# SKYLIGHTS

Vol. 21, No.3 & 4 **FROM LAKE AFTON PUBLIC OBSERVATORY** Summer Solstice, 2009


## Finding E.T.

*by Robert Henry*

The hunt for extraterrestrial life is entering a new chapter with the successful launch of a new space probe specifically designed to seek out Earth-like planets. The Kepler space telescope was launched on March 5th. It will spend 3½ years looking for planets orbiting about 100,000 preselected stars. The goal is to very carefully measure the brightness of the stars and the minute dimming of them as objects pass in front of them.

Although astronomers are already aware of over 330 planets orbiting other stars, the Kepler space telescope is expected to find hundreds more during its mission and it is estimated that as many as 50 of them will be the right size and in the "habitable zone" where they could support life as we know it.

The project is designed to measure the brightness of over 100,000 stars in the Cygnus-Lyra region of our Milky Way galaxy. Kepler will, essentially, stare at this one area of space for 3 ½ years monitoring the brightness of these stars. It will detect when a planet passes in front of, or transits, the star.

It is known that only a small proportion of planets have orbits which take them in front of their stars from our perspective here on Earth. However, the large number of stars Kepler will monitor should ensure that plenty of planets are detected.

The Kepler mission's primary objective is to locate Earth-sized planets in the "habitable zone" of star systems where Earth-like planets would be close enough to the star they orbit to be warm but far enough away that water would not boil away. This is often referred to as the Goldilocks zone … "not too hot, not too cold, but just right".

Once a candidate planet has been identified by Kepler, ground-based telescopes will be trained on them to confirm their identity and establish their likely composition.

A key element of the project will be Kepler's ability to detect planets that orbit their stars in about the same amount of time as an Earth year. This is a good indication that a planet is in the Goldilocks zone.

The Kepler space telescope will do this by using the biggest camera ever put into space. It has an aperture a meter wide and a 95 megapixel detector with an area of one square foot. Ordinary digital cameras have detectors that are a few mega pixels and the size of a thumbnail.

Photo of ET and Michael flying in front of the moon, courtesy of Universal Studios.

The mission has now taken its first images in hopes of discovering these elusive exoplanets. Focused on the Lyra-Cygnus region of the Milky Way, the first images show a star field rich with millions of stars. Over time, the probe will take more and more images of that portion of the sky.

Unfortunately for us, detecting life on other planets is beyond the specifications of Kepler's mission. But among the planets it identifies, astronomers expect that several will be capable of supporting life as we know it.

William Borucki, of the NASA Ames Research Center said, "Kepler won't find ET but it's helping to find ET's home."

To stay apprised of the Kepler mission visit: http://kepler.nasa.gov/ .

## Summer Photograhpy

*by Jim Fullerton*

Astronomically, there are only two photography programs this summer. I will be generous and include the late September Moon program. We have a Summer Milky Way program, then it is Jupiter and the Moon through November.

July 18 is the Summer Milky Way photo program. You will need a tripod and shutter release. A "standard" 50mm lens (35mm for digital cameras with under-sized CCD image chips, which is most of them) or wider is necessary. You can use a lens as short as a "standard" 28mm (17-18mm digital). If you use film and cannot find ISO 800 film, 400 will work.

After the LAPO staff leads you through taking constellation and star trail images, here are some ideas to try on your own:

1. Make the brightest stars stand out more with a Pro-Mist 2 or 3, or equivalent, filter. Fog or Smoke filters are too strong.
2. Take a constellation image. At the end of the exposure time, often 20-30 seconds, cover the lens with a large matte black object, being careful to not touch the lens or jiggle the camera. Block the lens for a minute or two, then remove the blocking object and let the stars trail for up to an hour.
3. Add foreground objects (trees, buildings, or very patient people) and take a star trail image. Try it once with natural light only. Next, try it with one "painting" of the foreground, with an out-of-focus flashlight or low-powered diffuse flash.

For Jupiter and the Moon, try Black & White mode on your digital camera. Jupiter's colors are weak and low in contrast, and the Moon has almost no color. Define a setting for Black & White with higher than average, but not extremely high, contrast. If you decide to try that, PLEASE save your setting before your turn at the telescope, You won't have time to configure your camera at the telescope.

