Houston Astronomical Society

December, 2012

GuideStar

December, 2012

Volume 30, #12

At the December 7 Meeting

Lunar Science:

Unraveling the Secrets of the Solar System

Dr. Jennifer Rapp, Lunar and Planetary Institute

The Moon is Earth's closest neighbor, and the only other planetary body so far that humans have walked on. It has also seen very little geological activity in the last 3 billion years, making it an excellent laboratory to study the very earliest processes in the solar system. We are able to use samples returned from the Moon by the Apollo program, lunar meteorites and orbital data to build an understanding of planetary formation processes and solar system dynamics, and even to learn more about the Earth.

The *GuideStar* is the winner of the 2012 Astronomical League Mabel Sterns Newsletter award.

The Houston Astronomical Society is a member of the Astronomical League.

Highlights:

HAS Web Page:

http://www.AstronomyHouston.org

See the *GuideStar's* Monthly Calendar of Events to confirm dates and times of all events for the month, and check the Web Page for any last minute changes.

Schedule of meeting activities:

All meetings are at the University of Houston Science and Research building. See the inside back page for directions to the location.

Novice meeting: ..... 7:00 p.m.

Justin McCollum (chair) — "A Brief Tour of the Winter Constellations"

General meeting: ..... 8:00 p.m

See last page for directions and more information.

The Houston Astronomical Society

The Houston Astronomical Society is a non-profit corporation organized under section 501 (C) 3 of the Internal Revenue Code. The Society was formed for education and scientific purposes. All contributions and gifts are deductible for federal income tax purposes. General membership meetings are open to the public and attendance is encouraged.

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Dues and Membership Information

Annual Dues:Regular $36
Associate $6
Sustaining $50
Student $12
Honorary ..... N/C

All members have the right to participate in Society functions and to use the Observatory Site. Regular and Student Members receive a subscription to *The Reflector*. *The GuideStar,* the monthly publication of the Houston Astronomical Society is available on the web site. Associate Members, immediate family members of a Regular Member, have all membership rights, but do not receive publications. Sustaining members have the same rights as regular members with the additional dues treated as a donation to the Society. *Sky & Telescope* and *Astronomy* magazines are available to members at a discount.

Membership Application: Send funds to address shown on last page of *GuideStar*. Attention - Treasurer, along with the following information: Name, Address, Phone Number, Special Interests in Astronomy, Do you own a Telescope? (If so, what kind?), and where you first heard of H.A.S.

Table of Contents

Other Meetings...

Johnson Space Center Astronomical Society meets in the the Lunar and Planetary Institute on the 2nd Friday of each month. Web site: www.jscas.net

Fort Bend Astronomy Club meets the third Friday of the month at 8:00 p.m. at the First Colony conference Center. Novice meeting begins at 7:00, regular meeting begins at 8:00. Web site: http://www.fbac.org

North Houston Astronomy Club meets at 7:30 p.m. on the 4th Friday of each month in the Teaching Theatre of the Student Center at Kingwood College.Call 281-312-1650 or E-mailbill.leach@nhmccd.edu. Web site: www.astronomyclub.org

Brazosport Astronomy Club meets the third Tuesday of each month at the Brazosport planetarium at 7:45 p.m. The Brazosport planetarium is located at 400 College Boulevard, Clute, TX, 77531. For more information call 979-265-3376

GuideStar deadline for the January issue is December 15th

December/January

Calendar

Date	Time	Event
December		
3	8:00 p.m.	Jupiter at opposition
4	5:00 p.m.	Mercury at greatest elongation west
6	9:32 a.m.	Moon at last quarter
7	7:00 p.m.	HAS Novice Meeting, U of H
	8:00 p.m	HAS General Meeting, U of H
8	8:00 p.m.	4 Vesta at opposition
12	7:30 p.m.	HAS Board Meeting HEB Community Meeting Room I-10W @ Bunker Hill
13	2:41 a.m.	New Moon Geminid meteors peak
15		Prime Night, Columbus Site
18	12:00 a.m.	1 Ceres at opposition
19	11:19 p.m.	Moon at first quarter
21	5:12 a.m.	Winter Solstice
22		Ursid meteors peak
25		Christmas
28	4:22 a.m.	Full Moon
January		
4	7:00 p.m.	HAS Novice Meeting, U of H
	8:00 p.m.	HAS General Meeting, U of H
	9:59 p.m.	Moon at last quarter
11	1:44 p.m.	New Moon
12		Prime Night, Columbus Site
18	5:46 p.m.	Moon at first quarter
26	10:39 p.m.	Full Moon

Send calendar events to Doug McCormick - skygazer10@sbcglobal.net

For the latest information on club events, go to http://www.astronomyhouston.org/

Check the web site: www.astronomyhouston.org

The HAS website not only has news and information about our society, but also a variety of features to manage your membership and connect with other club members. Current members can post photos, trade gear, pay dues, manage discount magazine subscriptions, swap stories in the forum, and more.

Questions about the site? Need a hand to get your account set up?
Contact webmaster@astronomyhouston.org.

The HAS web site is the winner of the 2012 Astronomical League award for excellence.

Follow the *GuideStar* on Twitter at:

GuideStar_HAS

Join Facebook and look for:

Houston Astronomical Society

Starline

Call 832-go4-HAS0 (**832-464-4270**) for the latest information on the meeting and other information about activities within the HAS.

HAS Board Meeting

HAS Board meetings are scheduled regularly (see the calendar, above). All members are invited to attend these meetings, but only board members can vote on issues brought before the board.

Observations... of the editor

by Bill Pellerin, GuideStar Editor

Good books make great gifts...

Astronomy books are always great to give and to receive. Here's a list of some of my favorites, in no particular order.

Pocket Sky Atlas (Sky and Telescope), Roger Sinnott—easy to carry and comprehensive enough that it may be the only star map book you need.

