# THE YOUNG ASTRONOMERS NEWSLETTER

 Volume 21 Number 7 June 2013

 ***STUDY + LEARN = POWER*** *OWER*

**GREENSBORO STUDENT NAMES *BENNU***

 Asteroid **(101955) 1999 RQ36** now has the much friendlier name "**Bennu**," thanks to Michael Puzio, a 3rd-grade student at Jefferson Elementary School in Greensboro, North Carolina. And **Bennu** will soon have a visitor - NASA's ***OSIRIS-REx*** *spacecraft* is scheduled to launch in 2016, visit **Bennu** in 2018, and return a sample of the asteroid to Earth in 2023.

 More than 8,000 students from around the world entered the ***Name that Asteroid!*** competition. The contest was a partnership -- the University of Arizona; Planetary Society; and LINEAR Survey at MIT.

 Puzio suggested the name because he imagined the Touch-and-Go Sample Mechanism (TAGSAM) arm and solar panels on ***OSIRIS-REx*** look like the neck and wings in drawings of **Bennu** which Egyptians usually depict as a gray heron.

**SEND YOUR NAME TO MARS**

 NASA is inviting members of the public to submit their names and a personal message online for a DVD to be carried aboard the *MAVEN* spacecraft by July 1st. It is scheduled for launch in November on a mission to study the Martian upper atmosphere. You can also submit a message in the form of a three-line poem, or *haiku*.

 See: **http://lasp.colorado.edu/maven/goingtomars**

**DRAGONFISH**

 Astronomers have spotted the most jam-packed cluster of young supermassive stars ever seen in the Milky Way galaxy, including hundreds of the most massive types of stars that are dozens of times heavier than our Sun.

 The light from these newborn stars is heating the surrounding clouds of gas and dust, punching out a hollow shell into space.

 It was named "Dragonfish" because it resembles the undersea creature's dark, gaping mouth and teeth with bright eyes and a fin.

 "And we've found a rebel in the group, a runaway star escaping from the group at high speed" a researcher said. See: **http://www.livescience.com/17382-**

**supermassive-stars-dragonfish-mouth-cluster.html**

**ELEMENTARY SCHOOL ROBOTS**

 A robotics program in 15 schools allows students to build their own robots with the goal of engaging them in science, technology, engineering and math.

 A Canadian organization's goal is to teach elementary school students hands-on skills it says will serve them well in an increasingly technological world.

**ISS "BULLET HOLE"**

 A small object, possibly a meteoroid or piece of space debris, has flown through a solar panel on the International Space Station, leaving a "bullet hole", Canadian astronaut and Expedition 35 commander Chris Hadfield wryly said: "Fortunately, it missed the hull."

**GAMMA RAY BURST**

 A record-setting blast of gamma rays from a dying star in a distant galaxy has wowed astronomers around the world. The eruption designated **GRB 130427A**, produced the highest-energy light ever detected from such an event.

 Gamma-ray bursts are the universe's most luminous explosions. Astronomers think most occur when massive stars run out of nuclear fuel and collapse under their own weight. As the core collapses into a black hole, jets of material shoot outward at nearly the speed of light.

**POLLUTED DEAD STARS**

 The *Hubble Space Telescope* has found the building blocks for Earth-sized planets in unlikely places - the atmospheres of a pair of burned-out stars (**white dwarfs**) being polluted by asteroid-like debris falling onto them.

 The discovery suggests rocky planet assembly is common around stars, and it offers insight into what will happen in our own solar system when our Sun burns out 5 billion years from now.

**CLOUD CLUSTER**

 In a dark, starless patch of intergalactic space, astronomers have discovered a cluster of hydrogen clouds strewn between two nearby galaxies**, Andromeda** (M31) and **Triangulum** (M33).

 The researchers speculate that the gas condensed out of a vast and as-yet undetected reservoir of hot, ionized gas, which could have accompanied an otherwise invisible band of dark matter.

