

"CLEAR SKIES"



NEWSLETTER OF THE CHAMPAIGN-URBANA ASTRONOMICAL SOCIETY, INC.
AN AFFILIATE OF THE CHAMPAIGN PARK DISTRICT

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JULY 2010

CUAS OFFICERS MESSAGE

BY GUY HAMPEL

July is another fun month as summer is now officially just over a week old where it seems that summer started months ago; just listen to the weathermen. I remember as a child when I started getting interested in Astronomy, well more on that later, there was a saying that helped us remember that summer was here "The corn was knee high by the 4th of July". Other things that were interesting about corn were that it was planted in 30" rows in both directions after it was cultivated and as it grew over a young child's head mom would remind us not to wander into the fields with "They won't find you until late fall if you get lost". Those early days of being able to look up at the night sky from the back yards of the suburban areas around big cities that I lived in as a youth were amazing and inspiring. My earlier reference to corn reminds me to publicly thank our Club Member of the month, Mike Rosenberger, for his efforts to get our storage shed up and running again and replacing the Dome's temporary steps that were reused after an earlier good set were stolen. Thank you, Mike!

Growing up after the second war to end all wars when there was a big push in science because we had to be better than the Russians, we had to be first to have more nukes and space seemed to be the final frontier. We had the rocket boys, later a movie, men trying go fast to see if there was life after traveling faster than sound, then trying to put things in space and asking are there little green men on Mars. How could a child interested in math, science and always asking why, not be interested in what is out THERE! I would get up early and watch a science guy named Doctor Dan Q. Posin talk about science, space, travel out there and how will we get there, where ever there is. He would try to explain to mere mortals that current rocket technology will not cut it, it will take at least something like ION power to start to get the job done. This guy was fun and easily kept me interested day after day and to my amazement the day came were I actually got to meet him, listen to him challenge our minds and get to ask him questions. I bring this up as NASA is now after over 50 years developing a more practical ION rocket for the future. Isn't it amazing we as humans think, dream, ponder, dwell on, and a select few put ideas into it into motion and someday it happens. Isn't nice that we live in a country that there is time for the few to spend time developing ideas that help mankind in general rather than just having the time to find food, housing and An article about the Dawn Spacecraft setting a record for velocity change firing in turn each of its (3) engines for a cumulative total of 620 day while burning only 363 pounds of xenon. Now wait its 0-60 mph speed burst took a mere 4 days to accomplish however during that time it only used 37 ounces of xenon fuel. We still need many people to "keep looking up", thinking dreaming and testing thought.



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|---|----------|
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Come to this month's meeting and discover what is new with Bob Holmes and observing in Douglas County. Come with questions, thoughts of what has interested you about astronomy, which of the fall sky parties you plan on attending and come to see the progress on the planetarium updating. See or is that here you at our next sky watches.

-Guy



LOOKING UP THIS MONTH

Mid-year already? Doesn't it seem like 2010 started not long ago? Time marches on (no matter our perception of it) and the planets continue in their orbits. We begin the show in the west after sunset. Of course, the brightest star-like object there will be Venus. To the upper left of Venus will be the star Regulus, then further to the upper left, is Mars and then Saturn. The nearly straight line will start lower to the horizon. You can even extend the line further south to include the star Spica, if you wish. The three planets form a triangle in the sky by the end of July.

Venus will get brighter this month as it swells in apparent size (from 15.5 arc seconds to 19.7). This is because, during July, Venus gets 21.5 million miles closer to us as it swings around the Sun. Venus will creep closer to Regulus early in the month until, on July 9th, it comes to within 1.1o of the star in our sky. Watch the planet nightly and see it almost touch the star. Venus will appear gibbous in the eyepiece.

Meanwhile Mars continues to recede from the Earth, being roughly 178 million miles from us (roughly twice the Earth/Sun distance). Mars comes in at around magnitude +1.5, fainter than Saturn. The two will come to within 1.8o on the 30th. Saturn will appear to be above Mars on this night.

Mercury also enters the scene later on in the month, situation in the northwest, to the lower right of both Venus and Regulus. It's not a great sequence for Mercury as, at its highest (around the 25th), it sets only 30 minutes after the end of twilight. On the 13th, the Moon joins the party, too, as a very thin crescent below Regulus and to the left of Mercury. Each night the Moon will appear higher, passing below and to the left of Venus on the 14th, below Mars on the 15th and below and to the left of Saturn on the 16th. Be sure to note the location of the Moon each night as you'll see first-hand that the Moon moves west to east in its orbit around the Earth, plus the fact that the Moon's orbit is five degrees off the plane of the solar system. By the 21st the now waxing gibbous Moon is roughly 5o to the right of the red star Antares.