Binocular Highlights (Sky and Telescope), Gary Seronik — the book you want to have when you want to observe, you're in dark skies, and you have your binocs handy.

The Inexplicible Universe: Unsolved Mysteries (The Great Courses) - DVD—Neil deGrasse Tyson—six lectures on things we don't understand in the universe — great for a cloudy night.

The Sky is Your Laboratory (Springer), Robert Buchheim — Advanced Astronomy Projects for Amateurs — when you're ready to take your work to the next level.

The Observer's Sky Atlas, Third Edition (Springer), E. Karkoschka — a remarkably compact atlas guides you to unaided eye, binocular, and telescope objects.

Coming of Age in the Milky Way, Timothy Ferris (1988). The history of astronomy well told.

The Day We Found the Universe (Marcia Bartusiak) — The history of scientific discovery leading to the determination that the universe is larger than the Milky Way.

How Old is the Universe (David A. Weintraub) — How did we come to know the age of the universe with such certainty? Available as a paperback, an e-book, or an audio book

Star Testing Astronomical Telescopes (Harold Richard Suiter) — 2nd ed. Want to know if your telescope is performing properly? Get this book.

Cosmic Challenges (Philip Harrington) — Challenge your observing skills with this book. For any size telescope.

The Backyard Astronomer's Guide (Terence Dickinson & Alan Dyer) — anything by either or both of these guys is going to be good. This one's a comprehensive look at amateur astronomy from just getting started to sophisticated astro-imaging.

If it Ain't Broke….

This weekend I tried to make some new software work for controlling my autoguider camera. The old software (PHD) was working just fine, thanks, and it's free. In fact, it was working better than 'just fine'. It worked right the first time I tried it and it has been working for me ever since. The only reason I considered using new software is that it is integrated with my sky mapping software and, if I can get it to work, it'll allow me to control the telescope, the imaging camera, and the autoguider with one software package.

I couldn't get the new autoguider software to work. It wouldn't successfully complete its calibration routine and so it wouldn't autoguide. For the observing session I used my 'old' software, and it worked as good as ever.

So, here's the question. Is the benefit of having my autoguiding software integrated into my telescope control software worth the cost of figuring out how to make it work? Maybe. I haven't determined what that cost will be yet. I'm prepared to spend some more time trying to make everything work, but I'm also prepared to abandon the new software in favor of the old. The goal is to be able to take the images I want; the goal is *not* to optimize the software configuration.

Thanks to GuideStar Contributors

This is the last *GuideStar* for 2012. Thanks to everyone who contributed to the publication. I look forward to HAS club year 2013 and a lot of exciting opportunities for Houston Astronomical Society members to observe, contribute to the organization and to share our love of the sky with others.

Until next time...

clear skies and new moons!

..Bill

New Neighbors

By Don Selle

Our galactic neighborhood got a bit more neighborly recently. On Oct. 16, 2012 astronomers using the ESO 3.6 meter telescope in La Silla Observatory in Chile announced discovery of an Earth-sized planet orbiting the star Alpha Centauri B. The team lead by Xavier Dumusque used the HARPS (High Accuracy Radial Velocity Planet Searcher) instrument package on the telescope to take more than 450 measurements over a four-year period to detect the planet, known as Alpha Centauri Bb (AC Bb).

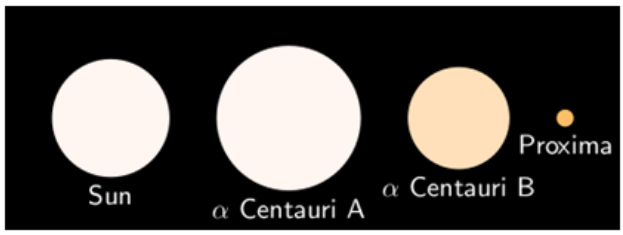
The discovery was made possible by the extreme sensitivity of HARP. As the planet orbits its star, its gravity causes both star and planet to oscillate slightly in the line of sight to Earth. This causes a slight change in the radial velocity of the star over the period of the planetary orbit as the star first moves away and then toward the Earth.

The change in radial velocity of the star is only 1.8km per hour, which is slower than most people walk. This small change in velocity, and period of the orbit, coupled with the star's likely mass, allowed the team to measure the mass of the planet at least 1.2 times that of Earth. However, its orbital inclination is not yet known so this is a lower limit. Given its mass, it is quite possible (but not known for sure) that AC Bb is a terrestrial (or rocky) planet like the four inner planets in our solar system. Its orbital period of about 3 ¼ days means that the radius of its orbit is only about 0.04 AU, about ten times closer to its star than Mercury is to ours.

At a distance of about 4.3 LY from Earth, planet AC Bb is the closest planet to Earth known to exist, and as a result, some scientists are already talking about it as a likely target for further exploration. Sending a mission to explore this planetary system though would take decades to prepare, and using current technology, it would take the probe about 40,000 years to reach the star system. Theoretical space propulsion technology (like an anti-matter drive) could drastically shorten the trip time to several hundred years, if the technology can be developed and proven.

Even if a robotic probe were sent to visit our nearest neighbor, it is likely that no one would be home. The short orbital period of AC Bb means that the planet is so close to its star that astronomers estimate its surface temperature exceeds 1,200 degrees, making life (our kind of life anyway) on this planet a virtual impossibility. While there are many reasons for scientists to explore an unknown planetary system, one of the most compelling for the public is the possibility of finding life there, so it is probably unlikely that a publicly-funded probe to AC Bb would gain much public support.

The belief that life is common in our solar system and throughout the universe has a long history. It is has largely been based on the recognition that the planets in our solar system are truly "other worlds," and by extension, that similar to the Earth, they are populated by beings like us. This position was supported by philosophers Emanuel Kant and John Locke, astronomer William Herschel and politicians Benjamin Franklin and John Adams. As more was learned and scientific skepticism grew, the popularity of this position was diminished.