# Earth Times Two...

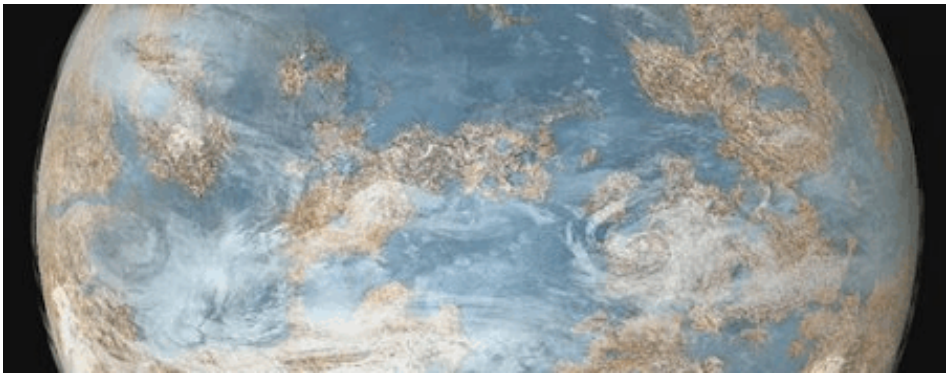
Few things are more exciting than the search for earth-like planets. And with billions of stars in unknown numbers of galaxies in the universe, the odds are tremendous that there are more planets like ours out there.

It has only been within the last 17 years of astronomy that technological advances have allowed astronomers to even begin to search for extrasolar planets, let alone those that might be like earth.

The Kepler probe will greatly help in this search. But it is not the only thing pointed at the sky looking for exoplanets. Amongst those looking are the astronomers using the HARPS spectrograph attached to the 3.6-meter ESO telescope at La Silla, Chile.

One new discovery made is found orbiting the star known as Gliese 581. Found in the constellation Libra, this star is about 20 light years from Earth. It is classified as a low-mass red dwarf star, class M. This means that it is much fainter, cooler and has a lower mass than our own sun. Stars like Gliese 581 have been the focus of astronomers because of the likelihood of finding lower mass, rocky planets in a habitable zone around the star.

Up to this point, most of the planets found orbiting neighboring stars are closer to the size of the gas planets in our own solar system. However, the lightest exoplanet discovered yet was found orbiting Gliese 581. Called "e", it is the fourth planet found in orbit around this neighborhood star. It is considered the lightest, because it has a mass of 1.9 Earth masses.



Artist's conception of an earth-like planet. Photo courtesy of NASA.

That may not seem significant at first, but the average exoplanet mass is nearly 1,000 Earth masses. That and the fact that each of the other three planets in the system have larger masses make this discovery pretty amazing.

"The holy grail of current exoplanet research is the detection of a rocky, earthlike planet in the 'habitable zone,' " said Michel Mayor from the Geneva Observatory in Switzerland, leader of the team making this most recent discovery.

This is very promising for astronomers. The closer a planet is to Earth in both size and location around its parent star, the more likely it is to have earthlike conditions. Unfortunately, Gliese 581e is outside the habitable zone of the planet. In this case, the planet is too close to its star to allow liquid water to exist on the planet.

There is another possibility in this same stellar system – planet "d". This planet discovered in 2007 is located "just" within the star's habitable zone.

However, planet "d" has a mass seven times that of Earth. However astronomers just don't have enough information to know if a planet of that mass can also be a habitable planet. Only time and more advances in knowledge and technology will tell. Regardless, Gliese 581d is the most viable planet discovered so far.

## Back to the Moon

After a long five day journey, on the morning of June 23, NASA's Lunar Reconnaissance Orbiter entered orbit around the moon – NASA's first lunar mission in a decade.

This long awaited mission will, in the next few days, turn on all its equipment and prepare to do its work - map the moon, including taking pictures of former lunar landing sites. Its purpose is to find possible locations for future human missions.

The partner mission of this launch is the Lunar Crater Observation and Sensing satellite, designed to fund water at the lunar poles. Water is one of the most expensive things to take into space. If enough water can be found already on the moon, then NASA can concentrate its efforts on more equipment and less on cargo. Keep your eyes on the NASA website (http://lunar.gsfc.nasa.gov/) for updates of this exciting mission.

