

# THE YOUNG ASTRONOMERS NEWSLETTER

Volume 23 Number 10

STUDY + LEARN = POWER + SUCCESS

September 2015

\*\*\*\*\*

## MRO – AN ACHIEVER

In ten years after launch, NASA's *Mars Reconnaissance Orbiter* (MRO) has revealed more about Mars every week than all six other active Mars missions. MRO now plays a key role in NASA's **Journey to Mars** planning. Even after more than 40,000 orbits, the mission remains exciting, with new challenges such as supporting next year's *InSight* mission.

*InSight* will place a lander on Mars to investigate the deep interior for clues about the formation and evolution of all rocky planets, including *Earth*.

## BLACK HOLE PROVIDES CLUES TO GROWTH

Astronomers using NASA's Chandra X-ray Observatory and the 6.5-meter Clay Telescope in Chile have identified the smallest supermassive black hole ever detected in the center of a galaxy. This object could provide clues to how larger black holes and their host galaxies formed 13 billion years or more in the past.

## KEPLER-453 B

Astronomers announced the discovery of a new transiting "**circumbinary**" planet, bringing the number of such known planets to ten. A **circumbinary** planet orbits two stars, and like the fictional planet "Tatooine" from Star Wars, this planet has two suns in its sky.

Once thought to be rare or even impossible, these discoveries confirm that such planets are common in our galaxy. The new planet, **Kepler-453 b**, also presented astronomers with a surprising twist--the tilt of the orbit of the planet rapidly changes, making transits visible only 9 percent of the time.

## ROSETTA OPTION

Scientists are debating whether *Rosetta* should make another attempt to contact the *Philae* lander or study the comet's tail. Members of the *Philae* team would like *Rosetta* to swoop close to the surface of comet **67P/Churyumov-Gerasimenko** as soon as possible in another bid to restore communications with the lander.

That, though, could mean sacrificing a one-time opportunity to study the comet's tail as the comet recedes from the Sun. Engineers are also concerned that dust in the vicinity of the comet could confuse the spacecraft's star trackers during a close approach close to perihelion

*Rosetta* has been witnessing growing activity from the comet with one dramatic outburst event proving so powerful that it even pushed away the incoming solar wind. See: <http://sci.esa.int/jump.cfm?oid=56325>

## ROSETTA SINGING?

Charged particles make *Rosetta's* comet "sing." The European spacecraft detected an unusual signal like "a long string of slowed-down, low-pitched dolphin clicks" as it approached "Comet 67P" last year.

That noise is likely created by charged particles coming off the surface of the comet's nucleus, creating waves in the magnetic field that the magnetometer detected as a clicking noise.

## ANOTHER PLANET

Jupiter, Saturn, Uranus, and Neptune may have a long-lost relative. According to a new study, our system was once home to a fifth gas giant that suddenly vanished some 4 billion years ago after a run-in with Neptune.

Indirect evidence for this lost world is seen in a strange cluster of icy objects called the "kernel" in the Kuiper Belt -- the vast region of primordial debris that encircles the Sun beyond the orbit of Neptune.

## JUST A FALSE ALARM

There is no scientific basis - not one shred of evidence - that an asteroid or any other celestial object will impact Earth between Sept. 15 and 28, 2015. On one of those dates, as rumors go, there will be an impact - "evidently" near Puerto Rico - causing wanton destruction to the Atlantic and Gulf coasts of the United States and Mexico, as well as Central and South America.

In fact, NASA's Near-Earth Object Observations Program says there have been no asteroids or comets observed that would impact Earth anytime

## DAWN

*Dawn* is gracefully descending toward dwarf planet Ceres taking great advantage of its unique ion propulsion system to maneuver extensively in orbit, optimizing its views of the alien world that beckoned for more than two centuries. it is truly an interplanetary spaceship

One of the benefits of being in orbit (besides it being an incredibly cool place to be) is that *Dawn* can linger at **Ceres**, studying it in great detail rather than being constrained by a fast flight and a quick glimpse.

## CHINA TESTS A NEW ROCKET

Scientists successfully tested the power system of a **Long March-5** carrier that will serve the 2017 **Chang'e5** lunar mission to the dark side of the Moon.