Snobbish Jupiter doesn't care to sit with the other planets this month, but rises a little after midnight in the southwest. Jupiter will be the brightest star-like object in this part of the sky at this time. Jupiter also gets a little closer to our Earth this month, thus it will appear larger and will brighten some. And if you're up for a challenge, the planet Uranus is just to the west of Jupiter. At 6th magnitude, it will be a tad fainter than some of the Jovian moons, but you should still be able to see the planet with good binoculars and a dark sky. A waning gibbous Moon rises with the pair on the night of July 31st.

We have a total solar eclipse this month on July 11th. Well, by "we" I guess I mean the Earth. We won't see it in C-U unless you happen to find a company operating a web cam. The eclipse track passes over Easter Island in the South Pacific, then makes landfall in South American, though Chile and Argentina.

We also have the Delta Aquarid meteor shower at the end of this month. Though some would argue, you could say this is the first "big minor shower" of the year. The best times to view are just before dawn on the 20th or 21st. You could catch a dozen or so meteors per hours during these times.

And the Earth is farthest from the Sun at 6am on the morning of July 6th. If you're keeping score, we'll be 94,508,351 miles from our closest star. See ya.

-DCL

MOON PHASES

| | | |
|-------------------------|---------|-----------|
| Last quarter | July 4 | August 3 |
| New | July 11 | August 9 |
| 1 st quarter | July 18 | August 16 |
| Full | July 25 | August 24 |



CUAS NEWS

A note about **July's meeting** . . . we are pleased to welcome Bob Holmes for a presentation in the planetarium. Bob has made a name for himself by discovering a comet (http://www.herald-review.com/news/local/article_33d3250b-9c34-5412-b4c8-837465e12ac6.html) and several asteroids. He won the 2009 Edgar Award from the Smithsonian Astrophysical Observatory. Bob will talk about his 32-inch telescope housed near Charleston and his observing programs. See Bob's Astronomical Research Institute page at <http://ari.home.mchsi.com/index.htm>. Be sure to attend the meeting!

We have been in contact with Savannah Hampson at the **Champaign County Forest Preserve District** who asked the club several questions that were discussed at the June meeting.

1. Were we still interested in collaborating with the CCFPD on night programs? **YES!**
2. Would the club be interested in doing a program at Homer Lake? **YES!** Homer Lake is roughly half the distance to the Middle Fork so more may come but the skies maybe wouldn't be as dark. Guy asked for a volunteer to scout out Homer Lake for a spot away from security lighting. Dave contacted former member Lex Lane who lives adjacent to the park. Lex agreed to check out spots at night. He had forwarded to the club a rough map of possible observing locations.
3. What dates would we like to observe from CCFPD site in spring, 2011? It was agreed that April and May worked pretty well. We could maybe do one on the New Moon Saturday of each month, with one at the Middle Fork and one at Homer Lake. Dave will email some dates to Savannah.
4. Savannah is also interested in doing some daytime programs with solar observing. More details will come out later.

Guy has seven leftover **2010 calendars** that he will give away at the public open houses

Dave Leake is in the process of booking speakers into the Staerkel Planetarium's 2010-2011 "World of Science" Lecture series. If you know of a good speaker OR a hot topic that would make a good talk, let Dave know at 351-2567 or dleake@parkland.edu.

There's a new **program at the Lowell Observatory** in Flagstaff, Arizona, aimed at amateur astronomy clubs. Basically it's more of a behind-the-scenes tour of the facilities at Lowell with one of the staff astronomers. The highlight is to spend an evening observing with Percival Lowell's 24-inch Clark refractor (circa 1896) in the dark skies (7000 feet elevation) on Mars Hill. You'll see the blink comparator where Pluto was discovered, tour the Anderson Mesa Research site (home of the 72-inch Perkins Telescope used by Vera Rubin), and see the Discovery Channel Telescope – a new 4.3 meter instrument situated at 7700 feet, 40 miles southeast of Flagstaff. Trips last 1-3 days or 1-2 nights. Depending on the number of members interested, costs range anywhere from \$100 to \$500 per person. A sample itinerary is available. The contact is Rusty Tweed at 928-233-3267 or tweeddr@lowell.edu.

Guy led a discussion at the June meeting on **digital setting circles**, demonstrating the "Sky Commander." This unit can be attached to the 16-inch truss-tube Dobsonian at the dome site. It runs on a 9v battery. If

you're observing late at night, Guy advised that you put in tomorrow's date for the best results. It is aligned by the "two star method." After you punch in an object, it will give you a degree offset in both altitude and azimuth and then you move the scope (with encoders attached) until the numbers say zero/zero and you should be close to seeing the object. We have three sets of these units in the club with one belonging to the club. They retail at \$450 with the encoders included. Encoders are roughly \$60 each by themselves.

