

This Summer, NASA's Mars Perseverance Rover is Taking the Next Giant Leap in our Search for Signs of Life Beyond Earth



Photo Courtesy of NASA/JPL-Caltech: In a clean room at NASA's Jet Propulsion Laboratory in Pasadena, Calif., engineers observed the first driving test for the Mars rover, Perseverance. Perseverance will search for signs of past microbial life, characterize Mars' climate and geology, and collect samples for a future return to Earth.

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The EAS newsletter, Observer, is published monthly. Anyone wishing to contribute articles or photos may mail them to the club's PO Box: EAS, PO Box 3474, Evansville, IN 47733, or e-mail them to the editor at:

dasiceman@yahoo.com

Dear Members of the EAS – Regarding COVID-19

Dear Members of the EAS,

To benefit our Society and Facebook members, we will have an exciting online live Zoom with the title, Extremes in Astronomy. Our presenter will be Chuck Allen. Chuck is a renowned amateur astronomer having earned numerous awards, an EAS member, and is currently the Astronomical League Vice-President.

The program is an examination of astronomical firsts and the furthest, largest, hottest, brightest, fastest, and most massive objects of various types. It is a colorful program and easy listening, suitable for novice through advanced amateur astronomers.

The online meeting will begin promptly at 7:30 PM CDT, September 18, 2020. An invitation with a link will be emailed and also posted to Facebook a few days prior to the event. You may login up to fifteen minutes early. Please login well in advance of 7:30 because once the presentation begins, managing new logins may be difficult.

If you are unfamiliar with online meetings, you may wish to visit the following link ahead of the meeting night to learn more:

<https://support.zoom.us/hc/en-us/articles/201362193-How-Do-I-Join-A-Meeting>

Clear Skies,

Tony Bryan
EAS President

Message from our Treasurer – Amy Barrett Dear Members of the EAS – Regarding Membership Dues

Hello Everyone,

It's membership drive time! If you are a current member who has not yet renewed your membership, we ask that you do so soon. If you are not yet a member and would like to be, please complete our application from the website and mail to the address given.

<http://www.evansvilleastro.org>, the application link is on the left, fifth link down.

Thanks!
Amy Barrett

The **Evansville Astronomical Society (EAS)** is a non-profit organization fully incorporated in the state of Indiana. It has, as its primary goal, the advancement of amateur astronomy. Founded in 1952, the society seeks to:

- 1... maintain adequate facilities for its members and the public in order to extensively study the skies and
- 2... promote an educational program for those who wish to learn more about the science of Astronomy.

Meetings are held the third Friday of each month, except June, when the annual EAS picnic is held. The society also sponsors monthly Open House events during the warmer seasons that afford the public an opportunity to tour the observatory.

EAS 2020 Officers and Contacts

President – Tony Bryan
812.827.3234
evansvilleastro@gmail.com

Vice President – Scott Conner

Secretary – David M Kube
740.223.6854

Treasurer – Amy Barrett

Counselors
Michael Borman (2018)
Ken Harris (2019)
Mitch Luman (2020)

Webmaster – Michael Borman

Program Director
Chuck Allen

Newsletter editor – Dave Kube
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For more information about the EAS or directions to the Observatory, please visit the club's web page:

www.evansvilleastro.org



Local Events and Information

EAS Update

Please note that currently we have a Zoom Meeting Scheduled on Friday, September 18, 2020 @ 7:30pm. Please refer to the letter from our EAS president on page 2 of this newsletter.

EAS Update

Please note that currently all public meetings have been canceled and therefore we are trying to meet via Zoom Meeting.

EAS Update

EAS Update

EAS Update

EAS Update

EAS Update:

Please visit our website www.evansvilleastro.org and our Facebook page to keep yourself up to date for any changes.

FOR SALE:

Telescopes and accessories for sale...