In modern times, astronomers like Frank Drake and Carl Sagan truly popularized the plurality of worlds - Drake with his famous equation and pioneering work on SETI, and Sagan with his popular books and the *Cosmos* television series. Sagan especially excited the public imagination about the scale of the universe with its "billions upon billions" of stars, and associated planets. With such a vast number of opportunities for life to emerge and evolve, he argued that we could hardly be alone in the universe.

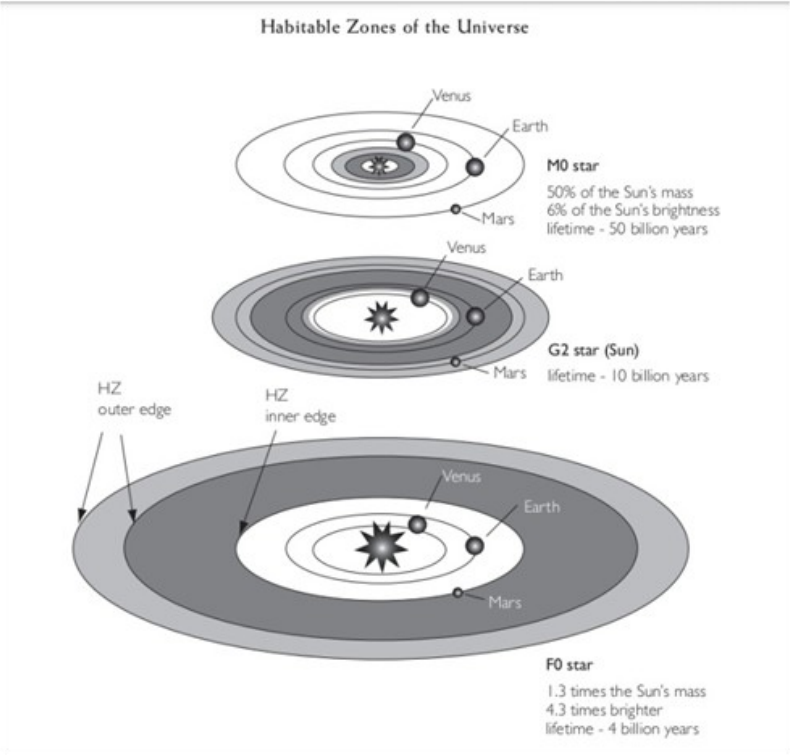
To date, 850 exoplanets have been discovered orbiting nearby stars. This has included 126 known multi-planet systems. With so many planets discovered relatively close to

(Continued on page 6)

(Continued from page 5)

the Sun, it is safe to say that there are likely to be a couple of billion planets in our Milky Way galaxy. But does this “plurality of worlds” mean that we are likely to find life or, more interestingly, intelligent life in our galaxy?

The reality may be very different. Though the number of planets in our galaxy could be huge, the numbers may not add up to intelligent life



being widespread in the Milky Way. In fact, there may be reason to believe that we may be alone in our galaxy. The plurality of worlds argument assumes that life will emerge wherever conditions are right, and once life is established, intelligent life will evolve, and with a large number of planets, intelligent life should be common in our galaxy.

But is this likely to be the case? What if of all of the billions of planets in the galaxy, only a very small fraction of them possess the necessary conditions for life to arise? And if simple life forms do emerge, how likely is it that these same planets have the right environments that this life will evolve and increase in complexity sufficient for intelligence to emerge?

By themselves these two probabilities, the number of planets fit for life, and the likelihood that intelligent life will evolve on them are hard to estimate. This is especially so because we have only one example to study (ourselves), and probabilities are very hard to estimate if you have a sample size of one.

It is possible, though, to break the problem down so that while we may not be able to establish actual probabilities, we can at least gain some insight into what they might be. Breaking the problem down, into several factors some of which might be measurable or at least easier to “guesstimate” can help us to understand how likely are we to find other intelligent life in the galaxy.

In their book *Rare Earth: Why Complex Life is Uncommon in the Universe* (Copernicus Books 2000), authors Peter D. Ward and Donald Brownlee do just that. After identifying and discussing a number of factors that facilitated the rise of intelligence on Earth and that might just make Earth very rare among its planetary peers, the authors develop the “Rare Earth Equation”. This equation is suspiciously like the famous Drake equation which the authors compare it to.

There are several characteristics of the planetary systems around other stars and the individual planets in them which the authors recognize as conditions which are required for life as we know it. Two of these are "habitable zones". One describes the location of a parent star in the galaxy in which it resides, and the other, the radius about that star in which a planet orbits which ensures that temperatures on the planet are suitable to life. Both of these habitable zones are also time dependent.

In order for Earth-like life to exist on another planet, that planet must be a "terrestrial" or rocky planet. While it may be possible for life to exist in the atmosphere of a gas giant planet, it is hard to imagine how that might occur.

Current theories of the beginnings of life have been strongly influenced by the discovery of "extremophiles”, bacteria-like organisms which exist in extreme conditions of heat pressure and acidity, such as those found around volcanic vents in the deep sea. Studies of their DNA and the fact that they are so well adapted to conditions thought to exist on a very young Earth, indicate that they are representative of the first living organisms. That they typically live deep underground have lead evolutionary biologists to believe that life first began there. So the evidence would indicate that a rocky planet is

(Continued on page 7)

(Continued from page 6)

required for Earth-type life to emerge.

In order for an Earth-like planet to form with its parent star, the cloud of interstellar gas and dust that they form from must have a high content of "metals" (elements heavier than helium, including iron). Since these elements are forged in the interior of stars, and liberated with their death, it means that such a star would need to be in an area of high star birth and death. In a spiral galaxy like the Milky Way, high levels of star birth (and hence, metalicity) are found well out in the galactic disk in the spiral arms. Coincidentally, this is where Earth resides.

