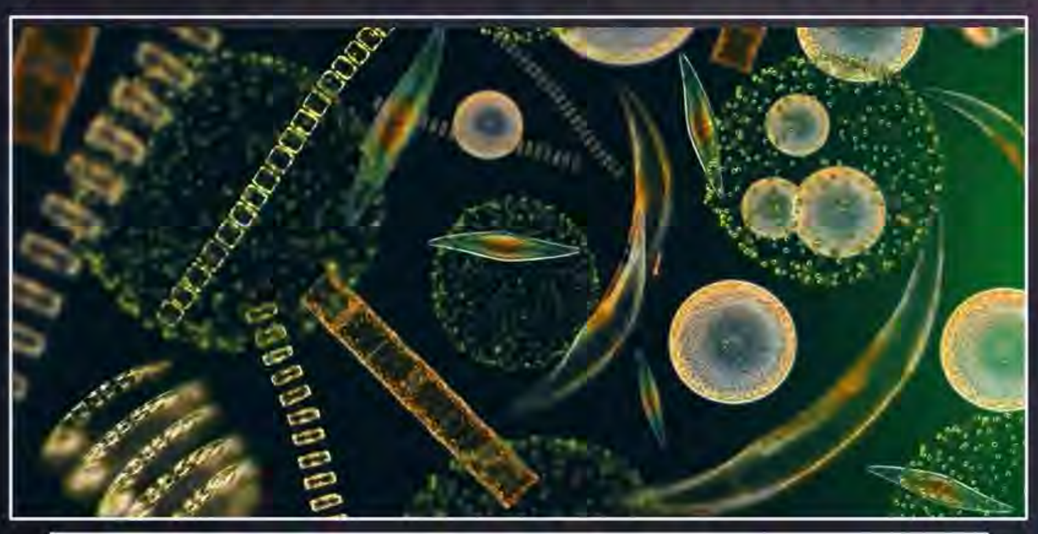
Recent observations from NASA's James Webb Space Telescope (JWST), our most advanced space observatory, detected a chemical in K2-18b's atmosphere that has sparked real excitement: Dimethyl Sulphide (DMS).

On Earth, DMS is primarily produced by life, specifically by tiny oceanic organisms like phytoplankton. Its detection in another planet's atmosphere could indicate that similar processes occur on alternative worlds.

Distant World May Hold Clues to Alien Life Part 2



Could the existence of this little chemical, Dimethyl Sulphide (DMS), result in the discovery of an entirely new world?



Phytoplankton are known to be the primary source of DMS on Earth. Could their alien counterparts be producing DMS on other planets?

A study published on April 17, 2025, in The Astrophysical Journal Letters confirmed the presence of DMS, methane, and carbon dioxide. This combination of gases suggests a potentially habitable world, but the detection is not yet conclusive. The DMS signal currently has a three-sigma confidence level, meaning there's a 0.3% chance it's a false positive. In science, the gold standard is five-sigma, which means just a 0.00006% chance of error. To achieve that, researchers are planning 16 to 24 more hours of JWST observations, with new data expected by late 2025.

Even more provocative is that DMS levels on K2-18b appear to be much higher than on Earth, according to recent modeling by the Hycean Worlds Group at Cambridge (hycean.group.cam.ac.uk). Astronomer Dr. Jane Smith noted in a recent post that JWST is still refining its measurements, and the data is only getting more compelling.

Still, scientists are cautious. DMS might arise from non-biological sources, such as volcanic activity beneath a thick atmosphere or exotic chemical reactions in the ocean. If so, it would not indicate life, but an alternative and unusual natural process.

This leads to a deeper question: What if alien life isn't like life at all?

Astrobiologist Carol Cleland suggests we may be looking for the wrong signs. Alien life could be based on unfamiliar chemistry, using solvents other than water or energy sources we have not yet imagined. In other words, we could be observing life and not recognizing it. This challenge — trying to detect the unknown using Earth-based tools — is what makes the search for extraterrestrial life both exciting and humbling.

K2-18b reflects this mystery perfectly. While we may still be a long way off finding life on another planet, K"-18b is close enough to study, strange enough to surprise us, and potentially full of clues about how life begins. Even if we do not confirm biology there, it will help scientists search more effectively, improve their tools, and reconsider what it means for a planet to be considered "alive."

June Star Map

The chart depicts how the night sky will appear at midnight at the start of June, 11pm in mid-June, and 10pm at the end of June. The position and phase of the Moon are given for the 1st, 6th and 10th June.

The summer solstice on the 21st June marks the northern hemisphere's longest day, when the Sun reaches its highest point in the sky at noon.