**ORION'S FIERY RIBBON**

 A spectacular new image of cosmic clouds in the constellation of **Orion** reveals what seems to be a fiery ribbon in the sky. It is a part of a bigger complex called the **Orion Molecular Cloud** - a rich melting pot of bright nebulae, hot young stars and cold dust clouds.

 The large bright cloud in the upper right of the image is the well-known Orion Nebula, also called **Messier 42**. It is readily visible as the fuzzy middle "star" in Orion's sword. See: **Http://www.eso.org/public/images/eso1321a**

**THE SUN IS ACTING UP**

 The Sun's activity is increasing as it heads to the next Solar Maximum. On May 17, the Sun erupted with an Earth-directed "coronal mass ejection" sending billions of tons of solar particles into space and heading our way.

 The Sun is also erupting with solar flares - powerful bursts that send light and radiation into space that cause communication blackouts.

 Given a legitimate need to protect Earth from the most intense forms of space weather, some people worry that a gigantic "killer solar flare" could hurl enough energy to destroy Earth, but this is not actually possible. You can track solar activity at: [**http://www.swpc.noaa.gov/**](http://www.swpc.noaa.gov/)      *and*    [**http://sdo.gsfc.nasa.gov/data/**](http://sdo.gsfc.nasa.gov/data/)

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***SCIWORKS – for info and planetarium schedules, call 767-6730***

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

**http://amazing-space.stsci.edu/tonights\_sky/**

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

**THE NORTH AMERICAN METEOR NETWORK GUIDE**

This is an extensive guide to the basics of observing meteors. The guide states that it is intended for the amateur just starting out with meteor observing but it has a wealth of information for anyone interested in observing meteor activity. It's a worth-while download**. See: http://www.namnmeteors.org/**

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**PUZZLES**

 **FIND THE WORD SCRAMBLED ASTRONOMY**

**R E T T A M A S D U BENNU OSIRIS SUMMER SKY**

**O T T S A L B E N P BLAST PANEL SEPESUR \_\_ \_\_ \_\_ \_\_ \_\_ \_\_ \_\_**

**B S W W D H C N A P CHRIS RACED**

**O R I O N A E N T E EARTH ROBOTS MINGEI \_\_ \_\_ \_\_ \_\_ \_\_ \_\_**

**T S D R R B E R O R HEADS SHOOT**

**S P E D I L M H O O HERON SPEED CAPSI \_\_ \_\_ \_\_ \_\_ \_\_**

**I E A T A S D T H N IDEAS STATES**

**R E S S A R E T S I LASTED SWORD TARNUS \_\_ \_\_ \_\_ \_\_ \_\_ \_\_**

**H D M A H T R A E M MATTER UPPER**

**C E T D E T S A L S ORION WORLD BRAIL \_\_ \_\_ \_\_ \_\_ \_\_  *(Answers below)***

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**NAME AN ASTERISM --- Just for fun – do like astronomers have done for hundreds of years. Spot a star group and give it a name. Look in: http://stars.astro.illinois.edu/sow/crbful.jpg --- for birds?, animals?, and other objects. Use your own ideas and imagination.**

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

Stars in a cloud **- http://www.eso.org/public/images/eso1320a/**

Ultra-luminous infrared galaxy **- http://www.nasa.gov/images/content/748088main\_potw1318a.jpg**

13.3 billion years-old galaxy **- http://spaceinimages.esa.int/Images/2013/05/Abell\_S1077**

**SITE OF THE MONTH**

*Chandra* For Kids **- http://chandra.harvard.edu/photo/2013/vela/kids.html
\* \* \* \* \* \* JUNE MOON \* \* \* \* \* \***

**New Moon:** 6/8 **First Quarter:** 6/16 **Full Moon:** 6/23 **Last Quarter:** 6/30

**Apogee:** 6/9 1:40 PM 252,579 mi, (406486 km} **Perigee:** 6/23 3:12 AM 221,824\* mi. ( 356991 km)

**\*\*** The **June Full Moon,** the **Strawberry Moon**, isthe largest in 2013**. \*\* Best observing nights:** 6/1 – 6/15

