

GuideStar



June, 2015

Volume 34, #6

At the June 5 Meeting

Science Fair Winners & Texas Star Party Review

One of our favorite meetings each year is the presentations by the students who won awards from the Houston Astronomical Society from the Science Fair. The HAS has been awarding students who develop astronomy or space science projects for many years. Our members volunteer as judges for the science fair, attend the fair, see the students' presentations, and decide on winners. These students do some amazing work and you'll get to see it at this meeting.



Jayne Lambert and Amelia work on giving away prizes at the Great Texas Giveaway.

Also, the Texas Star Party happened from May 10-17, 2015. Were you there? Did you miss it? Either way, you'll want to see the review of the TSP by Steve Goldberg. There were several HAS members who either won awards (or door prizes). But everyone had a great time.

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.

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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.

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

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

Debbie Moran— “Astronomy Apps, Web Sites, and Software”

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

Science Fair Winners and Texas Star Party Review

*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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Annual Dues and Membership Information

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.

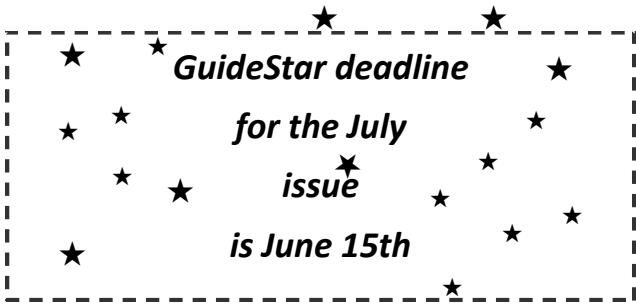
Membership Application:

You can join (or renew at the organization web site, www.astronomyhouston.org). Click the 'Join HAS' Tab.

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.

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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 Houston Community College Southwest Campus in Stafford, Texas http://www.fbac.org/club_meetings.htm. Novice meeting begins at 7:00 p.m., regular meeting begins at 8:00 p.m. Website: <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-mail bill.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

Novice Presentation—June 5, 2015

Astronomy Apps, Web Sites, & Software

By Debbie Moran

In June we will take a look at More Astronomy Programs, Apps and Web Sites, a subject I hope will also interest any of the Science Fair winners who come to join us for the main meeting.

Don Selle will introduce *Astroplanner*, a competitor to SkyTools that runs on Apple and Microsoft platforms.

If we find a replacement speaker to discuss an app or two, we will do that.

An example of an app useful to amateur astronomers is one called 'Darkness' available for IOS devices.

Screen shot at right.



Otherwise, I will add some information about useful astronomy web sites including those of the Astronomical League, the International Dark-Sky Association and skymaps.com.

President's Message

by Rene Gedaly, President

I hope you're planning to get to the June membership meetings. June is when we hear from Greater Houston's junior and senior high school students who won awards in astronomy. These are the awards HAS confers each year at the annual Science & Engineering Fair. There's something that rekindles the wonder in all of us seeing the next generation so passionate about science, especially when it involves some aspect of astronomy. These days it's all about STEM, and astronomy has always been a fun and more accessible doorway into the sciences. Come out and support these budding science enthusiasts. You're sure to learn something, too.

We also get to hear about the doings at the Texas Star Party. Steve Goldberg is back with his TSP Wrap Up which promises to be a visual feast. I'm really looking forward to it so I can see what—and who—I missed. Many, many HAS members attended this year with a significant number volunteering and giving talks. Although I did attend TSP 2015, it was only for a few nights and this year I stayed offsite. That may work for some, but it's just not the same as being in the thick of it, day and night. There's no comparison either to being able to stay up all night knowing your bed is just a short stumble away. Are there wall outlets in the bunkhouses for CPAPs?

HAS Member Awarded Omega Centauri

One very special event I did not miss was the Omega Centauri Award. In case you don't know, the Omega Centauri is awarded to that person who has most demonstrated dedication to the outreach, promotion, and education of the public in astronomy. It's a really big deal. There were many fine nominees, but this year's recipient is an in-demand speaker on astronomy in schools and at civic events, a champion defender against light pollution, a lead science fair judge, takes astronomy outreach to a global audience, and is a speaker at TSP, in fact, gave a talk at the first ever TSP AstroLearn Workshop, geared to the novice observer. You guessed it. This year it was my distinct privilege as president of the Houston Astronomical Society to present the 2015 Omega Centauri Award to our own Debbie Moran.



Rene Gedaly and Debbie Moran

backdrop banners. You'll see one with the HAS logo behind Steve Fast as you pick up your name badge. A gift from an anonymous donor, it was the brainchild of Rob Morehead, our video guy. (Now weren't the videos a great idea? Approaching 2000 member views and counting.) Rob thought astronomy themed banners would dress up the place, give us some much needed branding, and serve as a fitting backdrop to highlight the talent, knowledge, and accomplishments of our speakers. In case you don't recognize its orientation, the background photo printed across all three banners is a blowup of a Hubble image taken in 2007—a segment of The Veil Nebula in Cygnus.

We also need to give a shout out to FastSigns of San Antonio. Christine Knight, the print shop owner and spouse of member Chris Ober, did a beautiful job. If you've been to the dark site, you've seen other examples of her work, many donated by FastSigns, such as the address signs on the entrance and exit gates, the logo on the side of the observatory, the notices at the exit and entrances, the emergency procedure on the Dob shed, the reflective exit signs... And the memorial plaque for Bob Rogers, past director of the HAS Observatory. The bronze plaque unveiled at last year's Founders' Day event was also procured from them. HAS members are the best.

Keep Looking Up

..Rene Gedaly

President

Banner Headline

And while you're at the meeting, be sure to check out the speaker

June/July

Calendar



Date	Time	Event
June		
2	11:19 a.m.	Full Moon
5	7:00 p.m.	HAS Novice Meeting, U of H
	8:00 p.m.	HAS General Meeting, U of H
6	1:00 p.m.	Venus at greatest elongation east
9	10:42 a.m.	Last Quarter Moon
11	1:00 p.m.	Asteroid 2 Pallas at opposition
13		Prime Night Star Party, Columbus
16	9:05 a.m.	New Moon
21	11:38 a.m.	Summer solstice
24	6:03 a.m.	First Quarter Moon
	12:00 p.m.	Mercury at greatest elongation west
29	5:00 p.m.	Asteroid 1 Ceres at opposition
30	10:00 p.m.	Venus 0.34 deg. S.W. of Jupiter

July

1	9:20 p.m.	Full Moon
6	5:00 a.m.	Pluto at opposition
8	3:24 p.m.	Last Quarter Moon
10	7:00 p.m.	HAS Novice Meeting, U of H
	8:00 p.m.	HAS General Meeting, U of H
15	8:24 p.m.	New Moon
21	7:00 p.m.	HAS Board Meeting, Houston Arboretum

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

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

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.

