



the Skyscraper

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December 2017

AMATEUR ASTRONOMICAL SOCIETY OF RHODE ISLAND * 47 PEEPTOAD ROAD * NORTH SCITUATE, RHODE ISLAND 02857 * WWW.THESKYSCRAPERS.ORG

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**Skyscrapers
Board Meetings**
Third Monday of the Month
All Members Welcome

Phases of the Moon

Full Cold Moon
December 3 15:47

Last Quarter Moon
December 10 07:51

New Moon
December 18 06:30

First Quarter Moon
December 26 09:20

Saturday, December 9 at North Scituate Community Center

5:30pm: Potluck Dinner

Members are asked to bring hot or cold foot items for this portion of the meeting (appetizers, salads, main dishes, desserts, cider or fruit). There are multiple outlets, so you will be able to plug in your hot plate,

tec. to keep four warm.

Please contact Kathy Siok at kathys5@cox.net to report what you are bringing.

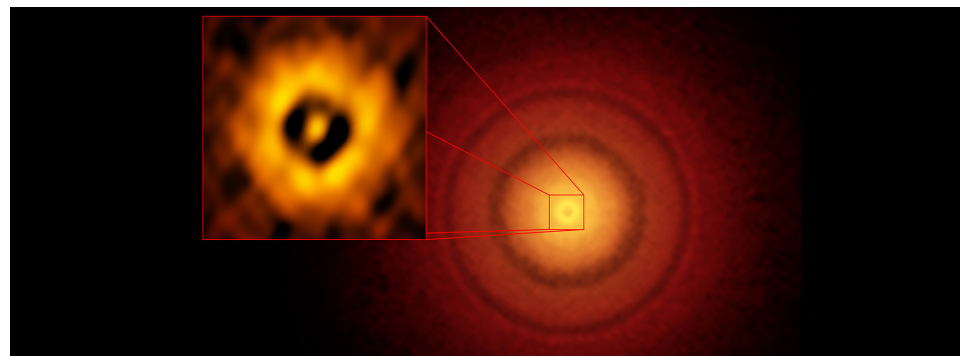
We will provide plates, napkins, cups, coffee, water and soda.

7:00pm: Featured Presentation: A New Window on the Universe from an Old Wave-Band

Although planets are always forming, this often occurs in disks of gas and dust so dense that light can't penetrate through to observe them, but radio wavelengths can. Radio telescopes, such as ALMA, possibly the most powerful one ever built, can show us incredible views of these planet-forming disks, giving us new knowledge of the possible origins of our own solar system. Meredith Hughes will lead us into the world of planet formation, using the most recent and spectacular information from

the ALMA facility.

Meredith Hughes is an assistant professor of astronomy at Wesleyan University. She earned a BS degree in physics and astronomy from Yale University and AM and PhD degrees in astronomy from Harvard University. Before arriving at Wesleyan, she also held Carl Sagan's old job as a Miller Fellow at UC Berkeley. She was recently awarded the Harvard Astronomy department's Bok Prize for research excellence by a PhD graduate under the age of 35.



Seagrave Memorial
Observatory
Open Nights

Saturdays st 7:00 pm
weather permitting

President's Message

by Steve Siok

Hello Everyone,

WOW!! Some of you may remember that in the October issue of "The Skyscraper", I mentioned that the month was really going to be exciting and it was. We should all be proud of our activities this October.

AstroAssembly was a success. We had a great lineup of speakers on both Friday and Saturday. I hope that some of us will be inspired by the great amateur projects that were highlighted this year. No, I do not think that anyone will attempt to put a 37" telescope on their roof like Mario Motta,



TJ Del Santo attends International Observe the Moon Night

but I always love to listen to how passionate and dedicated he is to astronomy. His collaboration with professionals was especially interesting. The weather was mixed but even though the skies were dreary and a little rain fell during mid day, we had a robust number of attendees. I thank all the members who worked hard during the year and on that day to make AstroAssembly possible. This is our only real fundraiser and the profits make up a large percentage of our revenues for the year.

International Observe the Moon Night (InOMN) was a great deal of fun. We hosted two speakers. Dr. Kim Arcand discussed her latest project, using 3D printing to build models of the remnants of star systems, such as planetary nebulae and supernovae. This was a shorter version of a talk that she will give at a monthly meeting in the new year. Member and former president Conrad Cardano helped visitors understand the surface features visible on the moon. Although there were clouds, we were able to catch glimpses of the first quarter moon through the telescopes and with the naked eye. TJ Del Santo, weatherman at Channel 12, attended and filmed a short segment at the observatory. It appeared on the 11PM newscast that night. We were on TV! Thank you to all those who helped with InOMN.

The other exciting news this month has to do with our August speaker. As you may remember, Dr. Rai Weiss from MIT

explained the design and operation of the LIGO gravitational wave observatories and described the actual discovery of the waves from a pair of colliding black holes. In October, Dr. Weiss received the Nobel Prize in Physics for his work, along with his close colleagues. He is the second Nobel Laureate to speak to our group. (A few years ago, Dr. Robert Wilson spoke about the discovery of the cosmic microwave background radiation.) To make it more exciting recently LIGO detected the merger of two neutron stars, called a "kilo-nova". The gravitational waves "chirped" for over 100 seconds and the merger lit up the entire electromagnetic spectrum!