The neighborhood we reside in also has the benefit that it is remote from the galactic center, where like most galaxies, a massive black hole resides, spewing very high energy radiation out as matter falls into it. This radiation, as well as the hard radiation from magnetars (which seem to be more concentrated in the galactic center) is powerful enough to sterilize a planet in the vicinity of the galactic center. It is also important, since most stars orbit the galactic center, that this galactic orbit (like that of Earth) maintains the star in the galactic "habitable zone" of high metalicity and low radiation. So it seems we Earthlings are fortunate to live in the neighborhood we do.

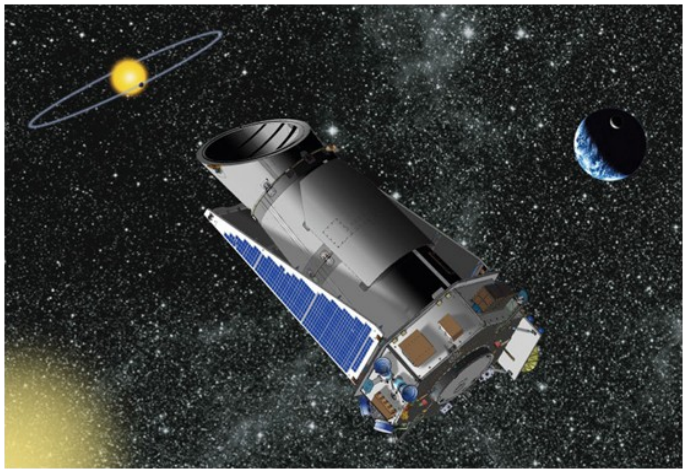
A planetary habitable zone is the range of distance from the central star at which a terrestrial planet might orbit such that surface temperatures on the planet are suitable for complex life to exist and evolve. You might call it the Goldilocks zone - not too hot, not too cold, just right! This roughly corresponds to the region in which liquid water will exist on the surface. In addition, the eccentricity of the planets orbit should not take it outside this zone.

This range of orbits differs for different classes of stars, since the flux of radiation differs for stars of differing classes. The radius for a planetary habitable zone for a red giant star will be much further from the center of the star than it would be for a much smaller M class star. The stellar flux must also be relatively constant if life on the planet is to avoid intermittent extermination from freezing or sterilization due to overheating.

Time is a factor for planetary habitable zones as well. Bigger stars live and die in much shorter time than do lower mass stars like the Sun. Consider also that it has taken life about 3.8 billion years to evolve from start to intelligence, out of about 4.5 billion years Earth has been in existence.

It is interesting to note that of the 850 planets discovered to date, most are large planets in close orbits, so called "hot Jupiters". This is due almost primarily to the fact that our detection technology is most sensitive to these types of planets. There have been several smaller, probably terrestrial planets discovered at least two of these discovered by the Kepler satellite mission have been touted as being Earth-like planets orbiting a sun-like star.

The Keppler satellite has uncovered thousands of potential planets, which will require a considerable amount of additional observation to confirm them. Initial analysis



of the results however indicate that at least 17% of these candidate systems contain multiple planets, and 5.4% of the candidates are Earth-sized planets. What is not clear though, and will not be until many more of the candidates are confirmed, is how many Earth-sized planets are in the habitable zone. It is sure to be a smaller percentage.

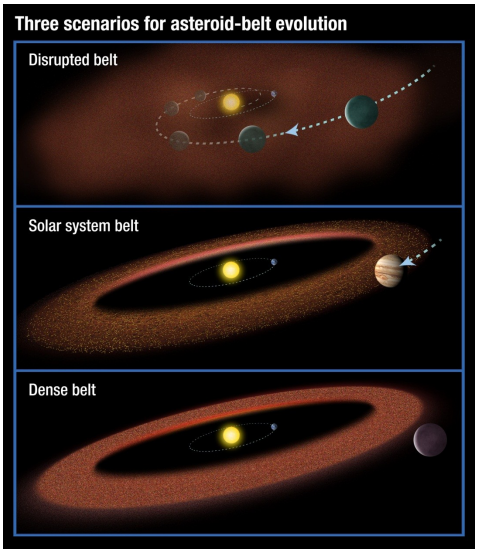
So what of our newest nearby neighbor? Alpha Centauri B is a K1 type star which is about 50% the size of the Sun and its primary star Alpha Centauri B, both of which are G2V stars. It seems to be the right type of planet to harbor life, but like Papa Bear's porridge which Goldilocks sampled, it's just too hot! Seems like at the neighbor's house, the lights are on, but no one is home.

For more on this subject see the Mike Simonsen's article on page 17 in the November, 2012 GuideStar . Also, see the article that begins on the next page about the Goldilocks zone. — Ed.

It Takes More Than Warm Porridge to Make a Goldilocks Zone

By Diane K. Fisher

The "Goldilocks Zone" describes the region of a solar system that is just the right distance from the star to make a cozy, comfy home for a life-supporting planet. It is a region that keeps the planet warm enough to have a liquid ocean, but not so warm that the ocean boils off into space. Obviously, Earth orbits the Sun in our solar system's "Goldilocks Zone."



Our solar system is represented by the middle scenario, where the gas giant planet has migrated inward, but still remains beyond the asteroid belt.

But there are other conditions besides temperature that make our part of the solar system comfortable for life. Using infrared data from the Spitzer Space Telescope, along with theoretical models and archival observations, Rebecca Martin, a NASA Sagan Fellow from the University of Colorado in Boulder, and astronomer Mario Livio of the Space Telescope Science Institute in Baltimore, Maryland, have published a new study suggesting that our solar system and our place in it is special in at least one other way.