Meetings are held at the Houston Arboretum at 7:00 p.m. on the date specified.



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.

Event Notification or Cancellation

- ★ HAS uses [RAINEDOUT.NET](#) to communicate late breaking updates about our various events. . Message delivery is via text messaging and e-mail. There are several ways to subscribe. If you would like to receive these notices via text messaging directly to your phone, subscribe to any of the sub-groups which interest you as follows:

- ★ To receive text messages, send any or all of the following
- ★ (one at a time) to **84483**

- ★ You will receive a confirmation message back for each successful enrollment.

<i>Text Message</i>	<i>Alerts about...</i>
OUTREACH	Public Outreach Events
STARPARTY	Members Only Star Parties (HAS observing site)
URBAN	Urban Observing Events
MEETINGS	HAS Meetings

- ★ You may also enroll your phone numbers or individual e-mail addresses via the website:

★ Here's a shortened link to get you there: <http://goo.gl/evrGsR>

★ For more information, please visit www.BainedOut.net

- ★ RainedOut notices will also automatically be sent to our e-mail list. Note that regular e-mail list conversations are not part of RainedOut communications and will not be sent to your phone as part of this service. Instructions to sign up for the e-mail list (a great way to keep your finger on the pulse of the club) are found here:

★ <http://www.astronomyhouston.org/about/email-list>

Observations... of the editor

by Bill Pellerin, GuideStar Editor

Back from the Texas Star Party

We made it, there and back. It was a long trip, as always, but a fun one. Here is my review of the week.

Awards — HAS Member Debbie Moran received the Omega Centauri award for her efforts in outreach. This award is well deserved for the work Debbie has done with students locally and in foreign countries. Amelia Goldberg won an Amateur Telescope Maker award for her outreach telescope (see article in this *GuideStar*). Steve Grimsley won for best deep space photo with some excellent entries and against tough competition.

Door prizes — A great list of door prizes this year, including three significant telescopes — a Celestron 8" SCT, a 4" Explore Scientific refractor (won by Robert Reeves of San Antonio) and a 14" Sky Watcher Dobsonian (won by HAS member Walt Cooney). Bill Flanagan won a nice pair of 8x42 Celestron binoculars and Bill Pellerin won the first two books of the *Annals of the Deep Sky* by Dennis Webb and Jeff Kanipe and a copy of *The Arp Atlas of Peculiar Galaxies* by the same authors. Any other winners within the HAS?

Weather — The weather didn't cooperate with the observers this year. The first day of the TSP, Sunday, May 10 was very good, as was the last day, Saturday, May 17. Between those two dates we had clouds either early or late or all night. Some periods of brisk winds, too. On the clear nights the temperature got down to about 46 degrees. A bit chilly. And, believe it or not, there was one night when the dew was so bad that it formed on my observing table — rare for the typically dry air of West Texas.

Observing — Since clear skies were few the observing opportunities were more limited. Larry Mitchell, who creates the 'Advanced Observing Program' reduced the requirement for completing the list from 20 objects to 15 objects to compensate for the reduced observing time. Still, there were observers who completed his list and the John Wagoner list. John wasn't at TSP this year and the development of the list was completed by HAS member Clayton Jeter.

Vendors — For those of us who have been coming for several years the number of vendors present and the range of goods available has shrunk considerably. There are fewer products for purchase from fewer vendors. This is not to denigrate the vendors who were there. There were some nice products, including optics, books, and accessories available for purchase.

West Texas — looked as green as I've ever seen it, meaning that they have had some rain.

The Prude Ranch — Change comes slowly to the Prude Ranch and there weren't any significant changes this year. The menu was quite literally the same as last year... the menu posted said 'Texas Star Party 2014'. The food was generally good, I'd say.

The evening speakers — An excellent list of evening speakers were at the TSP this year, highlighted by Alan Dyer (author of several books and reviewer of telescope equipment), Taft Armandroff (Director of the McDonald Observatory), Fred Espenak (author of 'Awesome Eclipses: a 2017 Preview'), Michael Endi of UT (Alien Planets), and Charlie Warren (editor of Amateur Astronomy magazine) discussed '21 Years of Amateur Astronomy'.

The daytime speakers — included Larry Mitchell on his Markarian Galaxy observing list, Dennis Webb on his books, Robert Reeves on his *365 Days of the Moon*, and others.

Chinati Foundation — Not astronomy related. Lori and I went to the Chinati Foundation in Marfa to see a new art installation by Larry Bell. Short story — If you haven't been to this facility, check it out while you're in West Texas for the 2016 TSP.

Until next time...

clear skies and new moons!

..Bill

Review of...

Annals of the Deep Sky

By Bill Pellerin, Editor

As I mentioned in my 'Observations of the Editor' column, I won (at the TSP give away) the first two books in Dennis Webb's and Jeff Kanipe's new *Annals of the Deep Sky* series.

I was very pleased to get these splendid books and I want to tell you why you should get copies for your library.

The books are organized by constellation, in alphabetical order. So, as you might expect, the constellations visible from our latitude will be dispersed among the volumes. Some folks suggested to me that the constellations should be arranged in order of declination, beginning with, say, Ursa Minor and continuing south. I don't know how practical that would be, and in any case it presumes that the reader already knows, generally speaking, the declination of the constellation that he or she is interested in.

I like the organization of the book(s) because I can find a constellation easily in the book if I know its name. The other thing to know about the books is that the initial two are the first of a series of, perhaps, 20 or more books. When I talked with Dennis at the TSP he wasn't sure about how many books it would take to complete the set. He didn't dispute my estimate of 20 books, however.

The first book begins with a 24 page 'Introduction to Basic Astronomy'. Much, if not all, of the information on these pages will be known by amateur astronomers already, and it seems unlikely that beginners

would buy this series. Nevertheless, the text constitutes good introductory information which is, if not new to some of us, a good review of basic knowledge.

This is followed by a chapter called 'Descriptive Astrophysics'. This 92 page chapter digs deeper into the history and science of astronomy and is worth reading. Astronomy can't be well understood without understanding the role of the people who made the discoveries that we all take for granted today.

On page 123 we're at our first constellation, Andromeda, which begins with a description of the constellation, a bit of the lore associated with the constellation, then goes on to provide observers information on when the constellation is visible. Following that are lists of all types objects available in the constellation. Interestingly, and not usually included are descriptions of some of the stars in the constellation and H-R diagrams showing the color / luminosity of the star. It takes 92 pages to get through all of the discussion of the Andromeda constellation, so, you can well imagine the range of objects and the detailed descriptions of these objects that appear in this text.