Back on Earth, I want to remind you that I hope to see everyone at our annual Holiday Party on Saturday, December 9th at the North Scituate Community Center. At 5:30, we will share a pot luck feast followed by our speaker at 7PM.

On behalf of Kathy and myself, I wish you and your family a happy holiday!

Wishing you clear skies,



Steve Siok is president of Skyscrapers, Inc. See more at <http://www.theskyscrapers.org/steve-siok>



The Skyscraper is published monthly by Skyscrapers, Inc. Meetings are held monthly, usually on the first or second Friday or Saturday of the month. Seagrave Memorial Observatory is open every Saturday night, weather permitting.

Directions

Directions to Seagrave Memorial Observatory are located on the back page of this newsletter.

Submissions

Submissions to The Skyscraper are always welcome. Please submit items for the newsletter no later than **December 15** to Jim Hendrickson, 1 Sunflower Circle, North Providence, RI 02911 or e-mail to jim@distantgalaxy.com.

E-mail subscriptions

To receive The Skyscraper by e-mail, send e-mail with your name and address to jim@distantgalaxy.com. Note that you will no longer receive the newsletter by postal mail.

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December marks the Anniversary of the First & Last of the Apollo Lunar Flights

by Francine Jackson

NASA's videotape (yes, videotape) on the flight of Apollo 11 mentions that, "if you were too young, or not born yet," this is a good introduction to the first men on the Moon mission. Sadly, there are some, even within our own organization, who lament that their only Apollo mission during their lifetime was the finale, the Apollo-Soyuz coupling, where the two countries in essence finished the Cold War space competition.

Although we normally place the Apollo 11 landing as the extreme accomplishment, there were other, equally incredible parts to this historic time, and, surprisingly, two of them took place this month.

The second manned Apollo launch, and the first to leave Earth orbit, was Apollo 8. Launched December 21st, 1968, this was the first human spaceflight launched from the Kennedy Space Center. It was the first time astronauts were leaving the safety of Earth proximity and traveling for three days to the Moon. Frank Borman, James Lovell and William Anders were also the first astronauts to travel around the Moon, therefore being out of radio contact from mission control during each of its ten lunar orbits. When they became able to transmit back to Earth, as this was right before the Christmas holiday, they read from the Book of Genesis, afterwards wishing the world the

happiest of the season. In addition, Bill Anders was the first human to observe the Earth from space, photographing it for all the world to see.

They returned to Earth on December 27th, after which they were named Time magazine's Men of the Year; however, this honor paled in the fact that they had paved the way for the actual Moon landing before the end of the decade, fulfilling the promise that President John Kennedy had made.

Eight flights and six successful lunar landings later, the Moon was abandoned as a destination.

The last of these missions, Apollo 17, also took place in December, when Eugene Cernan, Harrison Schmitt and Ronald Evans blasted off on December 7th, 1972. It was the first night launch for Apollo, and became the last manned launch of a Saturn V.

This mission was to both sample material believed to be older than that of Mare Imbrium, and to attempt to verify any volcanic activity that might have occurred in the region. Apollo 17 broke several records during its time: It was the longest time spent on the Moon (3 days, 3 hours), longest moonwalks (lasting over 7 hours), the return of some of the very largest lunar samples, and the longest time in lunar orbit. They returned to Earth twelve days later, on



December 19th.

Before leaving, Astronaut Cernan unveiled a plaque commemorating the achievements of all Apollo missions, and he expressed the hope that the Apollo program would be just the first step in the return of humanity to the Moon, "with peace and hope for all mankind." We've never gone back.



Francine Jackson is Skyscrapers Public Relations Spokesperson, writes the weekly newsletter for Ladd Observatory and serves as planetarian at the University of Rhode Island. See more at <http://theskyscrapers.org/francine-jackson>

Learn the History of Space Travel at the University of Rhode Island Planetarium!

University of Rhode Island Planetarium
Upper College Road
Kingston, RI

Friday, December 8th, 2017, 6:00 P.M.

Contact: Francine Jackson: 401-527-5558

In December, 1968, the first astronauts circled our Moon. In July, 1969, the first footprints on another world were made on our neighbor Moon. In December, 1972, the last footprints were left there. To honor these events, the University of Rhode Island Planetarium will present Dawn of the Space Age, taking us from the first successful Sputnik mission to the hoped-for expeditions to Mars. Often considered one of the greatest planetarium shows ever made, Dawn of the Space Age will follow both the

successes and the failings in our attempts to leave the Earth for other worlds.

Also shown will be a short program on our increase in the use of lighting, plus a live presentation to the Skies over the URI campus.

Admission, to benefit the URI Planetarium Fund, is only \$5.00.

The University of Rhode Island Planetarium is located on Upper College Road, on the Kingston campus, across from the Visitors' Center.

The University of Rhode Island Planetarium is available for programming for schools and other organizations. For more information, please contact Francine Jackson at 401-527-5558.