**\* \* \* \* \* \* PLANETS IN JUNE \* \* \* \* \* \***

**VENUS** is very low in the WNW and 25° high by month's end. **MERCURY** is in the WNW until the 23rd and then moves in front of the Sun (*inferior conjunction).* During the first weeks of June, MERCURY is at the upper left of Venus and sets about two hours after the Sun. By the end of June, Mercury is very close to the WNW horizon and hard to spot. **JUPITER** is very low in the WNW. It is on the far side of the Sun on the 19th *(superior conjunction)*. **SATURN** is high in the southern sky all month. This planet has 60+ moons – Titan is the brightest. **MARS i**s very low in the east just before sunrise in the last days of June. **URANUS** is 4° north of the Moon on the 3rd. Very faint

N North E East S South W West

 NNE NorthNorthEast ESE EastSouthEast SSW SouthSouthWest WNW WestNorthWest

 NE NorthEast SE SouthEast SW SouthWest NW NorthWest

 ENE EastNorthEast SSE SouthSouthEast WSW WestSouthWest NNW NorthNorthWest

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

**NAME DATES BEST NIGHT PER HOUR WHERE TO LOOK**

**GAMMA DELPHINIDS** U/K 6/11 4 AM U/K Low in the southeast. Source

 is not known. *Astronomy* calls it "A Shower of Mystery". June has six minor showers with less than 2 meteors per hour.

**LOOK FOR: >>>>> \* The** Moon is at this year's "closest to Earth" on the 23rd. **>>>>>** On the 12th*,* **MERCURY** is at its highest in the evening sky in 2013. **>>>>> Jupiter, Mercury,** and **Venus** are in a line in the WNW just after sunset on the 2nd.  **>>>>> Blue-white Vega,** rising in the NE in evening twilight. Tiny **LYRA** is just to the south.

**ASTEROID 2013 GM3**

 An Italian astronomer says new data suggest an asteroid 65 feet in diameter could pass dangerously close to Earth's surface on April 14, 2026, The flyby of the asteroid **2013 GM3** could bring it within 5,300 miles of Earth,

 The asteroid was discovered in mid-April by researchers an observatory in Arizona, but preliminary calculation by NASA suggested it would pass 24,000 miles from Earth.

**COMET C/2012 S1 (ISON)**

 Scientists eagerly await the arrival of a recently discovered, highly active comet that may be visible from Earth as it skims 730,000 miles above the Sun's surface on November 28th. The comet, C/2012 S1 (**ISON**), is highly unusual in that it comes to the inner solar system for the first time and will skirt around the Sun within less than two solar radii from the Sun's surface.

 It was discovered last September when it was farther away from the Sun than Jupiter, and was already active at such a great distance. Most other ***sungrazers*** (comets that pass extremely close to the Sun) are only discovered and remain visible for several hours when nearest the Sun.

 Then they are expected to be intensely heated by the Sun, and release ice, silicates, and metals plus a tremendous amount of dust.

**BETELGEUSE**

 Astronomers have released a new image of the outer atmosphere of red supergiant **Betelgeuse** that shows regions of surprisingly hot gas in the star's outer atmosphere and a cooler arc of gas weighing almost as much as the Earth. The star and its arc-shaped shields could collide with an intriguing dusty ‘wall’ in 5000 years.

 The mechanism by which supergiant stars like Betelgeuse lose matter into space is not well understood despite its key role in the lifecycle of matter that enriches the interstellar material from which future stars and planets will form.

 Detailed high-resolution studies of the regions around massive stars like the ones presented here are essential to improving our understanding of the universe. See: **http://www.esa.int/Our\_Activities/Space\_Science/         Betelgeuse\_braces\_for\_a\_collision**

**FAST STAR FORMATION**

 UCLA astronomers have found a galaxy turning gas into stars with almost 100 percent efficiency, a rare phase of galaxy evolution that is the most extreme yet observed. They say: "Galaxies burn gas like a car engine burns fuel. Most galaxies have fairly inefficient engines, meaning they form stars from their stellar fuel tanks far below the maximum theoretical rate. They're catching the galaxy in a short-lived phase of evolution, possibly triggered by the merging of two galaxies into one.