Dennis Webb and Jeff Kanipe, authors

One feature of the books that I *really* like is that some objects have a paragraph titled 'Contemplative Observing'. This is an idea that I have been trying to foster in my 'Stellar Evolution' Astronomical

League program and in the 'Shallow Sky' article in the *GuideStar*. The idea is this — some of the features of a star or a star system can't be observed, even by professional telescopes. But these features are known and can be thought about when completing the observation.

An example of this from the book, is Z And which has as components a white dwarf which is stealing matter from its companion, a red giant. You won't be able to see the white dwarf or the accretion disk, but you'll know when you're looking at the star what is going on. The magnitude range of the star system is 7.7 to 11.3. Check AAVSO for its current magnitude.

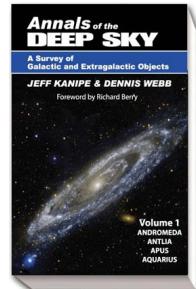
Even the constellations you won't be able to see from here are worth the read.

Even though I'm just getting started with these books I'm excited about the possibilities they offer — learning the sky, learning a bit of astrophysics, and making observations of objects I never considered before.

Check out this month's 'Shallow Sky' article. It will discuss an object from volume 2 of this series.

These books are available at the Willman-Bell (publisher) web site with an introductory discount through July 1. Highly recommended.

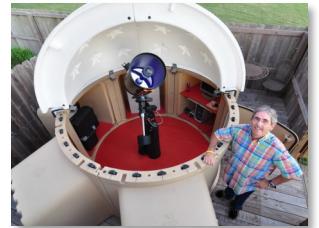
<http://willbell.com/HANDBOOK/Annals.html>



Just Looking

A GuideStar Interview by Clayton L. Jeter

Debbie Moran—Omega Centauri Winner



Editor — Debbie Moran is the winner of the 2015 Texas Star Party Omega Centauri award for outreach.

This month's interview is none other than our very own Debbie Moran. I first met Debbie out at our dark site near Columbus in about 1986. It was 'Open House' that summer evening and she was in our clubs observatory using one of the telescopes. She was also



Debbie Moran

showing the guests (including me) the many constellations in the sky. Debbie turned to me and asked if I had ever seen Sagittarius. I told her no, and she proceeded to explain that it appeared as a teapot with steam rising out of its spout. I looked at it and BOOM....I was instantly hooked on amateur astronomy. It was Miss Moran who hooked me into this wonderful hobby. Thanks again Debbie.

So...let's learn about her and her love of the cosmos. Here's Debbie...

The Debbie Moran bio...

Debbie Moran has had a lifelong interest in astronomy, seeking out all the books she could find on the sky from an early age. She grew up in Midland, Texas under beautiful skies until moving to Houston at the age of 12. A member of the Houston Astronomical Society since 1980, she enjoys sharing her love of the stars with new members as Novice Chair and continues to be involved in community outreach. She is also a frequent volunteer telescope operator at the George Observatory in Brazos Bend State Park.

She served as treasurer of both the HAS and the Astronomical League for a number of years in the past. In her late 20's she discovered the NASA test subject program quite serendipitously and moonlighted there for six years doing motion sickness studies, simulated zero-G flights and once dined only on space shuttle food and water for a month as part of an 11 week food study.

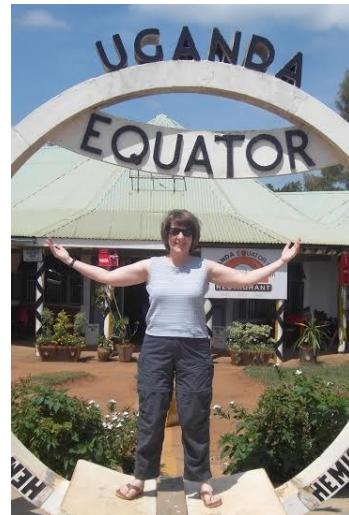
She is now enjoying more time for astronomy and total solar eclipse chasing around the world since retiring from the Houston Symphony violin section in 2010.

The Debbie Moran interview...

Clayton: Thanks Debbie for chatting with us here this month. Let's start...

First things first: I have to know; space food and water for a month? How much weight did you lose? Just kidding...how was the quality? Give us several examples on what was served.

Debbie: Actually all of us in my group lost 2 pounds (NASA wanted to know). It was very much like eating dehydrated backpacking food with a few MRE's (military meals ready to eat) thrown in. Hungarian Goulash was the best. Instead of bread,



Uganda eclipse trip of 2013 at the equator marker

they use soft tortillas which create fewer crumbs. So I had quite a few chicken teriyaki wraps. The food is slightly ever-so-much-more-so flavored apparently because taste perception is a bit deadened in space. My favorite dessert was the strawberries which looked just like dark pink Styrofoam cubes before you added water after which they magically morphed into some pretty decent stewed strawberries. The study used 12 women because they figured men would never comply. Before and after the four weeks of space food, we had to weigh everything we ate. I was going into restaurants carrying my regulation NASA food

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(Continued from page 8)

scale. My best friend knows to this day that I use 39 grams of milk in my coffee.

Clayton: Didn't you tell me once that it was your dad that encouraged you into this hobby of astronomy? Tell us how it all began for you.

Debbie: Yes, I still remember Dad sitting me down with the flashlight and an orange to show the Earth lit by the Sun. The amazing thing is finding out who instilled the interest in my dad. His father was a businessman and I just couldn't see him being into it so I finally asked Dad recently where he got his general interest in science. Turns out it was the sweet stay-at-home mom I had always heard about. I never knew my grandmother because she died soon after I was born, but she sat my dad down with books about the sky when he was a kid. My dad's youthful claim to fame was writing Albert Einstein to ask him to clarify how the edge of a rotating disc approaching the speed of light would behave and getting a short signed letter back.

Clayton: When did you become so enthusiastic in public outreach? You seem to be everywhere in many schools in the area showing kids, teachers, and parents the night sky. It's got to be a total desire for you.

Debbie: I have been doing that since I was first Education Chair quite a few years ago and fell in love with it. I remember being rather nervous for my first talk which was to 400 fourth to sixth graders...all the classes in the auditorium, but I found that the slides, (and they really were slides back then), pretty much told me what to say. My all time favorite comment was toward the end of a talk about the legends of the constellations. Finally a Norman Rockwellian kid raised his hand and said, "Is this all fake?" My other favorite experience was three year old Sadie who was terrified to look through my deck scope at Saturn at the George Observatory. After tears and much coaxing she finally took a peak. After that about every fifth or sixth person in line turned out to be none other than Sadie!