Light pollution update The International Dark Sky Association has announced the second draft of a Model Lighting Ordinance. They are inviting public comment on the document through August. It can be found at: <http://docs.darksky.org/MLO/2010/MLOdraft22June.pdf>. There is also more evidence to show that it actually isn't healthy to be in light all of the time. Our bodies need darkness in spells! See <http://health.msn.com/mens-health/articlepage.aspx?cp-documentid=100260380>. Good articles on light pollution can be found at http://www.pe.com/localnews/stories/PE_News_Local_D_nightsky11.238a408.html and <http://www.heraldnet.com/article/20100608/OPINION02/706089981>.

Staerkel Planetarium update the new full-dome video projection system is in! But now the staff is faced with a steep learning curve in getting to know the system. Beginning June 28, East Coast Control Systems arrives to install a new LED lighting system. Installation should take four days. On July 6th, the planetarium staff undergoes four intensive days of on-site training from Evans & Sutherland. This shouldn't impact the CUAS meeting that week.

Night Sky Network Update want to know which stars you can see in the night sky might go supernova? Use the most recent activity on the Night Sky Network web site to find out. Go to: <http://nightsky.jpl.nasa.gov/>. There is also a wonderful night sky planner on the site . . and you don't need to log in.

Consider taking your **CUAS newsletter** by email only and save the club some money. By your request, we can email you a pdf file monthly instead of spending money on stamps.

Also remember that the club offers magazine discounts for both *Astronomy* and *Sky & Telescope*. If you are interested, contact treasurer Willard Brinegar.

Join the **club listserv** and get viewing information in advance! This is a yahoo group that you have to join. See the web site www.cuas.org and look for "email listserv" link on the navigation bar on the left.

TREASURERS REPORT

BY WILLARD BRINEGAR, TREASURER

As of 6/30/2010

Assets*

\$ 3998.31 Checking account

\$ 3998.31 Total Assets

Income*

\$ 0.00 Total Income

Outgo*

\$ 0.00



*Note: Magazine subscription funds are not reflected in Income and Outgo since they are simply sent on to the respective publishers. As of 4/30/2010, all received subscription payments have been sent on, so they are not reflected in the Assets category either.



OBSERVATORY NEWS

Mike Rosenberger reported on the observatory site at the June meeting. The shed is coming along nicely with most of the wall repairs completed. He had a metal door on order which has now been installed. The inside of the shed is fine despite the fact it has been open to the weather. Mike also added a roof vent. The mowers are now back in the shed. Mike changed the oil on both mowers and fixed the handle of the one. He also assembled on another set of steps and have them anchored. We all need to scrape paint both inside and outside of the dome itself, down to the block . . . which won't be easy. The

scope will need to be temporarily relocated for the inside work, given the dust. Many thanks to Mike Rosenberger for his hard work!

Small projects list for the summer we probably need to **scrape paint** again, both inside and outside. The inside looks pretty bad in the daylight! Also, cooling **fans** in the telescope. Guy brought a paint expert out to the dome and has a paint solution. Might a work day be in store?

The mow list returns! If your name appears below, then please mow when your turn comes up and then contact the next person immediately. We usually have to mow weekly and the job takes several hours, but it's great exercise! Mowers are at the dome site. If you want to either be added or taken off the list, let Dave Leake know ASAP. Mike Rosenberger has already mowed.

- | | | | |
|---------------------|---------------------|------------------|----------------|
| 1) Mike Rosenberger | 4) Audrey Ishii | 7) Mike Lockwood | 10) John Stone |
| 2) Dave Leake | 5) Willard Brinegar | 8) Dick Robrock | |
| 3) Mark Prather | 6) Guy Hampel | 9) Wayne James | |



LOOKING AHEAD

July 8 CUAS Club Meeting 7-8:30pm Staerker Planetarium
Our guest speaker will be Mr. Bob Holmes from the Charleston area. Bob will update us on the instrumentation he is currently using to image the sky and the research programs he is currently participating in. See "Club News" for more details.

July 10 New Moon Observing 9pm - ? Observatory

July 17 CUAS Family Skywatch 8-10:30pm Observatory
If it's clear, lets meet at the observatory . . . weather permitting. Volunteers are needed. Take I-57 south to the Monticello Exit, go west (turn right) 1.4 miles and then turn left on County Road 700E. The dome is 0.8 miles to the south on your left. Call 351-2567 for cancellation notices.