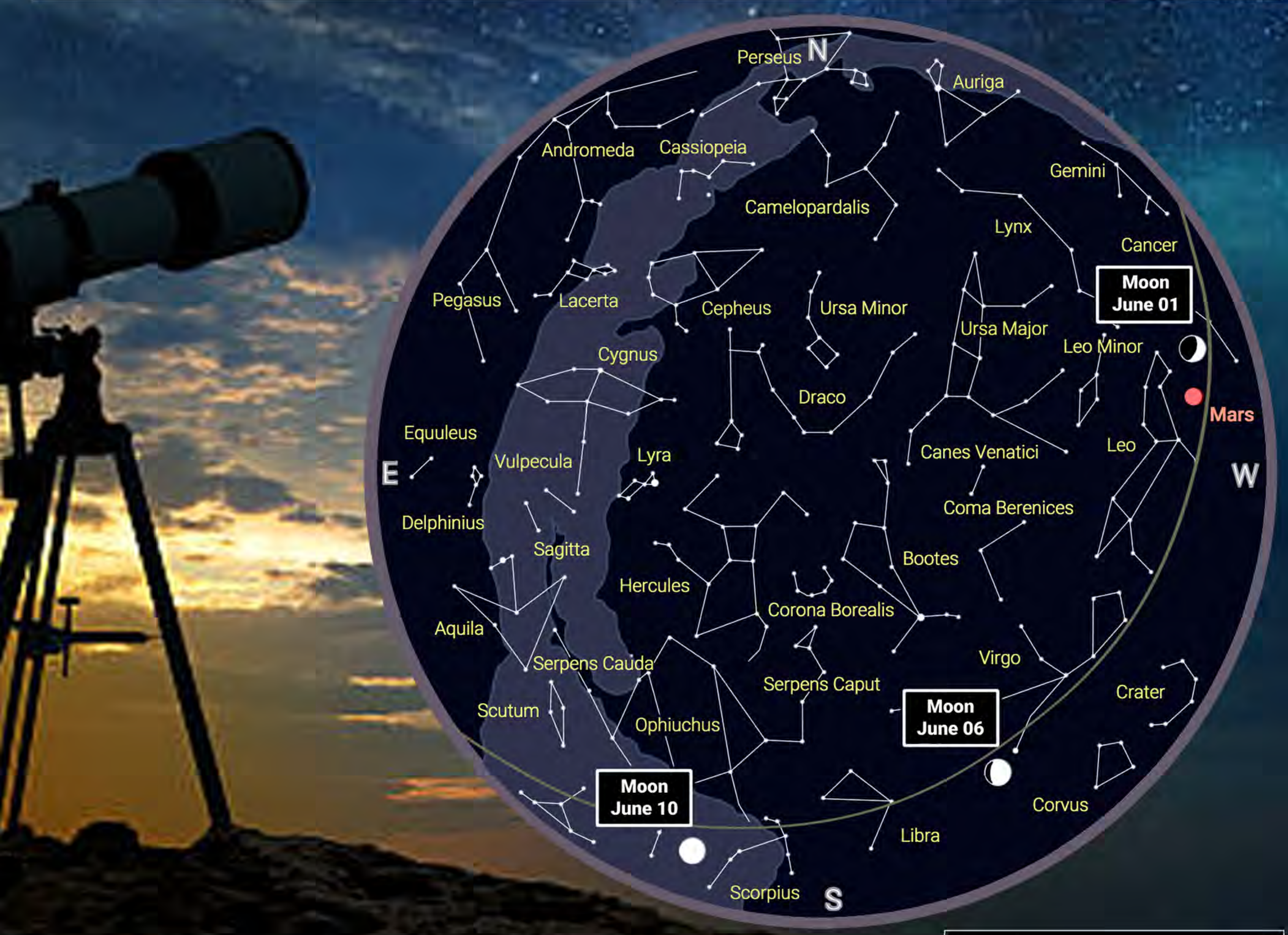
The Solar System was born from a flattened disk of gas and dust which orbited the Sun. Therefore, when we observe the Sun and the planets from the Earth, we see them follow a similar path across the sky.

That path is marked as an arc on the map, called the ecliptic. The Sun moves along this line over the course of the year. In June the ecliptic at night is the lowest it appears during the year.

When we have a full Moon, the Sun, Earth and Moon line up so that the Moon is fully illuminated and is opposite the Sun in the sky. It means that when the Sun is high during the day, the Full Moon is at its lowest in the year during the night. So, in June, the Full Moon skims across the horizon, while in December the Full Moon reaches its highest point.

On 10/11 June there's the lowest Full Moon for 18.6 years. This phenomenon is known as the Major Lunar Standstill. Being very low above the horizon, the Moon gives the illusion of being larger than usual.