Clayton: It seems in recent years that the younger people are not that interested in amateur astronomy, or any of the sciences. Are you gaining in your outreach? Have children from a past school star party joined HAS to your knowledge?

Debbie: I can't say for sure that they have. I was able to go outside my home as a kid and see a pretty decent sky, but I don't think today's kids can. They have little access to the sky and don't get that sense of wonder early on. If possible, I like to let kids handle my telescope and actually point and focus it. There were some girls at one outreach party who were pretty excited about that and we happened to have a wonderful Saturn that night. I hope there was some spark there.

Clayton: Are you in any way proactive in trying to save our night skies from our ever encroaching light pollution?

Debbie: Yes, I lobbied hard, first my homeowner's association and then the City to get full cutoff (shielded) decorative street lighting when I found out we had requested acorn street lights which are very high glare. But the City had decided that their calculation method would not allow full cutoff within city limits due to minimum spacing requirements. Mayor White even arranged a conference call between Lt. Col. Robert Gent, then head of the International Dark-Sky Association, and the head of Public Works at the time, but they still denied us. Then we had a delay before the north half of the subdivision was done and we tried again. This time we succeeded, but only after being required to fund our own lighting study which found the spacing was fine and paying 20% more. The city will soon install LED street lights everywhere which may help with light pollution, but I am now concerned about their relatively white color choice of 4000K. The International Dark-Sky Association is recommending a warmer 3000K or lower with no blue light component at all to reduce glare and light scatter and improve human and wildlife health. That is vital at least in residential areas where people are sleeping. Write those letters if you concur!

Clayton: Tell us a bit about your observing technique in the field. What scope design do you use? Do you log what you observe? Photos too?

Debbie: I started out with a C5 Schmidt-Cassegrain which I still have, but now do most of my observing with an 8 inch F7 home built Dobsonian telescope by Bob Kirschenmann who ground a spectacularly good mirror. I just use a Telrad finder and still use paper atlases...no computer programs or GoTo's. I have been making my way through Herschel objects mostly at the Texas Star Party since I have not been doing enough of my own observing throughout the year. I do log those. I have done almost no photography except a few wide field shots that

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came out well, most notably a multiple exposure of a partial lunar eclipse back in the 80's. It won Best Solar System at the Texas Star Party that year, but no way could I compete in this day and age.

Clayton: How did you find HAS back in 1980? No Internet then!

Debbie: OK, that is quite a story. I had just graduated from college and was practicing violin at my parent's home when my mom knocked on my door and said she couldn't believe it, but she had the president of the HAS on the phone and I should talk to him. Apparently she had been trying to call a friend's son or nephew named Steve Goldberg who was supposed to be a graduate student in the astronomy department at Rice...to ask him if he knew of a club. When she went down the phone book, she got our own Steve Goldberg, who said that no, he is not an astronomer at Rice, but he *is* the president of the Houston Astronomical Society, and the rest is history.

Clayton: Tell us about one observing session that stands out in your mind that was a sheer delight for you.

Debbie: In 1986 I took the museum's trip to Chile to observe Comet Halley. Because there were not too many experienced astronomers, I was given the museum's C8 to show the southern sky to the public for a couple hours and then had it to myself for the rest of the evening. One night the nucleus of the comet passed extremely close to a field star and I watched it literally glide past the star. It was wonderful.

Clayton: What's new out at the George Observatory in Fort Bend County?

Debbie: By now I hope everyone knows that a brand new 36 inch mirror has just been installed in the Ritchey-Chretien in the main research dome. I can't wait to take a peek.

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

Debbie: Good question. I am still learning how to be a better visual observer...how to identify field stars in the eyepiece definitively when looking for more elusive objects in the middle of nowhere. And I will probably take the next step and look for a little more aperture for the future. I like to tease observers at the Texas Star Party who go out under pristine skies to spend a week looking at nothing but a few photons in their admirable quest to go where no one has gone before. I still like to see what I am looking at and I am far from having seen it all.

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

Debbie: Just start from the beginning. Get out there and learn constellations first...I like H A Rey's *Find the Constellations* best, then find some binocular objects which will prepare you for using a telescope finder, and only then finally get a telescope after look-

ing through those owned by others or trying out some from the loaner program.

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

Debbie: Yes, debbiemoran@earthlink.net

Clayton: Thanks Debbie for taking the time to share your interest and thoughts within our HAS newsletter, the *Guide Star*. We wish you luck with all of your astronomy interests. Thanks too for all of the hard work that you provide to our society and public outreach in our area. You're a keeper!

Debbie: I have really been enjoying the club these days and all the vibrant new members we have been seeing. It has been my pleasure to be in a position to meet many of you. I like to tell people that I learned everything I know about observing from joining the club. Many thanks to all those who helped me out when I was new.

Clayton: Clear skies always...

Note: This interview was conducted prior to Debbie winning the Omega Centauri Award.

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

Astraea—The Star Maiden

by: Amelia Goldberg

This article is about my telescope for public outreach, mostly at elementary and middle schools and the George Observatory.

When I was given this telescope, it was in pretty bad condition and took a lot of work to turn it into a usable telescope. I decided that I wanted it to be a special telescope, one that would attract young girls. I turned to Greek mythology for a name for the telescope. I chose Astraea because in Greek mythology, Astraea means "Star Maiden" or "Star Goddess". She was believed to be the daughter of Zeus and is said to be the last of the immortal gods to live among humans at the end of the Golden Age. She later abandoned earth as the increasing violence and ignorance became too painful for her to bear. When she returned to the heavens, Zeus placed her in the sky as the constellation, Virgo.



I painted the telescope pink to denote that she is female and because most young girls like that color. Using the mythological background of Astraea, I decorated the telescope. I placed her name on the scope using black letters. Since little girls love bling, I blinged her up with jewels befitting a goddess. I used black Swarovski crystals to draw the constellation, Virgo, above her name and to draw an imaginary star field around the black words, "The Star Maiden". I gave her a necklace of pink crystals. Astraea is pink and she sparkles. What more could you ask for?

So far, I have only had Astraea out at three star parties, two at schools and one at the George Observatory. Usually, these school star parties are held during the month when the moon is easily visible, even before dark. Also, there is ample light around the school so that the telescopes are easily seen even if there is no Moon in the sky. Therefore, the kids can see the details on the telescope. Astraea is a real hit and attracts not only girls but boys and adults as well. During the session at the George, one mother came up to the telescope and told me that she had tried to get her three year old girl to look through one of the other telescopes on deck and the little girl refused. She pointed at my telescope and said, "No, the pink one!" To me, that was just priceless. Both young girls and young boys say that it is "sooo cool" and most of the older kids and adults say that it

is just awesome. I knew that little girls would love the telescope but I was totally amazed at the reaction of boys and adults to the scope, they like it, too.