## SPRITES

Astronauts onboard the International Space Station have witnessed exotic forms of lightning that reach up from thunderclouds near Earth's surface all the way to the edge of space.

Their photographs of "sprites" and "trolls" dancing over Mexico are a must-see. Sprites can be seen from Earth's surface.

See: <http://spaceweathergallery.com/index.php?title=sprite>

## FIRE FOUNTAINS

Volcano "fire fountains" occur frequently in Hawaii and require the presence of volatiles mixed in with the erupting lava. Volatile compounds turn into gas that expands causing lava to blast into the air once it reaches the surface.

Tiny beads of volcanic glass found on the Moon's surface during the Apollo missions are a sign that "fire fountain eruptions" occurred there also.

**SCIWORKS – For information and Planetarium schedules, call 767-6730**

\*\*\*\*\*

The Sky Tonight? <http://www.skymaps.com/downloads.html> and also

[http://amazing-space.stsci.edu/tonights\\_sky/](http://amazing-space.stsci.edu/tonights_sky/)

and [http://hubblesite.org/explore\\_astronomy/tonights.sky](http://hubblesite.org/explore_astronomy/tonights.sky)

\*\*\* Astronomy Picture of The Day - <http://apod.nasa.gov/apod/astropix.html> \*\*\*

\*\*\*\*\*

**ALSO** >>> A video game development event in Florida attracted NASA and SpaceX. The **Indie Galactic Space Jam** in mid-August in Orlando brought more than 100 game developers working in teams to create video games. And in attendance were representatives from other aerospace companies, looking for talented software developers.

**PUZZLES**

**FIND THE WORD**

S E R E C S T O R M	CERES	LANDER
D N E L M C E O E E	CHINA	MINOR
A I O R F E N T R T	CLOSE	MOONS
T S O O A I A H E H	DATES	OTHER
E F U N M L S E D G	DIONE	PLACE
S N E I E P G R N I	EVERY	SPACE
D M N V A R L E A S	FORMS	STORM
I O A C H I N A L N	FOUND	TEAMS
R V E E V E R Y C I	GLARE	THERE
E C I W T H E R E E	INSIGHT	TWICE

**SCRAMBLED ASTRONOMY**

**SKY PEOPLE**

ARSC TO

\_\_\_\_\_

NRUTHE

\_\_\_\_\_

ERUSPES

\_\_\_\_\_

OLXULP

\_\_\_\_\_

ARERHC

\_\_\_\_\_

(Answers below)

=====  
The four-page **YOUNG ASTRONOMERS NEWSLETTER** is on the Internet at:

<http://www.fas37.org> (FAS) and <http://204.200.153.100/pwood/sfair/yan.html> (The Summit School)

=====  
\*\*\*\*\* **INTERNET SITES** \*\*\*\*\*

**WEIRD STUFF ON MARS** --

<http://www.ufosightingsdaily.com/2013/11/iguana-found-on-mars-by-nasa-curiosity.html> (and)

<http://www.ufosightingsdaily.com/2015/08/newest-alien-face-discovered-on-mars-on.html>

Explore a fascinating site - <http://www.ufosightingsdaily.com/>

**SITE OF THE MONTH**

Planetary Society For Kids - <http://www.planetary.org/explore/for-kids/?referrer=https://www.google.com/>

\*\*\*\*\* **MOON IN SEPTEMBER** \*\*\*\*\*

**Last Quarter:** 9/5    **New Moon:** 9/13    **First Quarter:** 9/21    **Full Moon:** 9/28

**Apogee:** 9/14 7:30 AM    252,564 mi. (406,462 km)    \*\* The September Full Moon was called

**Perigee:** 9/27 19:55 PM    221,756 mi. (356,882 km)    the Harvest Moon and Hunter's Moon.

\*\* **Best nights for observing:** 9/4 – 9/21

\*\*\*\*\* **PLANETS IN SEPTEMBER** \*\*\*\*\*

**JUPITER** and **VENUS** are now in the Sun's glare and cannot be seen during August. Venus is between Earth and the Sun on the 15th, and Jupiter is behind the Sun on the 29th. **MARS** rises in the eastern sky about an hour before sunrise and difficult to observe. **SATURN** is in the southern evening sky. **MERCURY** is very low in the western evening sky in the middle of August through early September.