A “Gem” of a Meteor Shower and Other Stargazing Highlight

by Dave Huestis

Another year of enjoying the heavens is rapidly drawing to a close. We’ve been fairly successful in viewing many sky events in 2017, the best being the August 21 solar eclipse. We can only hope good weather prospects will continue for just a little while longer so we can wrap up the year with some decent astronomical viewing.

First up on December 3 will be a so-called supermoon. This Full Moon will be the closest full moon of the year at a distance of 222,443 miles. The average distance is 238,500 miles. But don’t let that fool you. The vast majority of folks will not be able to distinguish visually December’s supermoon size from any other Full Moon. It will, however, get everyone talking about the Moon and that’s good free public relations for local astronomical societies.

During the first week of the month you will definitely notice a brilliant “star” above the eastern horizon before sunrise. However, it is not a star. It’s the planet Jupiter. This giant world joins Mars for early morning viewing. The two planets will be moving closer to each other in the sky as the days proceed, coming closest to one another (conjunction) on the mornings of January 6 and 7. If you want to get up early to observe these planets with a telescope, Jupiter’s large disk will show a wealth of detail, while much smaller Mars will reveal little surface detail.

Near-perfect astronomical conditions

will prevail for this year’s best meteor shower, the Geminids, which will peak on the night of December 13-14. The Moon will be a thin waning crescent rising in the east around 3:23 a.m. Gemini will be on the opposite side of the sky, so the Moon’s faint illumination will not interfere with observing as many meteors as possible.

As with observing any meteor shower to best advantage, one should choose an observing location as far from interfering light pollution as possible. Also, do not remain standing too long to observe this display. Sit or recline in a comfortable lounge chair. Dress in layers. Climb into a sleeping bag if possible. Wear a hat to keep heat from escaping through your head. Wear warm mittens, not gloves. Mittens keep your fingers together for added warmth. You can also use a few of those pocket warmers to keep extremities toasty.

One important fact to remember is that the Geminids are one shower that can be observed before midnight. You won’t see the peak rate, but if you can’t scan the skies after midnight at least you will be able to observe more than a handful before the midnight hour. And there may be some earthgrazers within a few hours after sunset. With Castor and Pollux rising around 5:30 p.m. and 6:00 p.m. respectively, our observing vantage point will show an occasional Geminid skimming tangentially across the top of Earth’s atmosphere and

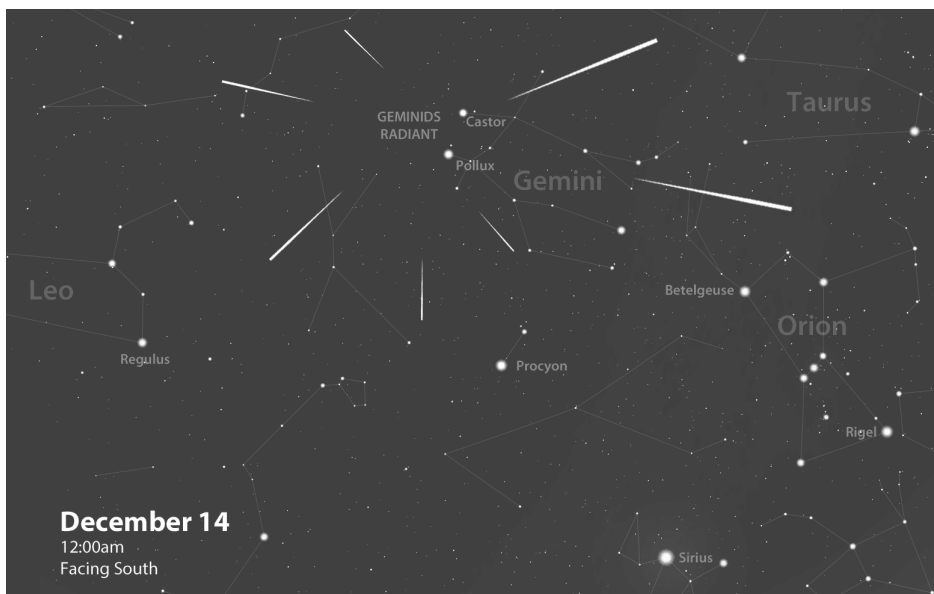


parallel to the horizon. This scenario provides for much longer streaks, often looking like a stone skipping across a pond.

While the Geminids appear to emanate from Gemini near its brightest stars, Castor and Pollux, scan around the sky as much as possible. As the night progresses and Gemini moves across the sky towards the west, your scan should move as well. At around 2:30 a.m. Gemini will be on your meridian, just south of zenith. With clear and dark skies a keen-eyed observer should see 60+ meteors per hour during the peak activity between midnight and dawn. If you care to conduct an accurate count, you should notice the number of meteors per hour increase as the night progresses, and then begin to decrease as dawn approaches.

The Geminids are fairly bright and moderate in speed, hitting our atmosphere at 21.75 miles per second. They are characterized by their multicolored display (65% being white, 26% yellow, and the remaining 9% blue, red and green). Geminids also have a reputation for producing exploding meteors called fireballs.