I took Astraea to the Texas Star Party this year and entered her in the ATM review. I received a Certificate of Merit for ATM- Outreach Telescope Design & Build. I was very pleased with that exposure of the telescope to those who had not seen it out on the upper field.

I have received only positive comments about the pink telescope. At TSP, many of the people that I talked with hope that I've



started a trend with this telescope and hope that others will follow suit. Who knows, we might start seeing telescopes of all colors and all kinds of decorations. I certainly hope so. It is a real joy to

do outreach with this telescope. The kids love looking through it and I'm having so much fun. We need to do anything we can to attract young people, especially young girls, to astronomy and to make it fun for them. They will certainly remember looking through this telescope.

The "G" in GOES Is What Makes It Go

By Dr. Ethan Siegel



Going up into space is the best way to view the universe, eliminating all the distortionary effects of weather, clouds, temperature variations and the atmosphere's airflow all in one swoop. It's also the best way, so long as you're up at high enough altitudes, to view an entire 50 percent of Earth all at once. And if you place your observatory at just the right location, you can observe the *same* hemisphere of Earth continuously, tracking the changes and behavior of our atmosphere for many years.

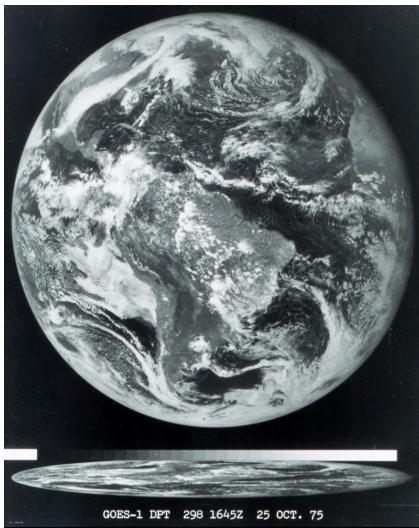


Image credit: National Oceanic and Atmospheric Administration, of the first image ever obtained from a GOES satellite. This image was taken from over 22,000 miles (35,000 km) above the Earth's surface on October 25, 1975.

Editor's note: There are cloudy skies over Houston in this photo! (The moon phase was waning gibbous.)

The trick, believe it or not, was worked out by Kepler some 400 years ago! The same scientist who discovered that planets orbit the sun in ellipses also figured out the relationship between how distant an object needs to be from a much more massive one in order to have a certain orbital period. All you need to know is the period and distance of one satellite for any given body, and you can figure out the necessary distance to have any desired period. Luckily for us, planet Earth has a natural satellite—the moon—and just from that information, we can figure out how distant an artificial satellite would need to be to have an orbital period

that exactly matches the length of a day and the rotational speed of Earth. For our world, that means an orbital distance of 42,164 km (26,199 miles) from Earth's center, or 35,786 km (22,236 miles) above mean sea level.

We call that orbit *geosynchronous* or *geostationary*, meaning that a satellite at that distance always remains above the exact same location on our world. Other effects—like solar wind, radiation pressure and the moon—require onboard thrusters to maintain the satellite's precisely desired position above any given point on Earth's surface. While geostationary satellites have been in use since 1963, it was only in 1974 that the Synchronous Meteorological Satellite (SMS) program began to monitor Earth's weather with them, growing into the Geostationary Operational Environmental Satellite (GOES) program the next year. For 40 years now, GOES satellites have moni-

tored the Earth's weather continuously, with a total of 16 satellites having been launched as part of the program. To the delight of NASA (and *Ghostbusters*) fans everywhere, GOES-R series will launch in 2016, with thrice the spectral information, four times the spatial resolution and five times the coverage speed of its predecessors, with many other improved capabilities. Yet it's the simplicity of gravity and the geostationary "G" in GOES that gives us the power to observe our hemisphere all at once, continuously, and for as long as we like!

Photos from the Texas Star Party 2015

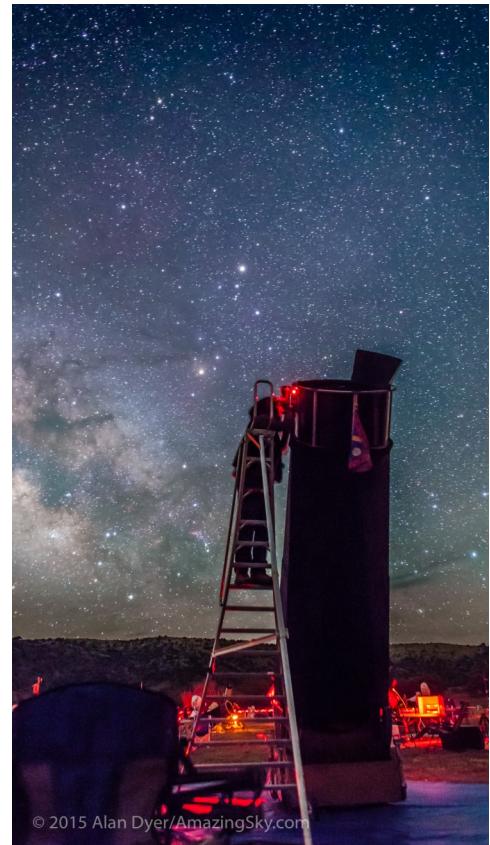
Photos by Alan Dyer

Alan Dyer, one of our speakers at the Texas Star Party provided us with these images to share with you. The bottom image is a composite of the sky image and the ground image. This was done to compensate for the difference in quantity of light coming from the sky and from the observing field.



This technique and others are described in Alan's ebook (for iPad only) *NightScapes* and *TimeLapses* available on the Apple.

Photos: Courtesy Alan Dyer © 2015 / www.amazingsky.com



UT Astronomy

A Leap Forward in the

Search for Life on Other Planets

By Darby Kendall, UT

Space aliens. Little green men. Life on far planets.

From time out of hand, humankind has wondered whether life exists beyond Earth. For over 25 years, William Cochran has been trying to answer that question, and rapid advances in technology for scanning the cosmos today may have pushed his goal within reach.



Professor Bill Cochran in front of a telescope on top of the Robert Lee Moore Hall at the University of Texas.

Cochran and other professors hope to make improvements to another telescope at the McDonald Observatory that will aid the search for life on other planets. Photo by Kiera Dieter/Reporting Texas

ets, so why can't we assume they all have life?"