\*\*\*\*\* **METEOR SHOWERS** \*\*\*\*\*

<u>NAME</u>	<u>DATES</u>	<u>BEST NIGHT</u>	<u>PER HOUR</u>	<u>WHERE TO LOOK</u>
<b>SEPTEMBER PERSEIDS</b>	9/5 - 9/21	9/9	5	Low in the north.

This shower is one of several Perseid secondary showers and is the most active. Studies of the overall Perseid family of showers point to an irregular distribution of activity with trains as high as 60%.

There are six other minor showers this month.

**LOOK FOR: >>>>> LUNAR ECLIPSE ON 9/27** occurs as the Moon is at its closest perigee for 2015. This eclipse is a so-called "Supermoon Eclipse". The eclipse begins at 9:07 EDT and at its greatest a t10:47 PM. The total phase lasts for 72 minutes, ending at 12:27 AM. The northern half of the Moon will be close to the center of Earth's shadow making it appear darker than the southern limb of the Moon. There is also a partial Solar Eclipse on the 13th bur it is not visible in North America.

### RED STREAKS ON TETHYS

In new Cassini images, unexplained arc-shaped, reddish streaks are visible on the surface of Saturn's icy moon **Tethys**. The origin of the features and their reddish color is a mystery to Cassini scientists. Possibilities are that the reddish material is exposed ice with chemical impurities, the result of outgassing from inside Tethys, or they could also be associated with features like fractures. See: <http://saturn.jpl.nasa.gov>

### CERES FEATURES

Colorful new *DAWN* maps of **Ceres**, showcase a diverse topography with height differences between crater bottoms and mountain peaks as great as 9 miles.

Mission scientists said: "The craters -- in terms of their depth and diameter are very similar to what we see on **Dione** and **Tethys**, two icy satellites of Saturn that are about the same size and density as Ceres."

See: <http://www.jpl.nasa.gov/spaceimages/details.php?id=PIA19606>

### CLOSEST EXOPLANET TO EARTH

Using *Spitzer*, astronomers have confirmed the discovery of the nearest rocky planet outside our solar system, -- larger than Earth and a potential gold mine of science data. Dubbed **HD 219134b**, this exoplanet, orbits too close to its star to sustain life. **HD 219134b** is also the closest exoplanet to Earth to be detected when transiting and is perfect for extensive research.

### A NEW REALITY

Our galaxy, the Milky Way, is crowded with planets yet we are not yet able to answer the big question: Are we alone? The first confirmation of a planet orbiting another star happened in October 1995, and planet finding kicked into high gear with the launch of the *Kepler Space Telescope* in 2009.

This spacecraft fixed its eye on a small patch of sky -- and kept it there for four years. Within that patch were more than 150,000 stars, a kind of cross-section of an arm of our own Milky Way galaxy, as if Kepler were shining a searchlight into deep space.

The exoplanet total is now more than 5,000 candidates, with more than 1,800 confirmed.

See: <http://planetquest.jpl.nasa.gov>

### STORMY SEAS IN THE LAGOON

Some of the most breathtaking views in the Universe are created by nebulae - hot, glowing clouds of gas. A new *Hubble* image shows the center of the **Lagoon Nebula**, an object with a deceptively tranquil name. See: <http://sci.esa.int/jump.cfm?oid=56244>

### EXOPLANET AND ITS STAR

*Hubble* and *Keck Observatory* results confirm the sighting of an exoplanet orbiting far from its central star. This finding opens a new opportunity in the extrasolar planet hunt: to uncover planets as far from their central stars as Jupiter and Saturn are from the Sun.