During the short summer nights, look out for electric blue noctilucent clouds in the northern sky. They are caused by dust reflecting sunlight high in the mesosphere, a layer of the Earth's atmosphere about 80 km up.

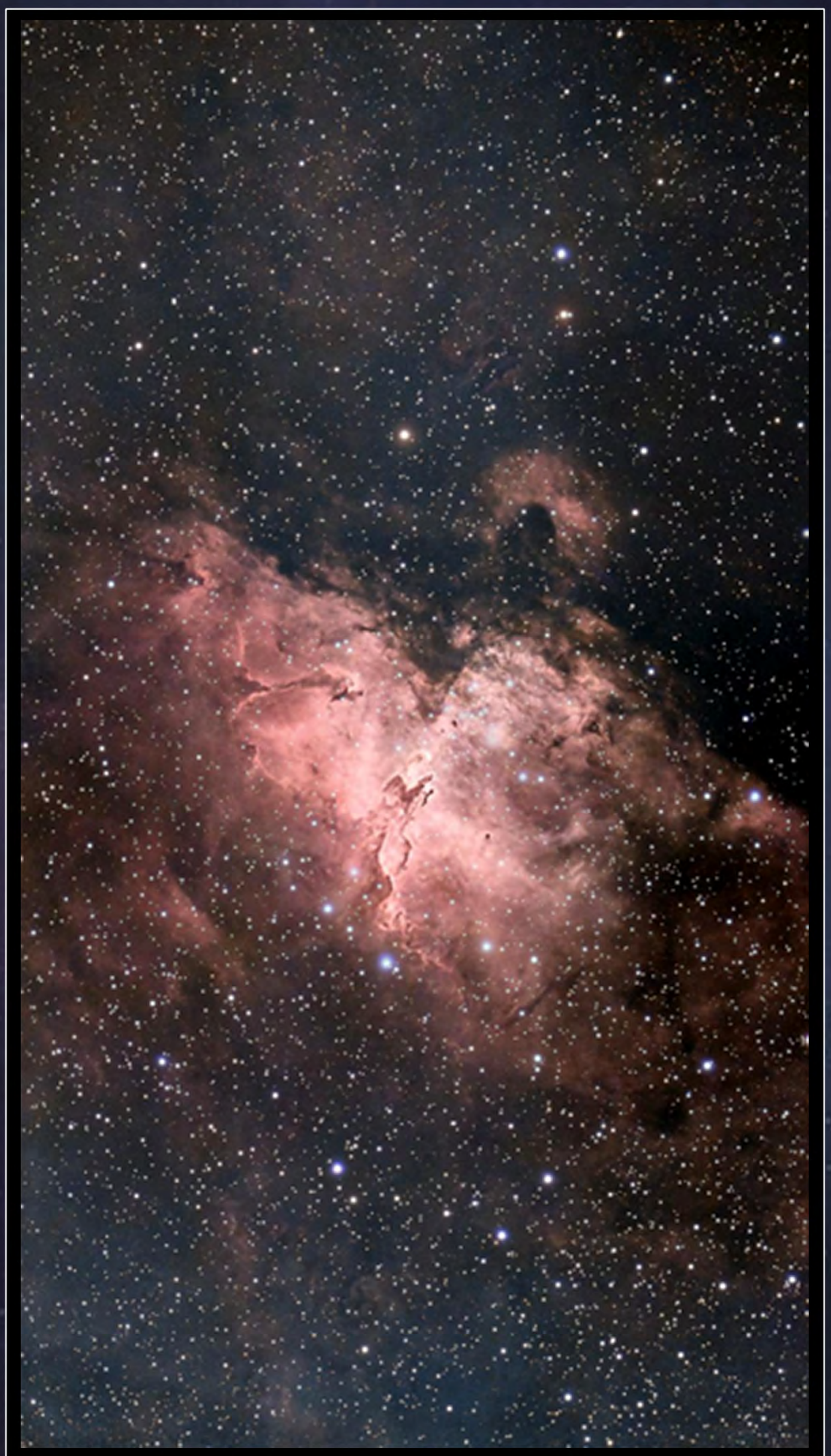


Words by Paul Whitmarsh
Star map by Sarah Carson

LAS Gallery

The Eagle Nebula - M16

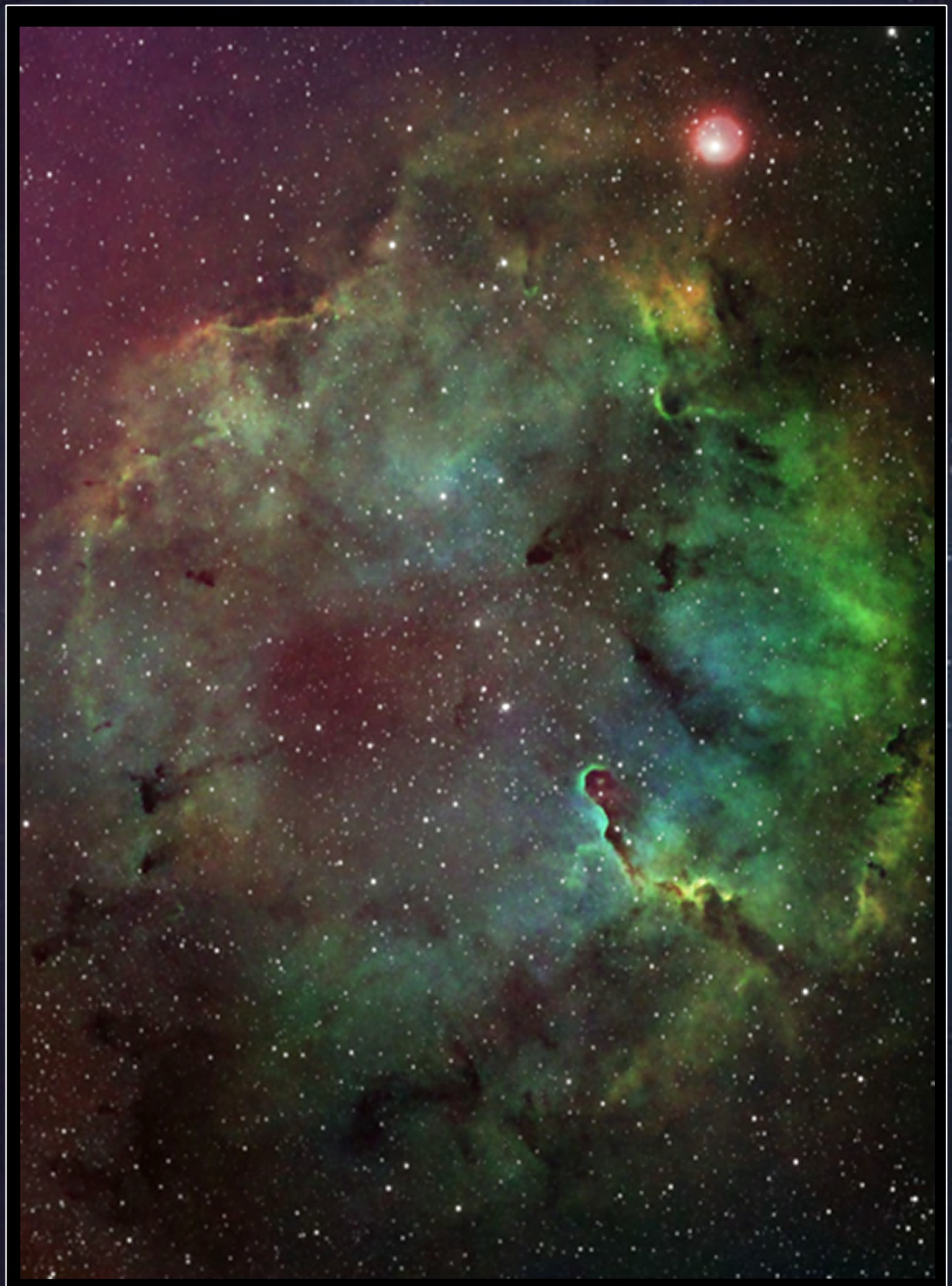
Captured with the SeeStar at 7h35m total exposure



By Paul Whitmarsh

LAS Gallery

Elephant's Trunk Nebula - IC1396
Shot using Redcat + ZWO ASI 294mc pro (OSC).



By Peter Quinn

LAS Gallery

M81 and M82 - A pair of galaxies located in the constellation Ursa Major.
M81 is a spiral galaxy, also known as Bode's Galaxy.
M82 is a Starburst galaxy, also known as the Cigar Galaxy.

The Horsehead and Flame Nebula

By Richie Jarvis

Adverts

Ever thought of volunteering for LAS? We're looking for members who are willing to contribute to the monthly newsletter.

At the LAS, we are very much for encouraging the growth of community, and this means providing open discussion and promoting the voice of our valued members.

We believe that a newsletter should be about more than just news. Your contribution could be about any topic within astronomy that youfind interesting, such as a closer look at a news topic that has caught your attention, or advice for other members on how to buy the right telescope and begin their stargazing adventures.

If you're interested in making a monthly, one-off, or an "every now and then" contribution, please contact Sarah at sarah.carson@lewesas.org.uk, or speak to us in person at one of our events or monthly meetings.