The very question marks a giant leap forward for science.

Until the early 1990s, researchers weren't even sure whether planets existed outside our solar system. Now, thanks to Cochran and his fellow pioneers at NASA's Kepler mission and at observatories around the world, we know there are tens of thousands of "exoplanets" in and beyond our own Milky Way galaxy.

Cochran and UT colleagues Phillip MacQueen and Michael Endl are advancing that search at the McDonald Observatory in Fort Davis, in West Texas, where their ground-based program uses state-of-the-art spectrography to detect planets that are most like Earth and therefore most capable of supporting life as we know it.

Spectrographs work by measuring the slight motion of stars that are often thousands of light-years away. Individual planets are invisible at such distances. If the star's path wobbles, however, scientists theorize that gravity from an unseen planet is tugging on it. In measuring the movement, the spectrograph will tell Cochran and his team the size of the planet doing the tugging.



The UT team expects its study to benefit from \$500,000 of improvements to McDonald's 20-year-old Hobby-Eberly telescope that come on line this year and will help them draw a sharper bead on their exoplanet clientele.

"We're very interested in finding rocky planets in the habitable zones of stars," said MacQueen, a UT astronomy professor and chief scientist at the McDonald Observatory, because that is where researchers believe they stand the best chances of finding signs of life.

UT researchers also have been using the Hobby-Eberly telescope to collect data on a million galaxies that are up to 11 billion light-years away, information likely to yield the most detailed map of the universe ever produced. Funding for both Hobby-Eberly efforts comes to \$33 million.

Cochran, 64, credits NASA's 25-year, \$600 million Kepler mission with kickstarting the field of exoplanet discovery. In addition to his university duties, he has spent much of the last two decades working as a co-investigator on Kepler, which is named after the pioneering 17th Century German astronomer Johannes Kepler. Since 2009, the Kepler space telescope has been orbiting our sun every 372.5 days and has spotted 4,000 exoplanets, 1,019 of which have been confirmed by other telescopes.

Astronomers now estimate the number of stars in the Milky Way at hundreds of billions, and each star could have at least one or two planets orbiting them. "There has to be life out there somewhere else," Cochran said. "It's kind of scary to think we're as good as it gets."

(Continued on page 15)

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The planet Kepler-22b, for instance, was detected by Kepler and confirmed at the McDonald Observatory in 2011. That particular world, 600 light-years from Earth, was the first transiting exoplanet to be found within the habitable zone of a sun-like star, meaning it has great potential to support life.

The Kepler telescope works by taking snapshots of the same patch of sky, day in and day out, for years. Because planets far off in the universe are too small for a telescope to detect, Kepler instead looks for “transits”—planets crossing in front of a star that temporarily block its light. When the light dims during one of Kepler’s 30-minute scans, scientists know they’ve discovered an exoplanet.

Public opinion polls consistently show that more than half of Americans surveyed believe extraterrestrial life exists. Yet Cochran warns that such life, if and when it’s discovered, is more

likely to take the form of micro-organic ooze than *Star Wars* aliens.

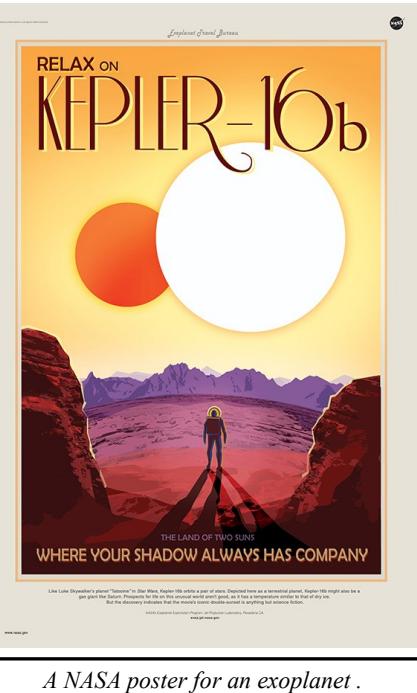
“Life developed very quickly on Earth,” Cochran said. “But for most of that time, the life was microscopic.” Intelligent life, he says, formed slowly, and that is likely to be the case at other cosmic addresses.

Efforts to find Earth-like planets and any alien life pasturing there are doing more than just working to answer the age-old question, “Are we alone?” They also help scientists better understand our own solar system and the sun that allows Earth to sustain life.

“We want to understand the diversity of planetary systems that have formed,” Cochran said. “That can help us to understand the process of star formation in general.”

Cochran’s fascination with astronomy began when he was a boy growing up outside of Schenectady, N.Y. While studying physics at Duke University as an undergraduate, he decided to make a career out of his passion. “I figured if I can actually get paid to do my hobby, well, it would be great,” Cochran said. “What else do I want in life?”

Cochran received his Ph.D. in astrophysics from Princeton University in 1976 before coming to UT as a post-doctoral fellow. Although



A NASA poster for an exoplanet .

Credit: NASA

Cochran joined NASA’s hunt for exoplanets in 1995, he was detecting them on his own time years before. In the late 1980s, a small community of astronomers, including Cochran, discovered exoplanets by surveying the movement of stars.

“Cochran got involved in the Kepler mission because he was already very well known for his work on exoplanets,” MacQueen said.

Few expected Kepler to find such a huge number of planets. “It is absolutely astounding that the Kepler telescope has found over 4,000 planets around other stars,” said Geoff Marcy, an astronomy professor at the University of California at Berkeley. “Incredibly, most of these stars are roughly the size of our Earth, or somewhat larger by two or three times.”

“The universe is lousy with Earth-size planets,” Marcy said.

The next advances in telescope technology may allow scientists to zero in on which exoplanets contain life, such as Kepler-22b. NASA’s \$8.7 billion James Webb Space Telescope, set for completion in 2018, will survey the chemical signatures of Earth-like planets from space to judge whether they might have life. The telescope will see if planets contain oxygen and methane and other gases that are essential to life.

The \$700 million Giant Magellan Telescope project, involving a consortium of American universities, is scheduled to start operation in 2020 in Chile and will produce images 10 times the resolution of the Hubble Space Telescope, the world’s costliest telescope when it was launched in 1990. UT, one of the founding partners of the GMT, will fund 10 percent of the telescope’s cost to receive 10 percent of the viewing time, according to Cochran. The Giant Magellan will be unique due to its ability to create high-resolution images of planets from Earth.

Those telescopes will give astronomers a much more detailed view of exoplanet

(Continued on page 16)

Progress on the Hobby-Eberly Telescope

By Matt Shetrone, Research Scientist, McDonald Observatory

The Hobby-Eberly Telescope (HET) at the McDonald Observatory will be receiving the wide field corrector lens from Arizona in about a month. There will be an effort to test the optical alignment of the corrector following its 'road trip'.