### GHOSTLY REMNANTS

Over the last decade, astronomers measuring the light intensities of celestial objects have found a number of new satellite galaxies, stellar streams, and overdensities around the Milky Way and the Andromeda galaxies. New super wide-field images of spiral galaxy **M81**, **M82** and **NGC3077** at: <http://subarutelescope.org/Pressrelease/2015/08/04/index.html>

### MYSTERY BLACK HOLES

NASA's *NuSTAR* X-ray observatory spotted two oddball black holes shining ultra-bright in distant spiral galaxy **Caldwell 5** and present a cosmic mystery. Their X-ray emissions shine as bright as supermassive black holes yet haven't sunk to the galaxy's core as such monster black holes usually do. Scientists dubbed these objects **ultra-luminous X-ray sources**, or ULXs. See: <http://spacenews.com/nasa-telescope-reveals-oddly-bright-black-holes/#sthash.eHi1HeDX.dpuf>

### THE EUPHROSYNES

Scientists have found a unique family of space rocks (asteroids), called the **Euphrosynes**. A **Euphrosyne** asteroid is about 156 miles across and is one of the 10 largest asteroids in the main belt of asteroids.

JPL researchers believe the **Euphrosynes** may be a remnant of a massive collision about 700 million years ago and the source of some of the dark **Near Earth Asteroids** (NEO). See: <http://neo.jpl.nasa.gov> and <http://www.jpl.nasa.gov/asteroidwatch>  
**GUM 29**

The nebula **Gum 29** is a star-forming region in the constellation **Carina** with a cluster of several thousand stars called **Westerlund 2**. These newborn stars are approximately 2 million years old, and their light illuminates, heats, and erodes the surrounding gas.

Within the nebula, several pillars of dark, dense gas are being shaped by the energetic light and strong stellar winds from the brilliant cluster of thousands of stars. An anniversary *Hubble* visualization is at:

<https://youtu.be/xnUzbqiwltM>

### HAWAII'S TELESCOPE

The **Thirty Meter Telescope** (TMT) on Hawaii's Big Island is slated to be one of the world's largest, most powerful telescopes, but the \$1.4-billion project has been a subject of controversy since its inception. A group of opponents have again protested and arrests continue.

At an international astronomy conference in Honolulu, the group said that while they were not against astronomy in general, they were opposed to plans to build the telescope atop Mauna Kea, a mountain considered sacred by some native Hawaiians. Conference organizers said they are working to set up an informal discussion between astronomers and demonstrators.

### GALAXY LIGHT

Astronomers studying light from more than 200,000 galaxies concluded that those galaxies were producing twice as much light two billion years ago as they are now. Astronomers, though, aren't worried about the universe going dark any time soon. "It's going to be a long process; I guess we've got worse things to worry about at some level."

### NEUTRON STAR DISPLAY

A super-dense star, a **neutron star**, formed in the aftermath of a supernova explosion is shooting out powerful jets of material into space from a double star system known as **PSR J1023+0038**.

It was previously thought that the only objects in the Universe capable of forming such powerful jets were black holes. See:

<https://www.youtube.com/watch?v=FLNFIJ7aqs>

## JUPITER'S GREAT RED SPOT

The largest and most powerful hurricanes ever recorded on Earth spanned over 1,000 miles across with winds gusting up to around 200 mph. But even that kind of storm is dwarfed by the **Great Red Spot**, -- the gigantic storm in Jupiter twice as wide as Earth that has been swirling wildly over Jupiter's skies for the past 150 years or longer.

Jupiter consists mostly of hydrogen and helium gas with a liquid ocean of hydrogen surrounding its core. One type of radiation that strikes Jupiter's clouds, can chemically produce new compounds that could explain the spot's color.

## HIDDEN PLANETARY SYSTEM

An astronomy team has found a secret planetary system hiding in the arms of **Cassiopea**. The remarkable system, named **HD219134**, hosts one outer giant planet and three inner super-Earths, one of which transits in front of the star.

It has a density similar to the Earth's and is by far, the closest transiting planet known today

## LAKE BED ON MARS

Mars turned cold and dry long ago, but researchers at the University of Colorado Boulder have discovered evidence of an ancient lake that likely represents some of the last potentially habitable surface water ever to exist on the Red Planet.

Digital terrain mapping and mineralogical analysis of the features surrounding the deposit indicate that this one-time lakebed is no older than 3.6 billion years old, well after the time period when Mars is thought to have been warm enough to sustain large amounts of surface water planet-wide.