 This galaxy is forming stars at a rate hundreds of times faster than our Milky Way galaxy, but the majority of the galaxy's starlight is being emitted by a region just a few percent of the diameter of the Milky Way." The star-formation is so ferocious that in a few tens of millions of years, the gas will be used up, and the galaxy will mature into a massive elliptical galaxy.

**GALACTIC WINDS**

 Astronomers using the *Hubble Space Telescope* have shown for the first time that bursts of star formation have a major impact far beyond the boundaries of their host galaxy, affecting galactic gas at distances of up to twenty times greater than the visible size of the galaxy,

 This alters how the galaxy evolves and how matter and energy is spread throughout the Universe. When galaxies form new stars, they sometimes do so in frantic episodes of activity (**starbursts**) during which hundreds of millions of stars are born, and, their combined effect can drive the powerful wind that travels out of the galaxy.

**METEOROIDS HIT SATURN'S RINGS**

 NASA's ***Cassini*** spacecraft has provided the first direct evidence of small meteoroids breaking into streams of rubble and crashing into Saturn's rings. These observations make Saturn's rings the only location besides Earth, the Moon, and Jupiter where scientists and amateur astronomers have been able to observe impacts as they occur.

 Our solar system is full of small, speeding objects. Planetary bodies frequently are pummeled by them. The meteoroids at Saturn range from about one-half inch to several yards in size. See: **http://www.nasa.gov/cassini**

**HURRICANE ON SATURN**

 The *Cassini* spacecraft has sent back the first close-up, visible-light views of a immense hurricane swirling around Saturn's north pole. The hurricane's eye is about 1,250 miles wide, 20 times larger than the average hurricane eye on Earth.

 Unlike terrestrial hurricanes, which tend to move, the hurricane on Saturn is locked onto the planet's north pole. On Earth, hurricanes tend to drift northward because of the forces acting on the fast swirls of wind as the planet rotates. Saturn's hurricane is believed to have been churning for years and is already as far north as it can be. See: **http://www.spxdaily.com/images-lg/**

 **cassini-saturn-storm-cell-lg.jpg**

**HERSCHEL'S DEMISE**

 The European Space Agency said the deep-space *Herschel* telescope has given up the ghost -- running out of coolant after a successful mission to observe the birth of stars and galaxies. Herschel has made over 35,000 observations and amassing more than 25,000 hours' worth of science data from about 600 observing programs. The telescope has been placed in a "parking orbit" around the Sun and will still be able to communicate with its ground stations for some time.

**WHITE DWARFS**

 Because it has no source of energy, a dead star (a white dwarf) will eventually cool down and fade away but may still support habitable planets. Using advanced technology to become available within the next decade, it should be possible to detect oxygen biomarkers that would be the most critical signal of the presence of life on extraterrestrial planets.

 Earth's atmosphere, for example, is 21 percent oxygen, and this is entirely produced by our planet's plant life as a result of photosynthesis. Without the existence of plants, an atmosphere would be entirely devoid of oxygen.

**SPACE DEBRIS PROBLEM**

 On Feb. 10, 2009, a study revealed that *Cosmos 2251*, a dead Russian communications satellite, would pass about 1,900 feet from the functioning *Iridium 33* communications satellite later in the day but at the predicted time of closest approach, all contact with *Iridium 33* was lost. Radar revealed clouds of debris traveling along the orbits of both spacecraft, confirming the first known satellite-to-satellite collision.

 That crash generated thousands of fragments large enough to be tracked and many smaller pieces that evade detection. Much of the wreckage remains a hazard today to operating spacecraft because only about 20 percent of the trackable pieces have reentered the atmosphere.

 When Julie McEnery, the project scientist for NASA's *Fermi Gamma-ray Space Telescope*, checked her email on March 29th she found an automatically generated report that *Fermi* was just one week away from an unusually close encounter with *Cosmos 1805*, another defunct Russian spy satellite dating back to the Cold War.