This fortunate "just right" condition involves Jupiter and its effect on the asteroid belt.

Many other solar systems discovered in the past decade have giant gas planets in very tight orbits around their stars. Only 19 out of 520 solar systems studied have Jupiter-like planets in orbits beyond what is known as the "snow line"—the distance from the star at which it is cool enough for water (and ammonia and methane) to condense into ice. Scientists believe our Jupiter formed a bit farther away from the Sun than it is now. Although the giant planet has moved a little closer to the Sun, it is still beyond the snow line.

So why do we care where Jupiter hangs out? Well, the gravity of Jupiter, with its mass of 318 Earths, has a profound effect on everything in its region, including the asteroid belt. The asteroid belt is a region between Mars and Jupiter where millions of mostly rocky objects (some water-bearing) orbit. They range in size from dwarf planet Ceres at more than 600 miles in diameter to grains of dust.

NASA Space Place

In the early solar system, asteroids (along with comets) could have been partly responsible for delivering water to fill the ocean of a young Earth. They could have also brought organic molecules to Earth, from which life eventually evolved.

Jupiter's gravity keeps the asteroids pretty much in their place in the asteroid belt, and doesn't let them accrete to form another planet. If Jupiter had moved inward through the asteroid belt toward the Sun, it would have scattered the asteroids in all directions before Earth had time to form. And no asteroid belt means no impacts on Earth, no water delivery, and maybe no life-starting molecules either. Asteroids may have also delivered such useful metals as gold, platinum, and iron to Earth's crust.

But, if Jupiter had not migrated inward at all since it formed father away from the Sun, the asteroid belt would be totally undisturbed and would be a lot more dense with asteroids than it is now. In that case, Earth would have been blasted with a lot more asteroid impacts, and life may have never had a chance to take root.

The infrared data from the Spitzer Space Telescope contributes in unexpected ways in revealing and supporting new ideas and theories about our universe. Read more about this study and other Spitzer contributions at spitzer.caltech.edu. Kids can learn about infrared light and enjoy solving Spitzer image puzzles at spaceplace.nasa.gov/spitzer-slyder.

This article was provided by the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

Just Looking

A *GuideStar* Interview by Clayton L. Jeter

Erika Rix — Astro Artist

Have any of you visual observers sketched any of the faint fuzzies that you have seen through your telescope? It's really a great way to focus (no pun), study, and record these cosmic treasures. Since the 1980's I have worked on many of the Astronomical League's observing programs. Many require you to actually make a simple sketch of the object listed. I still have all of my drawings and recorded data in zippered 3-ring binders. It's a great reference.

But… there are a few observers who take sketching up a notch and into a fine art form. Meet this month's guest, Erika Rix that lives in nearby Austin, Texas...

The Erika Rix bio…

My husband, Paul, and I share our love of astronomy. Paul enjoys the imaging side of the hobby, and I'm a visual observer who sketches my observations at the eyepiece. After the purchase of our first telescope, it was the Moon that initially caught my eye and it wasn't long before my fascination with the Sun was sparked after having my first view through a hydrogen alpha filter while at a star party in Michigan. Deep sky came next with the purchase of my first Dobsonian. I became completely hooked, which meant my spare time, night and day, was absorbed with astronomy.

It didn't take long before pencil and paper accompanied me at the eyepiece. Sketching my observations is a very rewarding exercise by honing my observing skills, not to mention the relaxation I experience in the process. In an effort to give back to the community for all the assistance given to me since taking up this hobby, I've had the privilege of co-authoring two astronomical sketching books, *Astronomical Sketching: A Step-by-Step Introduction* (Springer-Verlag, 2007) and *Sketching the Moon: An Astronomical Artist's Guide* (Springer-Verlag, 2011), and I currently write and illustrate quarterly for the "Drawn to the Universe" articles in *Astronomy Now* magazine. I deliver astronomical sketching workshops and presentations for astronomy clubs and events, and in 2010, presented a solar sketching workshop at the Northeast Astronomy Forum & Telescope Show (NEAF) in Suffern, New York. Since moving to Texas from Ohio this past spring, I've joined the Austin Astronomical Society and have had great fun volunteering for outreach events as well as taking on the role of the club's newsletter editor for *Sidereal Times*.

The Erika Rix interview…

Clayton: It's great to have you with us this month for our monthly interview here at HAS. Thanks for your time and this super opportunity for your ideas to be shared with so many observers.

So I'll ask, can you really see more when you sketch rather than just peering into an eyepiece at a distant object?

Erika: Most definitely and it makes sense that you do. A quick five-minute view will only give you a quick impression of object. If you sketch it, you're forced to spend more time actually studying the object, using all your observing skills to tease out the details. What first might appear as a faint fuzzy oblong patch in the sky with a handful of bright stars may gradually become an irregular shape of structured nebulosity with an abundance of faint stars in the field of view.

Clayton: You stated your husband is into astrophotography… has he tried his hand with a pencil like yourself?

Erika: Although he used to draw when he was younger, he hasn't tried his hand with astro sketching. He's settled into the astrophotography side of the hobby and seems content. It's been nice having us both enjoying different faucets of the hobby and sharing them with each other.

(Continued on page 10)

(Continued from page 9)

Clayton: I bought your book last year, *Astronomical Sketching: A Step-by-Step Introduction*, and love it. I use many of your drawing tips (there are so many). What kind of feedback have you received from your book?

Erika: I've actually been a little overwhelmed by the positive feedback. We (the other co-authors and I) wanted to fill a gap with astronomy related books by creating an easy to follow astronomical sketching book so that others could see just how easy it is to sketch at the eyepiece. It's been wild hearing so many people recommend this book as a "must have" for anyone interested in astro sketching. When I moved to Texas this spring and attended my first Austin Astronomical Society meeting, I was chatting with a member and told him that I was a visual observer who enjoyed sketching at the eyepiece. Much to my surprise, he started recommending Astronomical *Sketching* to me, not aware that I was one of the co-authors.