See: <http://www.spxdaily.com/images-lg/martian-chloride-deposit-lasp-ig.jpg>

## ATLAS

The first **ATLAS** telescope is now in operation on Mt. Haleakala on the Hawaiian island of Maui. It is part of an **asteroid impact early-warning system** under development by the University of Hawaii and funded by NASA. When completed in 2015, **ATLAS** will consist of two telescopes 100 miles apart that will automatically scan the whole sky several times every night looking for moving objects.

The promise of **ATLAS** is that it can provide one day's warning for a 30-kiloton "town killer," a week for a 5-megaton "city killer" and three weeks for a 100-megaton "county killer."

## SOUTHERN OWL NEBULA

An extraordinary bubble, glowing like the ghost of a star in the haunting darkness of space, may appear supernatural and mysterious, but it is a familiar astronomical object: a planetary nebula, the remnants of a dying star. The best view of the little-known object **ESO 378-1** yet obtained was captured by ESO's *Very Large Telescope* in northern Chile.

Nicknamed the **Southern Owl Nebula**, this shimmering orb is a planetary nebula located in the constellation of **Hydra** (The Female Water Snake). Its informal name relates to its visual cousin in the northern hemisphere, the **Owl Nebula**. See:

<http://www.eurekaalert.org/multimedia/pub/96636.php>

## PLANET RINGS

Why do some planets, like Saturn or Jupiter, have trings while others do not? It turned out that "the size does not matter" -- even tiny asteroids do also. In a recent *Spitzer* discovery, the remote asteroid **Chariklo**, which is only 162 miles in diameter, also has rings.

A natural answer may be that some planets had much more dust-like material in their vicinity than others. Dust particles merged together, due to gravitational or adhesive forces, and larger and larger aggregates appeared in a ring system.

## ORIGIN OF METEORITES

For decades astronomers debated the source of the most common type of meteorites that fall on Earth called **H ordinary chondrites**. A team of astronomers studied minerals on the surface of a near-Earth asteroid named **(214869) 2007 PA8** with the NASA infrared telescope facility on Mauna Kea, Hawai'i during its close approach.

Observations showed that meteorites similar to **2007 PA8** came from an asteroid in the outer regions of the main asteroid belt between Mars and Jupiter.

## EARLY GALAXY

A CalTech-led team of astronomers has discovered a giant swirling disk of gas 10 billion light-years away -- a galaxy-in-the-making that is actively being fed cool primordial gas tracing back to the big bang.

The researchers found that it is connected to a filament of diffuse gas that crisscrosses between galaxies, extends throughout the universe, and is fueling rapid star formation.

See: <http://www.caltech.edu/news/caltech-astronomers-unveil-distant-protogalaxy-connected-cosmic-web-47459>

## YOUNG PLANET DISCOVERY

Using the new **Gemini Planet Imager (GPI)** a team of national and international astronomers discovered a Jupiter-like planet within a young system that could help understanding how planets formed around our Sun. The planet, called **51 Eridani b**, is a million times fainter than its star and shows the strongest methane signature ever detected on an alien planet -- this should yield additional clues as to how the planet formed.

The **GPI** was designed specifically for discovering and analyzing faint, young planets orbiting bright stars. To detect planets **GPI** sees their glow and astronomers sharpen the image and block out starlight. The brightest spots indicate a possible planet.

## DIONE

A pockmarked, icy landscape is in *Cassini's* new images of Saturn's moon **Dione**. Two of the new images show the surface of Dione at the best resolution ever.

See: <http://newsr.in/video/20150821/3226575/Images-of-Saturn-Moon.htm>

## SPITZER ANNIVERSARY CALENDAR

Celebrate the 12th anniversary of NASA's *Spitzer Space Telescope* with a new digital calendar. See: <http://www.jpl.nasa.gov/images/spitzer/20150820/Spitzer12thAnniversaryCalendar.pdf>

\*\*\*\*\*

The **YOUNG ASTRONOMERS NEWSLETTER** is distributed by the **Forsyth Astronomical Society**

:srewsnA ymonortsA delbmarcS  
REHCRA ,XULLOP ,SUESREP ,RETNUH ,ROTSAC