Next up on our astronomical calendar is the Winter Solstice, which occurs at 5:44 a.m. EST (Eastern Standard Time) on the 21st. This event marks the beginning of winter in the northern hemisphere. Notice how low an arc the Sun travels across the sky. After this date and time the Sun’s arc will rise higher and higher each day as it appears to travel northward in our sky, reaching the Vernal Equinox (spring) on March 20, 2018 at 12:15 p.m. EDT (Eastern Day-



light Time). The apparent shift of the Sun's position in the sky is the result of the Earth's fixed axial tilt of 23.5 degrees as it revolves around the Sun.

And finally to round out the year, local astronomers will be able to observe yet another occultation of constellation Taurus' brightest star Aldebaran. During the early evening hours of December 30 the dark limb (left side) of a waxing gibbous Moon will occult (pass in front of) Aldebaran at approximately 6:28 p.m. EST. As the Moon continues to slide eastward in the sky Aldebaran will remain hidden for about 51 minutes. At approximately 7:19 p.m. Aldebaran will emerge along the Moon's bright limb (right side). Occultations by the Moon

are always fascinating to watch, as one can often see the occulted object blinking in and out from behind lunar mountains or crater rims. Binoculars or a small telescope will facilitate your observation of this event.

Lastly, as we approach the holiday season, many folks ask me about the mystery of the Christmas Star. An unabridged version of my latest treatise on this topic can be found on the Skyscrapers' website <http://www.theskyscrapers.org/mystery-of-the-christmas-star> for your examination.

Seagrave Memorial Observatory (<http://www.theskyscrapers.org>) in North Scituate is open to the public every clear Saturday night. However, in December Seagrave will only be open on the 2nd and 16th. Ladd

Observatory (<http://www.brown.edu/Departments/Physics/Ladd/>) in Providence is open every clear Tuesday night. The Margaret M. Jacoby Observatory at the CCRI Knight Campus in Warwick (<http://www.ccri.edu/physics/observatory.htm>) is open every clear Thursday night. Frosty Drew Observatory (<http://www.frostydrew.org/>) in Charlestown is open every clear Friday night year-round.

Happy holidays and clear skies to all.



Dave Huestis is Skyscrapers Historian and has been contributing monthly columns to local newspapers for nearly 40 years. See more at <http://theskyscrapers.org/dave-huestis>

A Young Astronomer Visits Seagrave

by Steve & Kathy Siok

When Weston Ambrose and his mother joined us at "Observe the Moon Night" in October, little did they realize what they were getting into. While it was partly cloudy, the evening was a great success with speakers Kim Arcand and Conrad Cardano as well as glimpses of the first quarter moon. This was the Ambrose' first visit to Seagrave.

Weston and his family live in nearby Massachusetts and he attends 8th grade in Franklin, getting excited about attending high school next year. They visited Seagrave because Weston has an intense interest in astronomy and space, which became obvious as he conversed with us all. It was such a pleasure to have such a mature and interested 14 year old in our midst, who soaked up everything he heard. We convinced the family to attend our November meeting and meet many more amateur astronomers.

During the summer, Steve and I had been contacted by a woman who lives in Wickford. She wanted to donate a small telescope that belonged to her husband. Upon visiting Jane, who wishes to remain anonymous, we learned that she and her husband had lived around the world before settling in Wickford for retirement. He had many interests and at one point had acquired a 4" telescope. He had not been able to use it since developing advanced Alzheimer's and was currently in a nursing home. During his life, this man had made significant impact on our daily lives, having invented the original pop-top can! Jane wanted to pass on the telescope to someone

who would use it. She also gave us a small coupon that said "Share for Shannon". She did not want a tax deduction, but wanted us to "pay it forward" to someone. The "Share for Shannon" foundation was established in memory of a fearless and memorable young woman from Rhode Island who had lost her life in an accident. To honor her spirit and good works, we were asked to extend "a gesture of kindness and pay it forward to someone else".

When we met Weston that night, we knew just what to do with this gift. The telescope was presented to Weston at the November meeting and it was a complete surprise to him and his family. The coupon

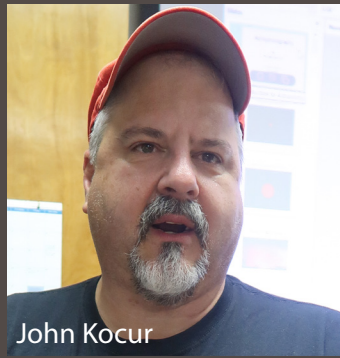
was also part of the package: to pay a kindness forward to someone else in some way. Also, part of the surprise were 2 astronomy books and a not so small assignment to come back to give a presentation in the future. You see, Weston with his keen interest in science wants to study astronomy and become the first "little person" to be admitted to the Air Force Academy. Perhaps he might become as astronaut one day!

So we hope that we helped with Weston's journey into a marvelous future. We do know that he could not stop smiling. As his mom said: "Dream big, my son, dream big". I know that Skyscrapers will forever be part of Weston's fan club!