Clayton: You seem to be very proactive in trying to spread the word to sketch what you see. Do you find that sketching at the eyepiece is becoming a bit more popular than say 20 years ago?

Erika: I don't believe I'd say it's more popular. Visual observers have been sketching their observations along with their observing notes for centuries. What I do think has changed over the past 20 years is the accessibility to share our sketches/observations and sketching techniques with others across the world. With the Internet at our fingertips, we can learn from each other and offer advice, encouragement, and ideas almost instantaneously. Sketching has other benefits, too, besides honing your observing skills. With the advancement of technology, it's sometimes a nice change to get back to basics. Also, a sketch will show a truer representation of what an observer can expect to see at the eyepiece.

Clayton: What exactly does a student learn at one of your workshops?

Erika: I've put together a few different workshops, each geared toward various celestial objects, such as lunar sketching, solar sketching, planetary, and DSOs. The workshops break down the sketching process into a step-by-step manner to remove the overwhelming feeling we sometimes get when attempting to sketch at the eyepiece. The attendees are shown a brief overview of sketching along with the media and accessories, such as lighting. A photograph of the object is projected in a PowerPoint Presentation for them to use as practice. Beside the photograph is a demonstration sketch that they can use as a guide. The demonstration sketch is built up with each slide to show the step-by-step process.

Clayton: Is a tracking scope (motor drive) necessary to make accurate sketches?

Erika: It's helpful, yes, but not necessary. My primary nighttime scope is a 16" reflector on a non-tracking Dobsonian mount. I can spend 2-3 hours on a lunar or DSO sketch with a rich star field, nudging my scope around and moving my observing chair inch by inch throughout the session. It becomes second nature to do so after time. On the other hand, it's really nice to use a tracking mount on occasion so that 100% of your concentration can be on observing and sketching rather than nudging your scope.

Clayton: What's your attraction to the night skies? Got a favorite object?

Erika: Gosh, I love it all. If I were to use just a couple words to describe my attraction to the night skies, it would have to be wonderment and peacefulness. Daytime skies provide warmth and the awe

(Continued on page 11)

(Continued from page 10)

of solar physics. The world around me just slips away. My favorite object would have to be either the Moon or the Sun – one has a stark peacefulness to it, the other alive with dynamic motion! I have to admit, though, that I'm a sucker for clusters.

Clayton: How would you like to see your own astronomy grow?

Erika: Outreach. After spending countless hours sitting behind an eyepiece by myself with no pressure to find an object at the drop of a hat or to (gulp) have to explain to others what various celestial objects are, I'm slowly coming out of my shell and am having a ball setting up my scopes for public outreach. There are no words to describe the look on a newcomer's face when they see Saturn for the first time or when you show them a distant galaxy and then explain to them about our own galaxy to put things into perspective. Outreach for children is absolutely the best. They love to learn and hopefully one or two will eventually pursue astronomy themselves.

Clayton: Why haven't you taken the astrophotography plunge? Or have you?

Erika: Ha. I love photography so wouldn't you think I'd enjoy astrophotography? I do play around with astrophotography by using my Rebel EOS with a scope on occasion. The problem is that I spend too much time doing trial and error with camera settings. In other words, it takes away from what I really enjoy, which is spending time viewing through the eyepiece. I'm fortunate that my husband is into astrophotography so that I can enjoy that side of the hobby vicariously through him.

Clayton: It seems in recent years that the younger people are not that interested in amateur astronomy, or any of the sciences. Is your club attracting any young members? How can we turn this around?

Erika: Our club really focuses on outreach and we have an amazing outreach chairperson, Dawn Davies, who works very hard on organizing and recruiting for those events. We just recently did outreach with cub scouts to help them achieve their belt-loops and astronomy pins. I truly feel outreach is one of the best ways to introduce sciences to our youth. We can go to the schools with our telescopes to offer solar or nighttime viewing, give hands-on workshops where they can draw celestial objects while learning about them in the process – basically anything that makes it fun for them to learn and spark their interest. I'll never forget my first introduction to the solar system sitting on a dark stage while my grade school teacher moved planets around her flashlight, the Sun.

Clayton: Do you have any helpful advice to pass on to observers just starting out in astronomy?

Erika: Join an astronomy club and go to star parties to learn first hand. Read equipment reviews and join astronomy forums. There is a wealth of information out there available to help guide us when choosing equipment. Start off with minimal equipment until you can determine what your astronomical interests are and then learn your equipment well before you purchase more.

Clayton: Is there an email address that you have that a Houston Astronomical Society member could contact you for an additional question or two?

Erika: Please feel free to contact me at erikarix1@gmail.com or via my website www.pcwobservatory.com. It would be great hearing from you!

Clayton: Thanks Erika for taking the time to share your interest and thoughts within our HAS newsletter, the *GuideStar*. We wish you luck with all of your astronomy interests. Please come visit our society when in the Houston area, we'd love to see you.

Erika: It's been a pleasure! Thank you very much for inviting me to the interview.

Clayton: Clear skies always

Clayton L. Jeter is an avid SCT visual observer and a longtime member of the Houston Astronomical Society. Contact him at: stonebloke@gmail.com

Observatory Corner

By Bob Rogers, Observatory Chairman

Hello everyone.

The work continues on the observatory upkeep and repairs. Allen Wilkerson has put in a lot of weekends at the site working on the Observatory and doing a lot of mowing. He has the place looking really good. Thanks Allen for your help. I would like to thank Clayton Jeter for coming out to the observatory and spending the afternoon cleaning the Lenses and Optics in the Observatory. I would also like to thank Chris Ober for his donation of an 80mm guide scope to the observatory.