The HET staff has also been looking at sub-systems which might cause further delays during the commissioning effort. To reduce sensitivity to lightning, copper cabling has been shortened as much as possible and has been replaced with fiber cable.

The night operations and software development teams continue to make progress on the Telescope Control System. Like many telescope mounts that amateurs use efforts have already begun to refine the mount model for the telescope.



In the last few weeks the McDonald Observatory has had an opening for a telescope operator. If you know of someone with a STEM (Science, Technology, Engineering and Math) background who would be excited by the idea of running one of the largest telescopes in the world and living in the lovely Davis Mountains be sure to have them apply:

<http://mcdonaldobservatory.org/visitors/jobs>

Courtesy The University of Texas at Austin McDonald Observatory, publisher of StarDate magazine
<http://stardate.org/magazine>

(Continued from page 15)

atmospheres, Cochran said. "This will completely revolutionize our study of exoplanets."

Some experts in the field, such as Tom Murphy, a physics professor at the University of California at San Diego, wonder if the long-term goals of interstellar exploration are realistic enough to warrant the spending.

Murphy approves of the spending on Kepler but is skeptical about the success of what might follow: human interstellar travel. "It's a catch-22; most people are energized by the human exploration side, so if it weren't for that maybe NASA wouldn't get enough funding to do the science part," Murphy said. "We can look, but we can't touch, and I don't think most people understand the reality of that."

Cochran said the spending is justified because exoplanet research produces vital knowledge and creates jobs. "I believe it would be a serious mistake to not spend this money," he said.

A shorter version of this story appeared in the Insight section of the Austin American-Statesman

Courtesy The University of Texas at Austin McDonald Observatory, publisher of StarDate magazine
<http://stardate.org/magazine>

***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.

Mismatched Twin Stars Spotted in the Delivery Room

By: [Harvard CfA News, https://www.cfa.harvard.edu/news/latest](https://www.cfa.harvard.edu/news/latest)

Cambridge, MA -- The majority of stars in our galaxy come in pairs. In particular, the most massive stars usually have a companion. These fraternal twins tend to be somewhat equal partners when it comes to mass - but not always. In a quest to find mismatched star pairs known as extreme mass-ratio binaries, astronomers have discovered a new class of binary stars. One star is fully formed while the other is still in its infancy. "We caught them at just the right time. In effect, we're seeing these stars



in the delivery room," says lead author Maxwell Moe of the Harvard-Smithsonian Center for Astrophysics (CfA).

The more massive a star is, the brighter it shines. This makes it difficult to identify extreme mass-ratio binaries because the heavier star outshines, and thereby hides, the lighter star.

To combat this effect Moe and his CfA colleague Rosanne DiStefano looked for eclipsing systems, in which the two stars line up in such a way that they periodically pass in front of each other as seen from Earth. When the fainter star eclipses the brighter star, their combined light drops detectably. These systems are rare because they require a precise alignment as seen from Earth.

After sifting through thousands of eclipsing systems, they identified 18 extreme mass-ratio binaries in a neighboring galaxy called the Large Magellanic Cloud. The stars circle each other tightly in orbits with periods of 3 to 9 days. The more massive stars weigh 6 to 16 times as much as the Sun, while the less massive stars weigh about 1 to 2 times the Sun.

A clue to the young nature of these systems came from an unusual feature in the data. The fainter star shows illumination phases, just like phases of the moon, as the two stars orbit each other. This indicates that the companion is reflecting the light of the brighter, more massive star.

We only see phases because the fainter and less massive companion is not yet a full-fledged star. Astronomers describe it as being "pre-main sequence."

A star forms when a giant clump of gas pulls together under its own gravity, growing denser and hotter until nuclear fusion ignites. This process happens faster for more massive stars.

"Imagine if a human baby shrank as it got older instead of growing. That's what happens for young stars," says DiStefano.

In the young systems this research identified, the more massive star is already on the main sequence, while the less massive companion is not. As a result, that companion is puffier than it would be, since it is still contracting. This effectively lets the pre-main sequence star act as a giant mirror, reflecting the brilliance of its partner.

The discovery of these stellar twins could provide invaluable insight into the formation and evolution of massive stars, close binaries, and star nurseries.

These 18 systems were culled from millions of stars in the Large Magellanic Cloud observed by the Optical Gravitational Lensing Experiment. Due to their rarity, finding examples in our galaxy likely will require an extensive survey using facilities like the upcoming Large Synoptic Survey Telescope.

This research has been accepted for publication in *The Astrophysical Journal*.

Headquartered in Cambridge, Mass., the Harvard-Smithsonian Center for Astrophysics (CfA) is a joint collaboration between the Smithsonian Astrophysical Observatory and the Harvard College Observatory. CfA scientists, organized into six research divisions, study the origin, evolution and ultimate fate of the universe.

For more information, contact:

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Shallow Sky Object of the Month

Eta (η) Aquilae

By Bill Pellerin, GuideStar Editor

Object: Eta (η) Aql

Class: Cepheid Variable

Magnitude: 3.5 to 4.3

R.A.: 19 h, 52 m, 29 s

Dec: 01 degrees, 00 minutes, 20 seconds

Distance: 1200 ly

Constellation: Aquila

Spectral: F6 to G (when dimmest)

Optics needed: Binoculars or a small telescope

Why this object is interesting:

Every star has a claim to fame, and Eta Aql's claim is that it is a bright Cepheid variable star.

Cepheid variable stars have short periods of variation and their period of variation is proportional to its intrinsic brightness. This relationship between period of variability and intrinsic brightness was identified by Henrietta Swan Leavitt working at Harvard in 1908.

Edwin Hubble used this characteristic of Cepheid variables to find such a variable in the Andromeda Galaxy. Once he had identified the period of the variable he knew the intrinsic brightness, and he used the simple inverse square law to determine the distance to the galaxy.

Before his research, it wasn't known that the Andromeda nebula and other spiral nebulae were separate galaxies. Hubble's measurement showed that the Andromeda galaxy was clearly outside our Milky Way galaxy and, thus, a separate galaxy of its own.

So, what will you see if you look at this star? You'll be looking at a star that is larger than the Sun — about 7 solar masses. The period of variability for the star is almost exactly one week. So, it's easy to observe a full cycle of brightness for this star (if we ever have 7 clear days in a row).

In fact, Eta Aql may be the first Cepheid variable star discovered. The prototypical star for this class of variables is Delta Cephei, not Eta Aql, however.