AstroAssembly Emcee
Scott Tracy



John Kocur



Ron Zincon



Jeff Padell



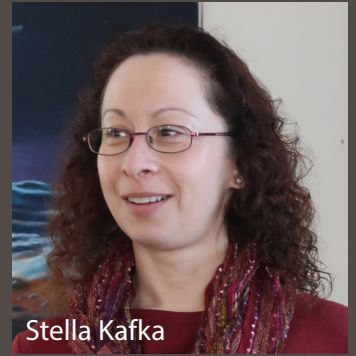
Julie Sage



Francis O'Reilly



Al Sliski



Stella Kafka



Lunch Grill Crew
Bob Horton, Jim Crawford & Tom Thibault



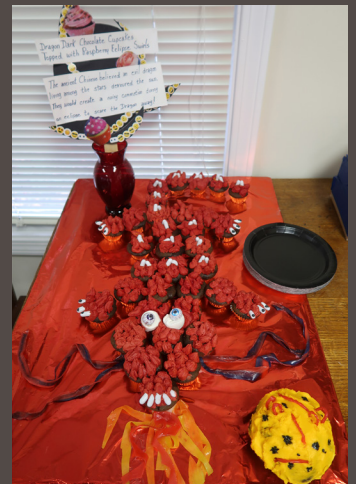
AstroAssembly Dinner prepared by
Quik-Stop Deli



Keynote Speaker
Mario Motta



Skyscrapers President & AstroAssembly Chair
Steve & Kathy Siok



AstroAssembly 2017



Barred Spiral Galaxy in Triangulum

NGC 925

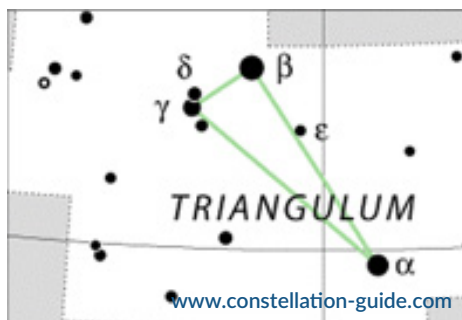
by Glenn Chaple for LVAS

(Mag. 10.0; Size 9.8' X 6.0')

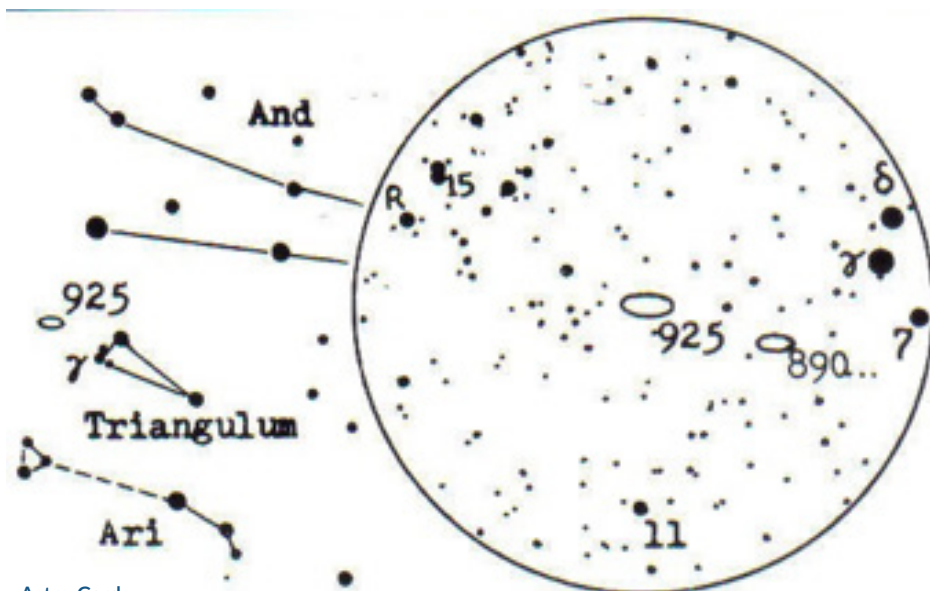
Our December LVAS Observer's Challenge is the barred spiral galaxy NGC 925, located 2 degrees east of the 4th magnitude star gamma (γ) Trianguli. It was discovered by William Herschel on September 13, 1784, and bears the Herschel Catalog designation HIII 177 (the 177th entry in Class III [Very Faint Nebulae]). He described it in part as, "Very faint, considerably large, irregularly round."

Any Class III Herschel object would be a visual test for modest-sized scopes, and NGC 925 is no exception. It's apparently too challenging to have been included in the Astronomical League's Herschel 400 observing program. If you're able to glimpse this galaxy, can you detect the ESE to WNW orientation of the elongated core? At what aperture do the spiral arms become visible? Ideally, you'd want to check out NGC 925 from a dark sky location. If you live in an area with skies of average (mag 5) limiting magnitude, how well can you see it?

The purpose of the LVAS Observer's Challenge is to encourage the pursuit of visual observing. It is open to everyone that is interested, and if you are able to contribute notes, drawings, or photographs, the LVAS will be happy to include them in our monthly summary. If you would like to contribute material, submit your observing notes, sketches, and/or images to either Roger Ivester (rogerivester@me.com) or Fred Rayworth (queex@embarqmail.com). To find out more about the LVAS Observer's Challenge or access past reports, log on to lvastronomy.com/observing-challenge.



Astronomy Magazine



Astro Cards



One of our most avid members, Kent Cameron, passed on Thursday, November 30th. Well-known as one of the first to volunteer for any observing group, Kent was, in addition to Skyscrapers, Inc., the lead on the Blackstone Valley GO program for many years. He also was a member of our observing committee, gladly taking his time on the 8-inch Clark.