I mentioned at the November HAS Business meeting about the observatory Committee's "Private Observatory" project. I will touch on this a little bit here, but will be giving a short presentation to the membership at the January meeting for those who are interested. The Observatory Committee will be providing a 12' x 12' piece of land for leasing for a member to install a private Observatory. The planning, design, and layout of the Observatory will be approved by the Observatory Committee along with a site User Agreement to be signed by the User, Observatory Committee Chairman and the President of HAS. The Observatory Committee will be providing a 10 amp power supply (110 vac) for each private observatory. The rates are set at $350 a year or $1,000 for a 3 year lease. The idea of this is not only to raise funds for the Observatory Committee and the upkeep of the facilities, but to also provide a way for members to leave their scopes out in their observatories already polar aligned and ready to use. If you have questions about this, you can contact me or wait untill the January meeting, after the presentation.

As Steve Fast has indicated, I will be changing the combination to the gates at the site on March 2, 2013. In order to get the new combination, that I will be passing out starting at the December HAS meeting, you will need to have your 2013 HAS dues paid and have taken the Site Orientation class. If you are interested in making a donation to the observatory, please do so when making you dues payment and let either Steve Fast or Don Selle know that you are donating to the Observatory Committee so the donation goes to the right place.

And the work goes on ….

I **do need** to remind everyone that we need to start filling out Log Reports at the site so I can give this information to the Fondren Foundation. The property is on a 99 year lease and part of the lease agreement is that HAS needs to report every year to the Fondren Foundation that the property is being used. The Log Reports are located in the box in the middle of the field. Just open the cover, fill out the report and then slide it into the slot that is in the inside of the cover and then close the box. It is very important that everyone fill out a Log Report so that we are showing that the observing site is being used. Your help on this is very much appreciated.

If you have a Randalls card, and have not done so, please have it coded for the Houston Astronomical Society. Our number is #6618. The Society gets 1% of the gross sales that members spend at Randalls. Randalls totals up the amount spent each quarter and will send us a check if the amount goes over $2,500.00, otherwise the total roles over to the next quarter or zeros out at the end of the calendar year. So please link your Randalls card to the Houston Astronomical Society so that the society can benefit from this Randalls program. Our number is #6618. This is very easy to do, just go to the Courtesy Booth and tell the person there what you want to do.

If you have any suggestions or thoughts for the site, let me know.

Thanks,

Bob Rogers

Observatory Chairman
281-460-1573
siteworkerbob@hotmail.com

Trailer/RV spots available free for weekend use at the site. **Contact the Observatory Chairman, Bob Rogers siteworkerbob@hotmail.com for more information**

Kids Outreach & Public Star Parties

By Alan Rossiter, coordinator

Event: Askew Elementary Star Party
Type: Elementary Science Night, with numerous organized activities. Telescopes outside + indoor astronomy activity.
Date: Tuesday, 11/27/2012
Time: 6:00 PM - 8:30 PM
Location: Askew Elementary, 11200 Wood Lodge, Houston, TX 77077 (west side of Houston, near Wilcrest @ Briar Forest)

Event: Tinsley Elementary "The Great Reading Campout"
Type: Elementary School Literature & Science Night. Numerous organized activities.
Date: Thursday, 11/29/2012
Time: 6:00 PM - 8:00 PM
Location: Tinsley Elementary, 11035 Bob White Dr., Houston, TX 77096 (southwest side of Houston, near Fondren @ West Bellfort)

Name: The Houston Arboretum Star Party
Type: Mostly Adults – Arboretum Members. An evening at the Arboretum. Food & Drink!
Date: Saturday, 12/01/2012 (Note date changed from 12/08/2012)
Time: 7:00 PM – 9:00 PM (tentative)
Location: Houston Arboretum, 4501 Woodway Drive

Name: Anahuac Nature Refuge Star Party
Type: Mostly Adults – Out in the country!
Date: Saturday, 12/15/2012
Time: 6:00 PM – 10:00 PM
Location: Anahuac Nature Refuge 4017 FM 563, Anahuac, TX 77514. Directions at: https://nightsky.jpl.nasa.gov/event-view.cfm?Event_ID=41692

Event: Arizona Fleming Elementary Math/Science/Technology Night
Type: Elementary School Science Night. Numerous organized activities.
Date: Thursday, 1/24/2013
Time: 6:00 PM - 8:00 PM
Location: Arizona Fleming Elementary, 14850 Bissonnet, Houston, TX 77083 (west side of Houston, Bissonnet @ Highway 6)

Event: Mission Bend Elementary Math/Science Night
Type: Elementary School Science Night. Numerous organized activities.
Date: Tuesday, Feb. 12, 2013
Time: 6:00 PM - 8:00 PM
Location: Mission Bend Elementary, 16200 Beechnut, Houston, TX 77083 (west side of Houston, Beechnut beyond Highway 6)

Event: Massey Ranch Elementary "Night Under the Stars"
Type: Elementary School Camp Adventure/PTA Fundraiser.
Date: Friday, February 22, 2013
Time: 7:00 PM - 9:00 PM
Location: Massey Ranch Elementary, 3900 Manvel Road Pearland, Texas 77584 (due south of Houston, just beyond Beltway 8)

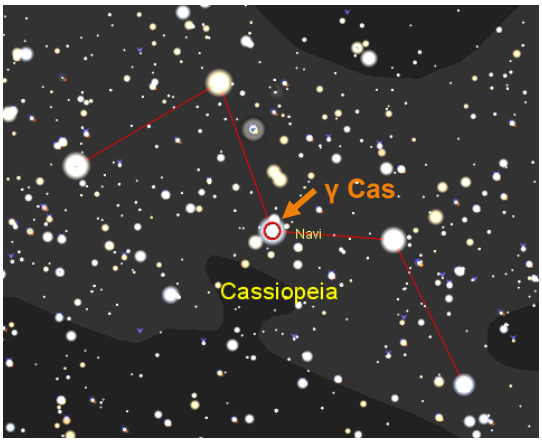
Event: Tents in Town
Type: Urban Overnight Camp for Kids & Parents. Numerous organized activities.
Date: Saturday, 4/06/2013
Time: 6:00 PM - 9:00 PM
Location: Zindler Park, 7008 South Rice, Bellaire, TX 77401