As mentioned in last month's issue, Mike Borman still has some excellent telescope equipment and imaging accessories for sale. Some of the gear has already been sold. If interested, go to Mike's web page. Here is the link: <http://www.mborman.org/forsale.htm>

Article Submitted by Member Bob Flater

ONLINE COURSES

Astronomy: Exploring Time and Space

Get a grounding in all things astronomy, with this free 44-hour online course, including lecture videos, quizzes and some written assignments.

www.coursera.org/learn/astro

COVID-19

How to get your astro fix from your own home

We pick the best astronomy events and resources available online this month

WHAT'S ONLINE



ONLINE TALKS

UK Goes to the Moon

Libby Jackson, human exploration programme manager for the UK Space Agency, talks about the UK's role in building technology for a return to the Moon. bit.ly/Libbyjackson

PODCAST

The Space Above Us

A lively, fact-packed look at every crewed NASA spaceflight, from Mercury to the Space Shuttles and everything in between, with JP Burke from NASA. <http://thespaceabove.us>

RADIO

The Food Chain: Made in Space

How studying plant growth in space – with low gravity and little or no natural light – may revolutionise food production on our increasingly populous planet. www.bbc.co.uk/sounds/play/w3csyp1n

Witness History: A Space Crash

The British astronaut on board a supply vessel that crashed into the Mir space station in 1997 gives a first-hand perspective of what is the worst collision in the history of manned space flight. www.bbc.co.uk/sounds/play/w3cszmtq

ONLINE COURSES

Astronomy: Exploring Time and Space

Get a grounding in all things astronomy, with this free 44-hour online course, including lecture videos, quizzes and some written assignments. www.coursera.org/learn/astro

PICK OF THE MONTH



Counting down to adventure: an entertaining show that's packed with real space science

Space Racers

Fun space-themed activities for preschoolers to 11 year olds

Parents of young children may already know the animated kids TV show *Space Racers* from Youtube or Netflix. It is produced in collaboration with NASA experts and follows Eagle, Robyn, Hawk, Starling and the cadets of Stardust Space Academy as they explore the Solar System. Each programme layers real space science into the stories and features catchy songs about topics such as gravity, the constellations and the Sun.

Now there are free printable *Space Racers* activities online, from monthly space-focused calendars

and constellation colouring sheets to singalong lyrics and planetary matching games. For all those lockdown parents-turned-teachers there are also great STEM-focused lesson plans, pitching subjects like heliophysics, Earth science, planetary science and astrophysics at a level suitable for preschool to Key Stage 2 (up to the age of 11). You'll find resources focused particularly on the Moon and NASA's Mars InSight mission too, for youngsters keen to go a bit deeper. www.spaceracers.com

CITIZEN SCIENCE

Disc detectives wanted

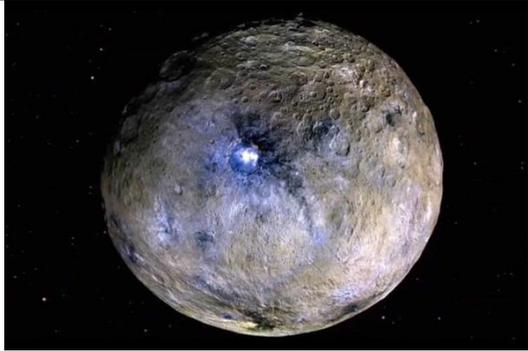
Join the hunt for new circumstellar discs, where new planets are born, by comparing NASA's Wide-field Infrared Survey Explorer (WISE) images with data from other space surveys. bit.ly/Discdetective

Spiral Graph project

Trace the spiral arms that you see in galaxy images – and learn how to measure their 'pitch angles' – as part of a useful project to help scientists find interesting candidate galaxies for future study. bit.ly/Spiral-graphproject

August 2020 BBC Sky at Night Magazine 21

Ceres: An Ocean World in the Asteroid Belt.



NASA scientists say that Ceres, a dwarf planet in the Asteroid Belt, is still holding onto pockets of a subsurface, liquid water ocean.

Credit: NASA/JPL-Caltech/UCLA/MPS/DLR/IDA

Remnants of an ancient water ocean are buried beneath the icy crust of dwarf planet Ceres. That's the tantalizing find presented August 10 by scientists working on NASA's Dawn mission.

Ceres is the largest object in the asteroid belt, which girdles the inner planets between Mars and Jupiter. But unlike its rockier neighbors, Ceres is a giant ice ball. It holds more water than any world in the inner solar system except for Earth. That knowledge had long led some astronomers to suspect Ceres may have once had a subsurface ocean, which is part of the reason NASA sent the Dawn spacecraft there.

However, some models predicted that Ceres' ocean would have frozen long ago, forming the world's thick, icy crust. After five years studying a series of strange surface features around recently-formed craters, astronomers believe they're seeing signs of a large, subsurface body of briny liquid. Variations in Ceres' gravitational field back that up, implying that the underground reservoir of salty water may stretch horizontally beneath the ice for hundreds of miles and reach depths of roughly 25 miles.