July 31-Aug. 4 Astro. Soc. Of the Pacific mtg Boulder, CO

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|---|-----------------------------|-----------|-----------------------------|
| August 7 | Middle Fork Observing | 8pm | Middle Fork Forest Preserve |
| August 11-12 | Perseid Meteor Party? | 11pm-? | Observatory |
| The Moon is in the right spot (two days or so after New), should we try to run an event? This is in the middle of the week, which isn't great. Thoughts? | | | |
| August 12 | CUAS Club Meeting | 7-8:30pm | Staerkel Planetarium |
| Hopefully Dave Leake will show-off some of the features of the Digistar 4 system. | | | |
| August 14 | CUAS Family Skywatch | 8-10:30pm | Observatory |
| August 28 | Sweetcorn Festival | all day | Downtown Urbana |
| Though the club won't have a table at the festival, the local museums group will. If anyone would like to work an hour or so, staffing a table and handing out a few brochures, let Dave Leake know at dleake@parkland.edu . | | | |
| September 4 | New Moon Observing | 9pm - ? | Observatory |
| September 8 or 9 | Planetarium reopening party | TBA | Staerkel Planetarium |
| The club is invited to a celebration of the reopening of the planetarium, complete with new light, sound, and projection system. The donor "star wall" will also be unveiled as well as our new Hubble Space Telescope "Viewspace" video exhibit in the lobby. More details will be available as we get closer to the date. | | | |
| September 9 | CUAS Club Meeting | 7-8:30pm | Staerkel Planetarium |
| September 10 | Planetarium Public shows | 7pm & 8pm | Staerkel Planetarium |
| The planetarium will reopen to regular public programming including "Fall Prairie Skies" and the new digital program "Violent Universe." All tickets are available at the door. 351-2446 or www.parkland.edu/planetarium . | | | |
| September 11 | CUAS Family Skywatch | 8-10:30pm | Observatory |
| October 2 | Middle Fork Observing | 8pm - ? | Middle Fork Forest Preserve |
| October 9 | New Moon Observing | 8pm - ? | Observatory |
| October 14 | CUAS Club Meeting | 7-8:30pm | Staerkel Planetarium |
| We'll have officer nominations this month for calendar year 2011. Voting to occur next month. | | | |
| October 16 | Family program | 2-3pm | Champaign Public Library |
| The library has requested some sort of program aimed at kids K-5. Details to follow. | | | |
| October 16 | CUAS Family Skywatch | 8-10pm | Observatory |
| November 6 | New Moon Observing | 8pm - ? | Observatory |
| November 11 | CUAS Club meeting | 7-8:30pm | Staerkel Planetarium |
| November 13 | CUAS Family Skywatch | 8-10pm | Observatory |
| Our last one for the year – lets hope it's clear! | | | |

November 26 “Season of Light” opens 8pm Staerkel Planetarium
A new digital holiday show replaces “Rites of the Season,” which ran at Staerkel since 1989. Tickets are available at the door and range from \$3 to \$4. This show will run Fridays & Saturdays through December 18.

December 9 CUAS Club meeting 7-8:30pm Staerkel Planetarium

December 21 Total Lunar Eclipse 12:30am



Black Holes No Joke

by Dr. Tony Phillips

Kip Thorne: Why was the black hole hungry?

Stephen Hawking: It had a light breakfast!

Black hole humor—you gotta love it. Unless you’re an astronomer, that is. Black holes are among the most mysterious and influential objects in the cosmos, yet astronomers cannot see into them, frustrating their attempts to make progress in fields ranging from extreme gravity to cosmic evolution. How *do* you observe an object that eats light for breakfast?

“Black holes are creatures of gravity,” says physicist Marco Cavaglia of the University of Mississippi. “So we have to use gravitational waves to explore them.”

Enter LIGO—the NSF-funded Laser Interferometer Gravitational-wave Observatory. According to Einstein’s Theory of General Relativity, black holes and other massive objects can emit gravitational waves—ripples in the fabric of space-time that travel through the cosmos. LIGO was founded in the 1990s with stations in Washington state and Louisiana to detect these waves as they pass by Earth. “The principle is simple,” says Cavaglia, a member of the LIGO team. “Each LIGO detector is an L-shaped ultra-high vacuum system with arms four kilometers long. We use lasers to precisely measure changes in the length of the arms, which stretch or contract when a gravitational wave passes by.”