## Special Upcoming Programs

### Grandparent's Weekend

*September 11 & 12 8:00-10:00 p.m.*

Bring Grandma and/or Grandpa to the Observatory for the program: Famous Astronomers. Grandma or Grandpa will receive free admission when accompanied by a paying child. (Limit one free admission per paying child.) Today, we know that the earth turns on its axis once a day; stars fuse hydrogen into helium; and our galaxy is only one of billions in a vast expanding universe. But, when you bring the grandparents out to the observatory they will get to learn who the men and women were that figured this stuff.

### Bring Your Own Telescope

*Friday, July 17 at 9:00 p.m.*
*Friday, August 21at 9:00 p.m.*
*Friday, September 18 at 8:00 p.m.*

In conjunction with the KAO (Kansas Astronomical Observers), we are inviting those who would like pointers on how to use their telescope. Bring your telescope to the observing pad north of the Observatory building and members of the KAO will be there to assist you. They will also have some of their telescopes available to look though. There is no charge for this program. Regular admission charges apply for the program inside the Observatory.

## First Views

*by Jim Fullerton*

Since 2009 is the International Year of Astronomy, it's a good time to reflect on my experiences with my first telescope. It was a cheap 3 inch Newtonian. The mount was a ball-and-socket joint that did not even qualify as an altazimuth mount. It had one eyepiece and a Barlow with an O-ring. Magnification was variable by moving the Barlow up or down in the eyepiece barrel!

The plastic end ring that held the mirror collimation screws was damaged in shipment. It was rumored that a reindeer kicked the box, but I did not believe that! I fixed the ring, then tried it on the nearly full moon. I only saw a bright area out of focus. But I did not give up. I had to figure out what was wrong (badly out of collimation) and fix it. That was not easy when I had no good instructional materials. When I could focus on distant objects in daylight, I was ready for night. My next view of the moon showed lots of craters and mare! It was much better than looking at pictures.

Next, I looked at Jupiter. I knew many constellations and where each planet was to demonstrate that I was ready for a telescope. I could see the Galilean moons and sometimes two dark belts. Besides obvious bright stars, I looked at the Lagoon and the Andromeda galaxies, the Crab and Orion Nebulae and the large Hercules globular cluster. I also looked at Venus, Mercury and Mars.

My first view of Mars was in 1973. All I saw was a tiny yellowish-orange disk with no features. I thought I needed a bigger telescope to see details. Then I learned that there was a global dust storm. When it cleared, I could see a tiny polar cap and sometimes a dark or bright area.

I also looked at all the wide doubles I could find. But finding deep-sky objects was a hit-or-miss affair, but I kept trying.

For my next birthday, my parents bought me a subscription to Sky and Telescope (S&T). I don't know if they were trying to help or had decided I was beyond hope of rehabilitation for going outside at all sorts of odd hours and insisting that all lights be blocked or OFF!

S&T had some articles about eyepieces, and I learned that the one that came with my telescope was not very good. While reading an Edmund catalog, looking for parts for building a larger telescope, I found and bought a small lens assortment. After some tinkering, I built an 11 mm Symmetrical eyepiece using model rocket parts and epoxy. I still have it and it works. It was MUCH better than the supplied eyepiece.

I went so far as to project the Sun's image onto a white card held above the eyepiece. I knew about the dangers of looking directly at the Sun and was not about to do that! I used the supplied eyepiece because I did not want to burn the barrel of the homemade eyepiece. I only remember seeing a few small spots. The Sun was near minimum then, but I did not know about that at the time. I did succeed in partially melting the plastic of the supplied eyepiece, though.

So, unless you or your children have a really terrible telescope, stick with it and get a better one when you can afford and use it.

## *Did You Know?*

Nicolaus Copernicus first began going to the University of Krakow in 1491. He studied liberal arts for four years withouth recieving a degree, and then went to Italy to study law and medicine. During the Janurary of 1497 he bean to study canon law at University of Bologna while living with a mathematician, Domenico Maria de Novara. Novara sparked Copernicus' interest in geography and astronomy, and the final climax of it came when the two watched the occultation(eclipse by the moon) of the star Aldebaran on March 9, 1497. Copernicus is best noted for stating the earth rotated on an axis and orbited the sun.