His interests also spread to art, as he was an accomplished painter. In addition, he was a member of the R.I. Beekeepers Association, and the Narragansett Bay Wheelmen.

Our hearts go out to Connie, his wife and companion for over 50 years, his son Bruce, sisters Priscilla and Lorna and their husbands, and his many nieces and nephews. Kent also was predeceased by a brother Richard. We at Skyscrapers, Inc., will all miss his devotion to the sky, his cutting-edge wit, and his amazing presence.



Studying Storms from the Sky

By Teagan Wall

The United States had a rough hurricane season this year. Scientists collect information before and during hurricanes to understand the storms and help people stay safe. However, collecting information during a violent storm is very difficult.

Hurricanes are constantly changing. This means that we need a lot of really precise data about the storm. It's pretty hard to learn about hurricanes while inside the storm, and instruments on the ground can be broken by high winds and flooding. One solution is to study hurricanes from above. NASA and NOAA can use satellites to keep an eye on storms that are difficult to study on the ground.

In Puerto Rico, Hurricane Maria was so strong that it knocked out radar before it even hit land. Radar can be used to predict a storm's path and intensity—and without radar, it is difficult to tell how intense a storm will be. Luckily, scientists were able to use information from a weather satellite called GOES-16, short for Geostationary Operational Environmental Satellite – 16.

The “G” in GOES-16 stands for geostationary. This means that the satellite is always above the same place on the Earth, so during Hurricane Maria, it never lost sight of the storm. GOES-16's job as a weather satellite hasn't officially started yet, but it was collecting information and was able to help.

From 22,000 miles above Earth, GOES-16 watched Hurricane Maria, and kept scientists on the ground up to date. Knowing where a storm is—and what it's doing—can help keep people safe, and get help to the people that need it.

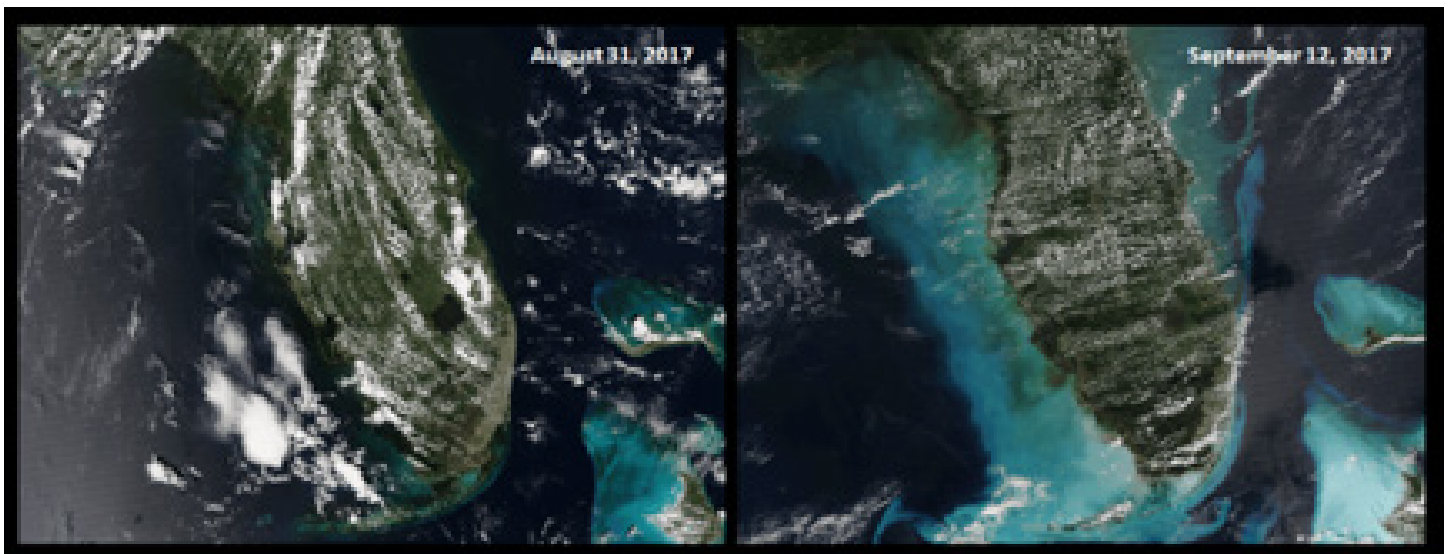
Hurricanes can also have a huge impact on the environment—even after they're gone. To learn about how Hurricane Irma affected the Florida coast, scientists used images from an environmental satellite called Suomi National Polar-orbiting Partnership, or Suomi-NPP. One of the instruments on this satellite, called VIIRS (Visible Infrared Imaging Radiometer Suite), took pictures of Florida before and after the Hurricane.

Hurricane Irma was so big and powerful, that it moved massive amounts of dirt, water and pollution. The information captured by VIIRS can tell scientists how and where these particles are moving in the water. This can help with recovery efforts, and help us design better ways to prepare for hurricanes in the future.