Details – especially times – are subject to change

Shallow Sky Object of the Month

γ Cas—Erupting Variable

Object: γ (Gamma) Cas
Class: Erupting variable star
Constallation: Cassiopeia
Magnitude: 2.15
R.A.: 00 h 56 m 43 s
Dec: 60 deg 43 min 00 sec
Size/Spectral: B Class
Distance: 613 ly
Optics needed: Easily seen with unaided eye.



The constellation Cassopeia, with γ Cas indicated

Star chart generated by TheSkyX © Software Bisque, Inc. All rights reserved. www.bisque.com

Why this object is interesting

Many stars have Arabic or Greek names; this one does not. Its Bayer designation is γ (Gamma). Astronaut Gus Grissom used the name Navi for this star, both because it was a good star for navigation and because it is his middle name, Ivan, spelled backwards.

It is easy to find in the W of stars that constitute the constellation Cassiopeia and is well placed for observing in December. It transits (is highest in the sky) at about 8:20 p.m. on December 15th. How bright will it be? If you go to the AAVSO.org web site and ask to see a light curve for this star, it's difficult to pick out much variation. What variation you do see may easily be the variation in observer's estimates of the brightness of the star. We know that in 1940, γ Cas dimmed to 3.4 magnitude.

Variable stars fall into many classes, and γ Cas is the prototype of a particular kind of variable. This class of stars are intermittently brighter than normal, usually at irregular intervals. The physics of stars that establish a ring or a sphere of obscuring gas are not well enough understood to be able to predict the maxima and minima of the star. While we may, in general, understand the mechanism, we aren't able to establish the day-to-day behavior of the star.

So, what's going on with Gamma Cas? The root cause of its variability is that it is rotating rapidly and casting off material that is obscuring the star and causing it to appear dimmer to observers. After some time, the obscuring material dissipates, partly due to the heat from its parent star and the star brightens again.

The rotational speed is such that it makes one complete turn in about 2.3 Earth days. This is quite remarkable considering that the Sun's rotation is 25.6 Earth days and that this star has a radius that is 14 times the Sun's radius.

Astronomers also observe high radiation from this star in X-Rays although no good explanation for this radiation has bee made. Studies of this high-mass star (over 19 solar masses) indicate that it has reached or is near reaching the end of its hydrogen burning (main sequence) phase. High mass stars like this one burn their fuel quickly and, as the star passes through subsequent phases of its life the burn rate increases. In the end, at the final stage of the star's life it has created an iron core. The iron core cannot be fused to create energy, and the star becomes a supernova.

Houston Astronomical Society

P.O. Box 20332

Houston, TX 77225-0332

General Membership Meeting

The Houston Astronomical Society holds its regular monthly General Membership Meeting on the first Friday of each month, unless rescheduled due to a holiday or a conflict with other events at the University of Houston.

Board of Directors Meeting

The Board of Directors Meeting is held on dates and at locations scheduled by the board. Information provided to *GuideStar* will be published. The meetings are open to all members of the Society in good standing. Attendance is encouraged.

***GuideStar* Information**

The H.A.S. *GuideStar* is published monthly by the Houston Astronomical Society. All opinions expressed herein are those of the contributor and not necessarily of Houston Astronomical Society. The monthly Meeting Notice is included herein. *GuideStar* is available on the HAS web site to all members of H.A.S., and to persons interested in the organization's activities. Contributions to *GuideStar* by members are encouraged. Electronic submission is helpful. Submit the article in text, MS-Word format via email BillPellerin@sbcglobal.net. Copy must be received by the 15th of the month for inclusion in the issue to be available near the end of the same month. Or, bring copy to the General Membership Meeting and give it to the Editor, or phone to make special arrangements.

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The Houston Astronomical Society welcomes you to our organization. The HAS is a group of dedicated amateur astronomers, most of whom are observers, but some are armchair astronomers.

The benefits of membership are:

- Access to our 18 acre observing site west of Houston -- a great place to observe the universe!
- A telescope loaner program -- borrow a HAS telescope and try observing for yourself!
- A monthly novice meeting, site orientation meeting, and general meeting with speakers of interest.
- Opportunities to participate in programs that promote astronomy to the general public (such as Star Parties at schools)
- A yearly all-clubs meeting for Houston area organizations
- Meet other amateurs and share experiences, learn techniques, and swap stories

You're invited to attend our next meeting.

You'll have a great time.

Houston Astronomical Society

Meeting on Friday, December 7, 2012

7:00 Novice Meeting, room 116 Science & Research 1 Bldg

8:00 General Meeting, room 117 Science & Research 1 Bldg

University of Houston

Directions to meeting:

From I-45 going south (from downtown)

- exit at Cullen Boulevard
- turn right on Cullen
- turn right into the parking lot (by the stadium)
- Science and Research is across the street (2nd building back)

From I-45 going north (from NASA/Galveston)

- exit at Cullen Boulevard
- turn left on Cullen
- turn right into the parking lot (by the stadium)
- Science and Research is across the street (2nd building back)

Parking:

There is Free Parking, **BUT DO NOT PARK IN ANY RESERVED PARKING SPACES AT ANY TIME.**
U of H parking enforcement will ticket your vehicle.

UPDATE — Due to construction in the stadium parking lot, use entrances 15D and 15F. You can park in this area, but NOT in a RESERVED space.