## Upcoming Programs

**Exploring the Solar System**
October 2-3, 23-24, 30-31
November 27-28

Join us as we celebrate the anniversaries of significant milestones in the unmanned exploration of our solar system. We will be viewing our Moon, Jupiter, Uranus and Neptune as we discuss the wondrous discoveries made by unmanned probes over the last 50 years.

**Exploring the Milky Way**
October 9-10, 16-17
November 6-7, 13-14, 20-21
December 4-5, 11-12, 18-19

Our Milky Way galaxy is not just a hazy streak of distant stars visible in the night sky on a dark clear night. Every object we can see with our naked eye in the night sky is part of our home galaxy. During this program, we will explore Jupiter, double stars, clouds of interstellar gas, and star clusters. We will conclude the program by viewing another galaxy that is very similar to our own Milky Way.

* * *

*Remember that an Observatory program is automatically canceled if there is a severe thunderstorm warning or tornado warning anywhere in Sedgwick County during the hour prior to the start of a program. In the event that we have snow, call 978-7827 and choose option three to see if the program has been canceled.*

## New Staff Member

Jeanette Bergkamp has joined the Observatory staff as a student assistant. Here is what she has to say about herself.

I am now finishing my third year at Wichita State University studying Physics and Aerospace Engineering. After graduation I plan to study astrophysics. Astronomy has always been of great interest to me, and I am extremely happy to be a part of the Lake Afton Public Observatory

The stars and planets have always fascinated me, from the ancient myths that give some objects their names to current explorations and discoveries. I believe that an interest in the universe is something every person shares to some degree, and I look forward to learning more and using that knowledge to further others' interest in the cosmos.

## New and Renewing Members

We would like the thank the following people who have become members or renewed their membership to the Observatory.

Jeremy Rood
Tony Haidai
James Fullerton
David and Vicki Pipher-Moore

# What Will You Observe in 2009?

*By C. W. Robertson*

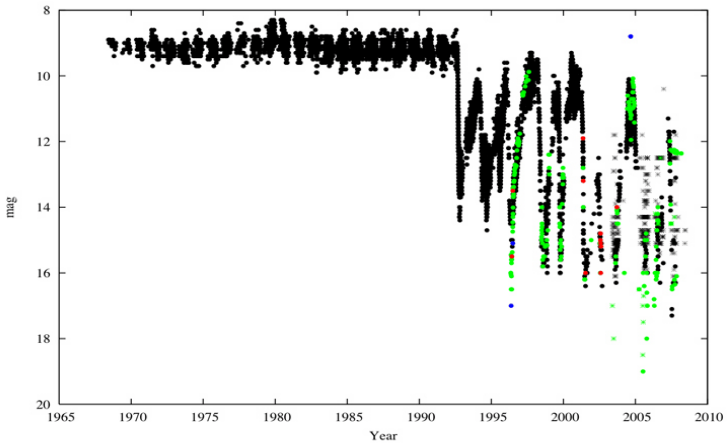
2009 has been designated as the International Year of Astronomy and the good news is that by visiting the Lake Afton Public Observatory, you are already participating. If you would like to do more, all you need to do is look at the sky. That's right, the whole purpose of this year of astronomy is to get people to look at the sky.


The author's roll-off roof observatory with 12-inch (right) and 16-inch telescopes

And once you start looking - you are observing. If you start looking more than a couple times a month, and notice how things change, well, then you have the start of an observing program. And you haven't even touched a telescope or a pair of binoculars.

Of course, if you have the desire you can always do more. You can pick up a star chart from the observatory, dust off those old binoculars or that old scope and see what you could find. Whatever you have, it is much better than what Galileo used and you have charts to follow.

Astronomy is one of the areas where amateurs can still contribute to science. There are simply too many targets and too many "really cool things" to observe, and too few observers. If you have a 6" or larger telescope at home, a watch and a notepad, can find objects and have the desire, then there is lots to do. Several of those stars actually change brightness (variable or eclipsing binary), and they need to be monitored because they don't always do what is expected. In the diagram below, you can see that all of a sudden FG Sagittae started wildly changing.