By using satellites like GOES-16 and Suomi-NPP to observe severe storms, researchers and experts stay up to date in a safe and fast way. The more we know about hurricanes, the more effectively we can protect people and the environment from them in the future.

To learn more about hurricanes, check out NASA Space Place: <https://spaceplace.nasa.gov/hurricanes/>

This article is provided by NASA Space Place. With articles, activities, crafts, games, and lesson plans, NASA Space Place encourages everyone to get excited about science and technology. Visit spaceplace.nasa.gov to explore space and Earth science!



These images of Florida and the Bahamas were captured by a satellite called Suomi-NPP. The image on the left was taken before Hurricane Irma and the image on the right was taken after the hurricane. The light color along the coast is dirt, sand and garbage brought up by the storm. Image credit: NASA/NOAA

The Sun, Moon & Planets in December

This table contains the ephemeris of the objects in the Solar System for each Saturday night in December 2017. All times are in Eastern Standard Time (UTC-5). Ephemeris times are for Seagrave Observatory (41.845N, 71.590W).

Object	Date	RA	Dec	Const	Mag	Size	Elong	Phase(%)	Dist(S)	Dist(E)	Rise	Transit	Set
Sun	2	16 33.4	-21 56.7	Oph	-26.8	1946.6	-	-	-	0.99	06:55	11:35	16:16
	9	17 03.9	-22 48.6	Oph	-26.8	1948.6	-	-	-	0.98	07:01	11:38	16:15
	16	17 34.8	-23 18.6	Oph	-26.8	1950.0	-	-	-	0.98	07:07	11:42	16:16
	23	18 05.8	-23 25.8	Sgr	-26.8	1951.1	-	-	-	0.98	07:11	11:45	16:20
	30	18 36.9	-23 09.9	Sgr	-26.8	1951.7	-	-	-	0.98	07:13	11:49	16:24
Moon	2	3 04.9	11 25.2	Ari	-12.7	2001.0	156° E	96	-	-	15:57	23:10	06:32
	9	10 13.6	11 39.8	Leo	-12.2	1904.0	107° W	64	-	-	22:10	05:07	11:56
	16	15 51.4	-15 37.6	Lib	-9.2	1759.3	25° W	5	-	-	05:20	10:29	15:33
	23	21 38.3	-15 15.5	Cap	-10.7	1797.3	51° E	19	-	-	10:35	15:58	21:28
	30	3 36.2	13 29.6	Tau	-12.6	1997.7	136° E	86	-	-	14:30	21:49	05:15
Mercury	2	17 56.3	-24 58.7	Sgr	0.4	8.1	19° E	36	0.34	0.84	08:31	12:56	17:21
	9	17 44.2	-22 59.9	Sgr	3.4	9.6	9° E	7	0.31	0.70	07:39	12:12	16:46
	16	17 06.1	-20 23.4	Oph	4.9	9.8	7° W	4	0.31	0.69	06:22	11:07	15:52
	23	16 47.9	-19 26.2	Oph	0.7	8.4	19° W	31	0.34	0.80	05:36	10:24	15:13
	30	17 00.9	-20 27.2	Oph	-0.1	7.0	22° W	56	0.38	0.96	05:27	10:12	14:57
Venus	2	15 55.1	-19 37.3	Lib	-3.8	10.1	9° W	99	0.72	1.68	06:09	10:58	15:46
	9	16 31.9	-21 27.0	Oph	-3.8	10.0	8° W	99	0.72	1.69	06:26	11:07	15:47
	16	17 09.6	-22 46.1	Oph	-3.8	10.0	6° W	100	0.73	1.70	06:42	11:17	15:52
	23	17 47.8	-23 31.6	Sgr	-3.8	9.9	4° W	100	0.73	1.70	06:56	11:28	16:00
	30	18 26.2	-23 41.6	Sgr	-3.8	9.9	2° W	100	0.73	1.71	07:07	11:39	16:10
Mars	2	13 35.6	-8 50.0	Vir	1.7	4.3	45° W	95	1.65	2.20	03:06	08:36	14:06
	9	13 52.2	-10 25.9	Vir	1.6	4.4	47° W	95	1.65	2.15	03:01	08:25	13:50
	16	14 09.0	-11 58.4	Vir	1.6	4.5	50° W	94	1.64	2.09	02:56	08:15	13:33
	23	14 25.9	-13 26.8	Lib	1.6	4.6	53° W	94	1.64	2.03	02:51	08:04	13:17
	30	14 43.0	-14 50.7	Lib	1.5	4.7	56° W	93	1.63	1.97	02:46	07:54	13:01
1 Ceres	2	9 30.8	23 08.2	Leo	8	0.6	112° W	97	2.59	2.05	20:59	04:31	12:04
	9	9 34.1	23 35.4	Leo	7.9	0.6	119° W	97	2.59	1.97	20:32	04:07	11:42
	16	9 36.0	24 10.3	Leo	7.8	0.7	125° W	98	2.59	1.89	20:04	03:41	11:19
	23	9 36.5	24 52.8	Leo	7.6	0.7	132° W	98	2.58	1.82	19:34	03:14	10:55
	30	9 35.6	25 42.1	Leo	7.5	0.7	139° W	98	2.58	1.75	19:01	02:46	10:31
Jupiter	2	14 36.7	-14 14.5	Lib	-1.6	31.3	29° W	100	5.44	6.28	04:27	09:37	14:46
	9	14 42.2	-14 40.1	Lib	-1.6	31.6	34° W	100	5.44	6.22	04:06	09:15	14:23
	16	14 47.6	-15 04.2	Lib	-1.6	32.0	40° W	100	5.43	6.15	03:46	08:52	13:59
	23	14 52.8	-15 26.7	Lib	-1.6	32.4	46° W	100	5.43	6.07	03:25	08:30	13:35
	30	14 57.8	-15 47.5	Lib	-1.6	32.9	52° W	99	5.43	5.98	03:04	08:07	13:11
Saturn	2	17 50.8	-22 29.1	Sgr	0.5	15.1	18° E	100	10.06	11.00	08:14	12:50	17:26
	9	17 54.3	-22 30.4	Sgr	0.5	15.0	12° E	100	10.06	11.03	07:50	12:26	17:02
	16	17 57.9	-22 31.2	Sgr	0.5	15.0	5° E	100	10.06	11.04	07:26	12:02	16:38
	23	18 01.4	-22 31.8	Sgr	0.5	15.0	1° W	100	10.06	11.05	07:02	11:38	16:14
	30	18 05.0	-22 31.9	Sgr	0.5	15.0	7° W	100	10.06	11.04	06:38	11:14	15:50
Uranus	2	1 33.5	9 07.5	Psc	5.7	3.7	135° E	100	19.91	19.20	13:56	20:31	03:06
	9	1 32.9	9 04.2	Psc	5.7	3.7	128° E	100	19.91	19.29	13:28	20:03	02:38
	16	1 32.4	9 01.7	Psc	5.8	3.6	120° E	100	19.90	19.39	13:00	19:35	02:10
	23	1 32.1	9 00.1	Psc	5.8	3.6	113° E	100	19.90	19.49	12:32	19:07	01:42
	30	1 31.9	8 59.3	Psc	5.8	3.6	106° E	100	19.90	19.61	12:05	18:39	01:14
Neptune	2	22 53.1	-8 06.4	Aqr	7.9	2.3	91° E	100	29.95	29.90	12:18	17:51	23:24
	9	22 53.3	-8 05.1	Aqr	7.9	2.3	84° E	100	29.95	30.02	11:51	17:24	22:57
	16	22 53.6	-8 03.1	Aqr	7.9	2.3	77° E	100	29.94	30.14	11:24	16:57	22:30
	23	22 54.0	-8 00.5	Aqr	7.9	2.3	70° E	100	29.94	30.26	10:56	16:29	22:03
	30	22 54.5	-7 57.4	Aqr	7.9	2.2	63° E	100	29.94	30.37	10:29	16:02	21:36
Pluto	2	19 17.0	-21 45.0	Sgr	14.3	0.2	38° E	100	33.46	34.23	09:37	14:16	18:55
	9	19 17.9	-21 44.1	Sgr	14.3	0.2	31° E	100	33.46	34.30	09:10	13:49	18:28
	16	19 18.8	-21 43.0	Sgr	14.3	0.2	24° E	100	33.47	34.36	08:43	13:22	18:02
	23	19 19.8	-21 41.9	Sgr	14.3	0.2	17° E	100	33.47	34.41	08:17	12:56	17:35
	30	19 20.8	-21 40.6	Sgr	14.3	0.2	10° E	100	33.48	34.44	07:50	12:29	17:09