Just one problem: Gravitational waves are so weak, they change the length of each detector by just 0.001 times the width of a proton! “It is a difficult measurement,” allows Cavaglia. Seismic activity, thunderstorms, ocean waves, even a truck driving by the observatory can overwhelm the effect of a genuine gravitational wave. Figuring out how to isolate LIGO from so much terrestrial noise has been a major undertaking, but after years of work the LIGO team has done it. Since 2006, LIGO has been ready to detect gravitational waves coming from spinning black holes, supernovas, and colliding neutron stars anywhere within about 30 million light years of Earth.

So far the results are ... nil. Researchers working at dozens of collaborating institutions have yet to report a definite detection. Does this mean Einstein was wrong? Cavaglia doesn’t think so. “Einstein was probably right, as usual,” he says. “We just need more sensitivity. Right now LIGO can only detect events in our little corner of the Universe. To succeed, LIGO needs to expand its range.” So, later this year LIGO will be shut down so researchers can begin work on Advanced LIGO—a next generation detector 10 times more sensitive than its predecessor. “We’ll be monitoring a volume of space a thousand times greater than before,” says Cavaglia. “This will transform LIGO into a real observational tool.” When Advanced LIGO is completed in 2014 or so, the inner workings of black holes could finally be revealed. The punchline may yet make astronomers smile.

Find out more about LIGO at <http://www.ligo.caltech.edu/>. The Space Place has a LIGO explanation for kids (of all ages) at <http://spaceplace.nasa.gov/en/kids/ligo>, where you can “hear” a star and a black hole colliding!

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



Laser Interferometer Gravitational-wave Observatory in Livingston, Louisiana. Each of the two arms is 4 kilometers long. LIGO has another such observatory in Hanford, Washington.

In addition to The Space Place website (<http://spaceplace.nasa.gov>), the NASA team has created two other fun and educational websites for kids? The SciJinks Weather Laboratory at <http://scijinks.gov> targets middle-schoolers. It explains the reasons for the seasons, the tides, and other weather and Earth science mysteries in colorful "Now I get it!" pages. Climate Kids at <http://climate.nasa.gov/kids> demystifies the "Big Questions" about global climate change using 4-6th-grade-level language, colorful illustrations, humor, interactivity, and games. Climate Kids was recognized as the "site of the month" for April on the Kids.gov website. Both Space Place and Climate Kids are in the top ten government sites for kids, as acknowledged by Kids.gov.



STUDENTS RECORD SPELLBINDING VIDEO OF DISINTEGRATING SPACECRAFT

Last year, high school science teacher Ron Dantowitz of Brookline, Mass., played a clever trick on three of his best students. He asked them to plan a hypothetical mission to fly onboard a NASA DC-8 aircraft and observe a spacecraft disintegrate as it came screaming into Earth's atmosphere. How would they record the event? What could they learn?

For 6 months, they worked hard on their assignment, never suspecting the surprise Dantowitz had in store. On March 12th, he stunned them with the news: "The mission is real, and you're going along for the ride." In early June, Dantowitz and the teenagers traveled halfway around the world to help NASA track Japan's Hayabusa spacecraft as it plunged into Earth's atmosphere at 27,000 mph and shattered over the Australian outback. After boarding the DC-8 and flying to 41,000 feet, their hard work finally paid off when they successfully recorded the fiery re-entry:

"As it came into our camera's field of view, Hayabusa looked like a little white dot at first, and we all followed it for a few seconds without uttering a sound," says young James Breitmeyer. "Then it exploded into a big orange fireworks display, with pieces flying off. Everyone crooned 'Ooooo' at the same time!"
 The recording was made as part of the Hayabusa Re-entry Airborne Observing Campaign. Dantowitz and his students Breitmeyer, Brigitte Berman, and Yiannis Karavas were invited to join the effort because of Dantowitz's expertise in optical observations, tracking, and spectroscopy.

Launched on May 9, 2003, Hayabusa became the first space mission to make physical contact with an asteroid and attempt to return samples to Earth. Its 7 billion mile round trip to asteroid Itokawa ended with the June 13, 2010, re-entry. Researchers are hoping that bits of the asteroid's surface are sealed inside the sample-return capsule, which parachuted safely to the ground as bits of the mother ship fell in flaming smithereens, with three spellbound teenagers looking on. The observing campaign was designed to measure the conditions the capsule's heat shield had to endure as the capsule plummeted through Earth's atmosphere.

See the video at: <http://science.nasa.gov/media/medialibrary/2010/06/25/reentryvideo.mp4>
 (It's pretty impressive!)

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William M. Staerkel Planetarium has public shows on Friday evenings in August. Call 217/351-2446 for more information. <http://www.parkland.edu/planetarium>



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