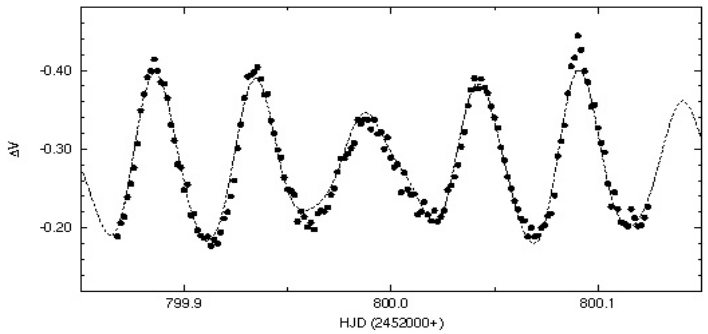



Variations of FG Sagittae from 1965 to 2008

Normally, these objects change brightness slowly, over a period of several months or years, as was happening between 1967 and the mid 1990s. Then something happened and the star started getting fainter. Those wanting to help with this kind of observing and gathering of data have to be patient. You never know what you will find.

Want to get involved? Then the American Association of Variable Star Observers (www.aasvo.org) would like to have your help. They have a list of stars, charts and tutorials to get you started.

Of course, there are many types of projects you can do. If you have a larger telescope, better charts, a better detector than your eye, and can set it all up so that it takes data unattended overnight so you can keep your day job, you can do a lot. Not all objects take years or days to change in brightness. Many of them change in a lot less time. The following chart shows information gathered for one of those stars that doesn't take long to change. This is data from a single night that I took in 2003 as part of a team working on this star.




The dots are the data points, the line is the fit to the data. The line is made up of three frequencies or beats that are added together. There are four of us on this team, two people with their own observatories that take the data and do preliminary analysis, and two professional astronomers to finished the data reduction and publish the paper.

Team members are located in Goddard, Kansas and Beersel, Belgium. We study newly suspected variables that change brightness in 2-6 hours and monitor other stars just to make sure things have not changed.

You have already taken the first step of this wonderful Year of Astronomy and have visited Lake Afton Public Observatory. If you haven't been out recently, it's time to come see us again. The next step is up to you. But if you would like to get started observing variables or would like to get involved with a team, ask me. I'm one of the explainers at the observatory. I'll be wearing a blue badge or stop by my site on the web: www.setec-observatory.org .

*Editor's Note:*

The website listed above is an excellent source of information. It features information on the telescopes being used, an extensive list of variable stars that can be used for observation and data gathering, a page giving a brief outline on a typical observing session, credentials, publications, and valuable links.

## From the Director

Many years ago, when I was teaching high school, my room was next door to a social studies teacher. One of the questions he would ask of his American History students was: "Where were you when you heard the news that President Kennedy had been shot?" He finally had to stop asking because as the years progressed, his students became too young to remember.

I can ask a similar question. Where were you on July 20, 1969? I remember that day even more clearly than Kennedy's assassination. My family and I were at a picnic, but we had to leave in the middle of the afternoon so I could get home to watch the first moon landing on TV! At the time we didn't know the original touch down site was littered with boulders, that Armstrong took control of the landing craft, and found a place to touch down moments before they would have run out of fuel.

As I recall, the astronauts were suppose to take a nap after the landing. The nap was scratched and a few hours later I sat in front of my parent's TV watching Armstrong climb down the lunar module's ladder and place his boot on the moon. For the next two-and-a-half hours we watched Armstrong and Aldrin perform various tasks before returning to the Lunar Module.

It's hard to believe that forty years have passed since that first moon landing and it has been nearly thirty seven years since the last one. It turns out that the median age in the United States is also nearly thirty seven. This means that half of the people living in this country were born after the last moon landing! To them, the moon landings are just part of history.

Well, I've done my reminiscing. I hope that you have a chance to do some of your own. If you are too young to remember the first moon landing what event in the exploration of space sticks out in your mind (the Voyager fly-bys of Jupiter or Saturn, the launch of the first space shuttle, the impact of Shoemaker-Levy 9 with Jupiter, etc.)?

Have fun reminiscing!

Clear skies,

Greg

Aldrin on the Moon. Note Armstrong's reflection in the faceplate.


**Lake Afton Public Observatory Quarterly Newsletter**

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**Volunteers:**
*Explainers:* Angie Chadd, James Fullerton, Elias Jordan, Jasmine Pfingsten, C.W. Robertson, Vicki Sieglen and Scott Sullivan.




## IN THE SKY

Keep an eye on the planets this summer, they're putting on quite the show. Saturn disappears from the evening sky by mid August. On the night of July 24, be sure to look for Saturn near the crescent moon, low in the western sky.