Jupiter's Weather Forecast: Lightning with a chance of Mushballs.



This artist's rendition shows shallow lightning like the kind the Juno spacecraft spotted in storms on Jupiter's dark side.

Credit: NASA/JPL-Caltech/SwRI/MSSS/Gerald Eichstädt/Heidi N. Becker/Koji Kuramura

Scientists have known about lightning on the gas giant since the Voyager spacecraft spotted it in 1979. Now, observations made by the Juno spacecraft are tweaking our understanding of where and how Jupiter produces its lightning, as well as what kind of weather accompanies it.

Earth's clouds, which are made of water vapor, can become electrically charged and generate lightning. When enough charge is built up within the cloud, it sparks a lightning bolt. Jupiter has water clouds, too, but they're fairly deep in its atmosphere — between 28 and 40 miles below the visible cloud tops, where the temperature is almost freezing. But Juno spotted shallow lightning striking much higher, about 16 miles above where these water clouds are thought to exist. At that altitude, temperatures drop below -126 degrees Fahrenheit, which is far too cold for liquid water or water vapor.

But Jupiter's atmosphere contains ammonia, which makes a great antifreeze. Based on the shallow lightning sightings, researchers now think that Jupiter's deeper thunderstorms fling water closer to the cloud tops, where it mixes with ammonia and forms clouds capable of developing electric charge.

There's one more consequence of these strange storms: ammonia-water hail, known on Jupiter as "mushballs." On Earth, hail forms when an airborne drop of water freezes into a core. The cores of Jupiter's hail are water-ammonia slushballs rather than hard, icy pellets. Ammonia acts as antifreeze, so the balls are slushy instead of solid ice. These too are flung around thunderstorms, gathering layer after layer of ice, until they're too heavy and fall lower in the atmosphere, where warmer temperatures evaporate them.

October 2020

Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

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Up and Coming Events 2020

EAS Meetings and Events are currently on hold or cancelled due to the current COVID-19 situation.

Please read the letter from our EAS President on page 2 of this newsletter.

Please note we have a Zoom Meeting Scheduled for September 18th, 2020 – See Page 2 for info.

Please visit our Web Page <http://www.evansvilleastro.org> for updates.

Please visit our Facebook Group Page for updates.

Moon Phases

New Moon	First Quarter	Full Moon	Third Quarter
October 16 th , 2020	October 23 rd , 2020	October 1 st , 2020 October 31 st , 2020	October 9 th , 2020

[Moon Phases courtesy of Time and Date.com](http://www.timeanddate.com)

EAS Unofficial Meeting Notes for August – 2020

Dear Members of the EAS – We had a Zoom Online Meeting for Members on August 21, 2020.

The online meeting began just prior to 7:30pm CDT and we had a host/ guest speaker on the topic of spectroscopy. Our presenter was Tom Field, a Contributing Editor at Sky & Telescope Magazine for the past 7 years and author of the RSpec software.

We had 14 members logged in plus our host.

Until recently, spectroscopy was too expensive and too complicated for all but a handful of amateurs. Today, though, new tools make spectroscopy accessible to almost all of us. You no longer need a PhD, dark skies, long exposures, enormous aperture... or a big budget! With your current telescope and FITS camera (or a simple web cam or even a DSLR without a telescope) you can now easily study the stars yourself. Wouldn't you like to detect the atmosphere on Neptune or the red shift of a quasar right from your own backyard?

This talk, with lots of interesting examples, showed us what it's all about and helps understand how spectroscopy is used in research. Even us armchair astronomers can understand this field and enhance our understanding of the things in the night sky.

There was a live Q&A after Tom's 45-minute presentation.

Members of the Evansville Astronomical Society in good standing received a ZOOM password via email a few days prior to the meeting.

It was discussed that we will have another online Zoom Meeting for the September 18th meeting. Please see page 2 of this newsletter, as well as the EAS website and Facebook group page for updates.

If you are unfamiliar with online meetings, you may wish to visit the following link ahead of the meeting night to learn more: <https://support.zoom.us/hc/en-us/articles/201362193-How-Do-I-Join-A-Meeting>

Respectfully Submitted – Dave Kube – Secretary