 Tuesday, April 3, the threat still had not receded and *Fermi* stopped scanning the sky, oriented itself along its direction of travel, parked its solar panels, tucked away its high-gain antenna and then fired its thrusters for one second. Soon after, *Fermi* was back doing science.

 Last year, the Goddard CARA team participated in collision-avoidance maneuvers for seven other missions. A month before the *Fermi* conjunction came to light, *Landsat 7* dodged pieces of *Fengyun-1C*, a Chinese weather satellite deliberately destroyed in 2007 as part of a military test. And in May and October, respectively, NASA's *Aura* and *CALIPSO* Earth-observing satellites took steps to avoid fragments from *Cosmos 2251*.

**MORE SPACE DEBRIS (JUNK)**

 Space scientists say that governments must start working urgently to remove orbital debris, which could become a catastrophic problem for satellites a few decades from now.

 Since 1978, the total of junk items whizzing around the planet has tripled. According to a count by ESA and NASA, there are more than 23,000 items in orbit that are bigger than four inches across, and hundreds of thousands of items between 0.4 to four inches across.

 Debris travels on average at 15,600 miles per hour, so even an object of small mass has the potential to cripple a satellite or punch a hole in the International Space Station

**SATURN'S INTERIOR HEAT**

 As planets age they become darker and cooler. Saturn however is much brighter than expected for a planet of its age - a question that has puzzled scientists. But now new research has revealed how Saturn keeps itself looking young and hot. Scientists found that layers of gas, generated by physical instability deep within the giant planet, prevent heat from escaping.

 This has resulted in Saturn failing to cool down at the expected rate- it just can't cool down! These findings suggest that evolution of giant planets in our Solar System, and beyond, may be much more complex than previously thought.

**RADIO WAVES DEFINE DISTANT GALAXIES**

 The **Karl G. Jansky Very Large Array** in Socorro, New Mexico, is a radio wave observatory with 27 dish antennas - each with a diameter of 82 feet and weighing 230 tons. Staring at a small patch of sky for more than 50 hours with the ultra-sensitive array, astronomers have for the first time identified distinct sources that account for nearly all the radio waves coming from distant galaxies. They found that about 63 percent of the background radio emission comes from galaxies with gorging black holes at their cores and the remaining 37 percent comes from galaxies that are rapidly forming stars. Their field of view in the constellation **Draco** covered about one-millionth of the whole sky. In that region, they identified about 2,000 radio-emitting objects.

**TWO NEW EXOPLANETS**

 An international team of astronomers has identified and characterized two new exoplanets. The new planets are about the size of Jupiter but have eccentric orbits with periods of less than 10 days.

 There are currently more than 850 known exoplanets, but as seen from the Earth, only some of them are oriented in a way that they are passing in front of their star every orbital period.

**TUNGUSKA**

 The Tunguska meteor impact event is one of the great mysteries of modern history. On 30 June 1908, a vast and powerful explosion engulfed an isolated region of Siberia. The blast registered 5 on the Richter scale and is thought to have knocked down some 80 million trees over an area of 1200 square miles (*Forsyth County is only 413 square miles!*). The region is very isolated and historians recorded only one death and just handful of eyewitness reports.

 But the most mysterious aspect of this explosion is that it left no crater and scientists have long argued over what could have caused it. Generally, it is believed that the explosion was the result of a meteorite or comet exploding in the Earth's atmosphere. That could have caused an explosion of this magnitude without leaving a crater but would almost certainly have showered the region in fragments of the parent body. In the 1930s, an expedition to the region returned with a sample of melted glassy rock but it was lost.

 More recently, a Russian scientist found three rocks from the Tunguska region with the telltale characteristics of meteorites. These rocks could finally help solve once and for all what kind of object struck Earth all those years ago. See: **http://www.spxdaily.com/images-lg/**

 **tunguska-meteorite-fragment-lg.jpg**

**UNUSUAL GRB'S**

 Three unusually long-lasting stellar explosions discovered represent a previously unrecognized class of gamma-ray bursts (GRBs). Two international teams of astronomers studying these events conclude that they likely arose from the catastrophic death of supergiant stars hundreds of times larger than the Sun.

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

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