For a few days at the end of July and the beginning of August, Jupiter and Saturn look like bookends for the stars as they will appear on opposite horizons. Jupiter and the nearly full moon will be near each other on August 6, September 1, 2, and 29. Look for the pair in eastern Capricorn.

On August 26, look for the waxing moon near the red star Antares. The moon will be past first quarter, so it may be harder to see the star's red color, but it makes for a great pair.

For the early morning observers, be sure to get up before dawn, starting around 4 a.m. if you want to see Venus and Mars together in the eastern sky, with Jupiter high overhead.

In the middle of July, watch Venus as it moves through Taurus on its way back towards the horizon. Then on July 18 & 19, watch as the waning moon joins the planets and the red star Aldebaran.

Then on September 13, look for the waning crescent moon next to Mars in the constellation Gemini.

Don't forget to check out the Perseid meteor shower this August. Even though this is not a favorable year, with the waning gibbous moon, it may be worth it to see some of brighter meteors. While meteors appear for several days during the shower, the peak happens during the early morning hours of August 12, so get up really early that morning for the best chances.

Want to know what else is happening in the sky? For auroras, sunspots, and more go to www.spaceweather.com. This site gives information about N.E.A.s (Near Earth Asteroids) and when they fly by Earth on their way around the solar system.

Don't forget to check out www.heavens-above.com occasionally to find out about visible comets, minor planets (a.k.a. asteroids) and when the International Space Station, the Shuttle or other major satellites, like Iridium flares will be going overhead. All the info can be found on the website.

**Lake Afton Public Observatory**
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Wichita, KS 67260-0032

## CURRENT OBSERVATORY PROGRAMS

### Famous Astronomers

*July 10-11, 17-18, 24-25* *9:00-11:00 p.m.*
*Aug. 7-8, 14-15, 21-22* *9:00-11:00 p.m.*
*Sept. 11-12, 18-19* *8:00-10:00 p.m.*

Earth turns on its axis once a day; stars fuse hydrogen into helium; our galaxy is only one of billions in a vast expanding universe. Today, we know these things, but who were the men and women who figured it all out? Wyou'll find out as you look at Jupiter, a star cluster, planetary nebula, and a galaxy.

### Voyage Through the Solar System

*July 3-4, 31* *9:00-11:00 p.m.*
*August 1, 28-29* *9:00-10:00 p.m.*
*September 4-5, 25-26* *8:00-10:00 p.m.*

Using the Observatory's 16" telescope, visitors can journey through our solar system as we commemorate the 30th anniversary of the Voyager spacecraft's fly-by of Jupiter. Our first stop will be our Moon, then we'll visit Jupiter, and Neptune.

### Photography Programs

*Milky Way* - Saturday, July 18 11:00 p.m.
*Jupiter* - Saturday, August 15 11:00 p.m.
*Moon* - Saturday, Sept. 26 10:00 p.m.

Bring your 35mm or Digital Single Lens Reflex Camera. Don't have one - bring your thumb drive and use our camera!

*ISO 400 or 800 color film and a cable release are recommended.*

### Observatory Hours

The Observatory is open every Friday and Saturday evening. Admission is $4.00 for ages 13 and over and $3.00 for ages 6 - 12. Children under 6 are admitted free. Family Rate: 2 adults & immediate children or grandchildren $12.00. Observing through the telescope begins soon after the doors open. Program times are subject to change. Call the Observatory at (316) WSU-STAR to confirm programs and times or to check for weather-related cancellations.

*May 1 - August 31* *9:00-11:00 p.m.* *September 1 - 30* *8:00-10:00 p.m.*

## Become a Friend of the Lake Afton Public Observatory

Name _____

Address _____

City _____State_____ Zip_____

e-mail: _____

**Annual Membership Categories**

☐ $15 Student ☐ $100 Sustaining
☐ $15 Senior Citizen ☐ $250 Patron
☐ $20 Individual ☐ $250 Business
☐ $30 Family ☐ $500 Business Donor
☐ $50 Donor ☐$_____

☐ New Member ☐ Renewal Can we list your name in our newsletter? ☐Yes ☐No
☐ I am interested in volunteering some of my time to the Observatory.
☐ Gift Membership