Directions to Seagrave Memorial Observatory

From the Providence area:

Take Rt. 6 West to Interstate 295 in Johnston and proceed west on Rt. 6 to Scituate. In Scituate bear right off Rt. 6 onto Rt. 101. Turn right onto Rt. 116 North. Peeptoad Road is the first left off Rt. 116.

From Coventry/West Warwick area:

Take Rt. 116 North. Peeptoad Road is the first left after crossing Rt. 101.

From Southern Rhode Island:

Take Interstate 95 North. Exit onto Interstate 295 North in Warwick (left exit.) Exit to Rt. 6 West in Johnston. Bear right off Rt. 6 onto Rt. 101. Turn right on Rt. 116. Peeptoad Road is the first left off Rt. 116.

From Northern Rhode Island:

Take Rt. 116 South. Follow Rt. 116 thru Greenville. Turn left at Knight's Farm intersection (Rt. 116 turns left) and follow Rt. 116. Watch for Peeptoad Road on the right.

From Connecticut:

- Take Rt. 44 East to Greenville and turn right on Rt. 116 South. Turn left at Knight's Farm intersection (Rt. 116 turn left) and follow Rt. 116. Watch for Peeptoad Road on the right.
- or • Take Rt. 6 East toward Rhode Island; bear left on Rt. 101 East and continue to intersection with Rt. 116. Turn left; Peeptoad Road is the first left off Rt. 116.

From Massachusetts:

Take Interstate 295 South (off Interstate 95 in Attleboro). Exit onto Rt. 6 West in Johnston. Bear right off Rt. 6 onto Rt. 101. Turn right on Rt. 116. Peeptoad Road is the first left off Rt. 116.



47 Peeptoad Road
North Scituate, Rhode Island 02857