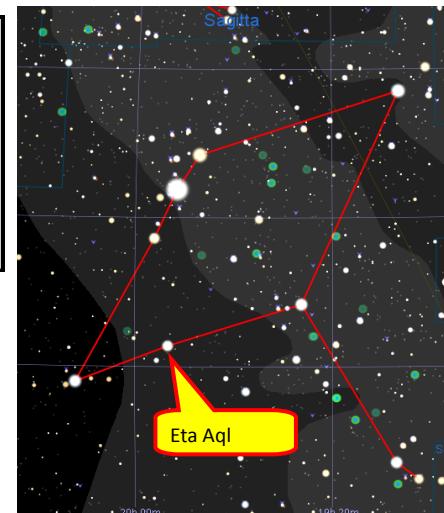
You can create an observing chart for this star at the AAVSO.org web site or look on page 13 of *Annals of the Deep Sky (Volume 2)* by Jeff Kaniipe & Dennis Webb.

Like all Cepheid variables, this is a late life star that has moved on from fusing Hydrogen to Helium and now

Finder chart, north is up.

Star charts generated by TheSkyX © Software Bisque, Inc. All rights reserved.

www.bisque.com



fusing Helium to Carbon and Oxygen. At about 7 solar masses this star is on the edge of being a high mass star, one that continues fusing

Carbon and Oxygen to heavier elements, Neon is next, but the final stage is Iron which cannot be fused in the way that lighter elements have been fused.

Information that I've found indicates that this star will end its life in a way that corresponds with low mass stars. That is, the star will cast off its outer shell of dormant material, become a white dwarf (a remnant of the original star that is no longer 'burning'). The white dwarf's radiation will light up the material now surrounding the star and future astronomers will see it as a planetary nebula.

Thanks to Jeff Kaniipe and Dennis Webb for pointing out this star to me.

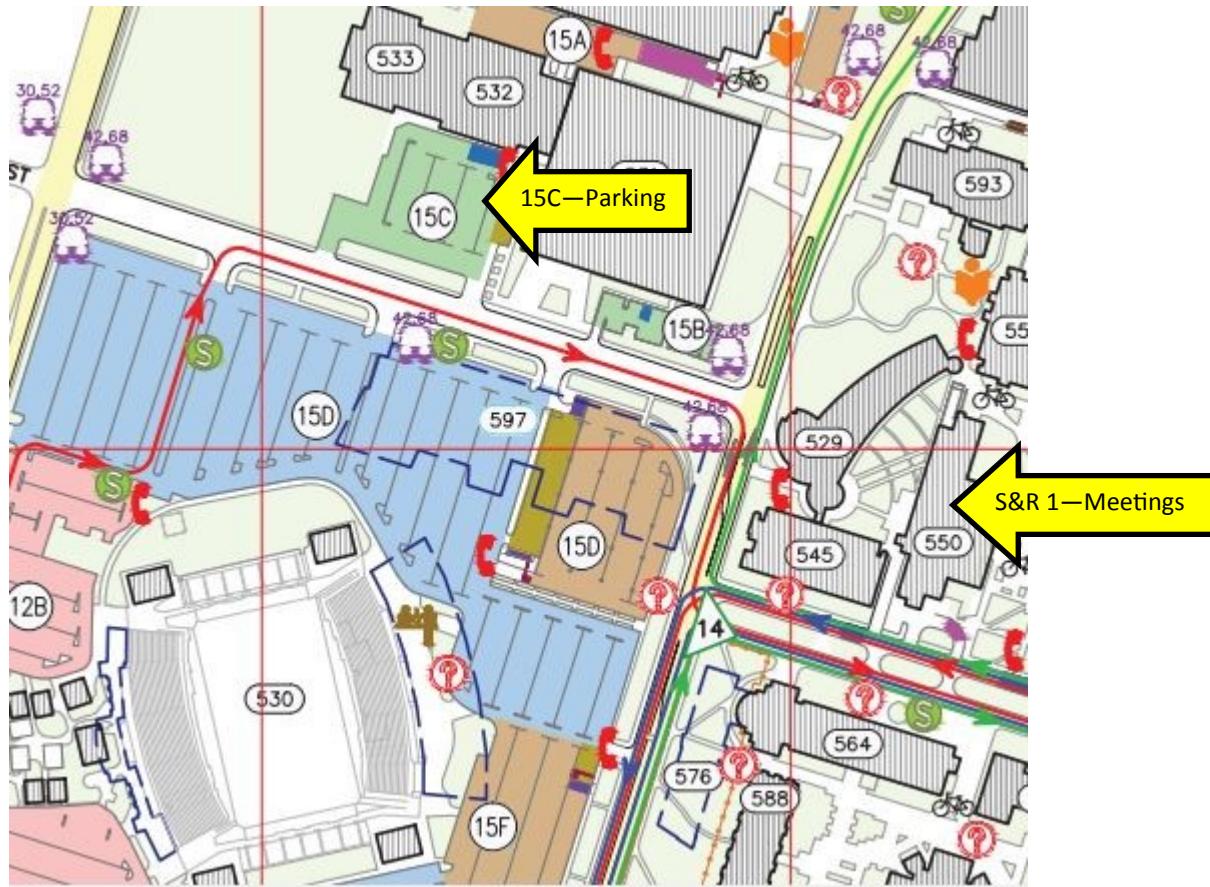
Parking at the University of Houston Main Campus

For the monthly Houston Astronomical Society Meeting

The map below shows the location of the 15C parking lot, west of Cullen Boulevard on Holman Street..

The map is from the University of Houston web site and identifies the lot that is available for parking while attending the Houston Astronomical Society monthly meeting. This parking is available from 6:30 p.m. until 10:00 p.m. on the Friday night of the HAS meeting (usually the first Friday of the month).

This parking is free. If you get a notice from the UH campus police on the night of the meeting, call the UH Security office and let them know that this area has been made available on HAS meeting night by the Parking Department.



Houston Astronomical Society

P.O. Box 800564

Houston, TX 77280-0564

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 GuideStar@astronomyhouston.org. 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.

Editing & Production: Bill Pellerin,

713-880-8061

Email: GuideStar@astronomyhouston.org

Advertising: Advertisers may inquire concerning ad rates and availability of space.

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. Access to meeting videos on the HAS web site.
- 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, June 5, 2015

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 on Holman Street; the parking lot is past the Hofheinz Pavilion
- 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 on Holman Street; the parking lot is past the Hofheinz Pavilion
- Science and Research is across the street (2nd building back)

Parking:

There is Free Parking. See [Parking map and detailed information on parking on the preceding page](#).