BACK BAY OBSERVER

June 2019

The official newsletter of the Back Bay Amateur Astronomers

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UPCOMING

June 1 **Nightwatch**
Dusk-Dawn
Chippokes Plantation, Surry

June 6 **BBAA Meeting**
7:30-9PM
TCC, Virginia Beach

June 7 **Cornwatch**
Dusk-Dawn
Cornland Park, Chesapeake

June 8 **Little Astronomers**
8:15-10PM
Breezy Point Park, NOB

June 10 **ECSU Grand Opening**
6-9PM
Elizabeth City, NC

For more information, go to www.backbayastro.org/

Shawn Loescher aims the club's Meade LX90 EMC toward the moon during Boardwalk Astronomy. On shore, Virginia Beach Horseback riders pass by. Join the BBAA again on June 18th, 6-11PM on the boardwalk at 24th Street.

LOOKING UP! *a message from the president*

Last month, I have been busy with family events and was only able to attend one club event—Boardwalk Astronomy. I want to take a moment to thank the club members and officers who have helped me by doing everything from making sure that all of our events were taken care of, to doing interviews with the City of Chesapeake. Thank you! The first Boardwalk Astronomy of the year turned out great even though the weather was cloudy and cool. My family from out of town really enjoyed going to the boardwalk to view the night sky and to see our club bring astronomy to the people of Hampton Roads.

Last month I reached out to many of the guests who have given presentations at our club meetings and I am happy to say that for the rest of the year, we will have a

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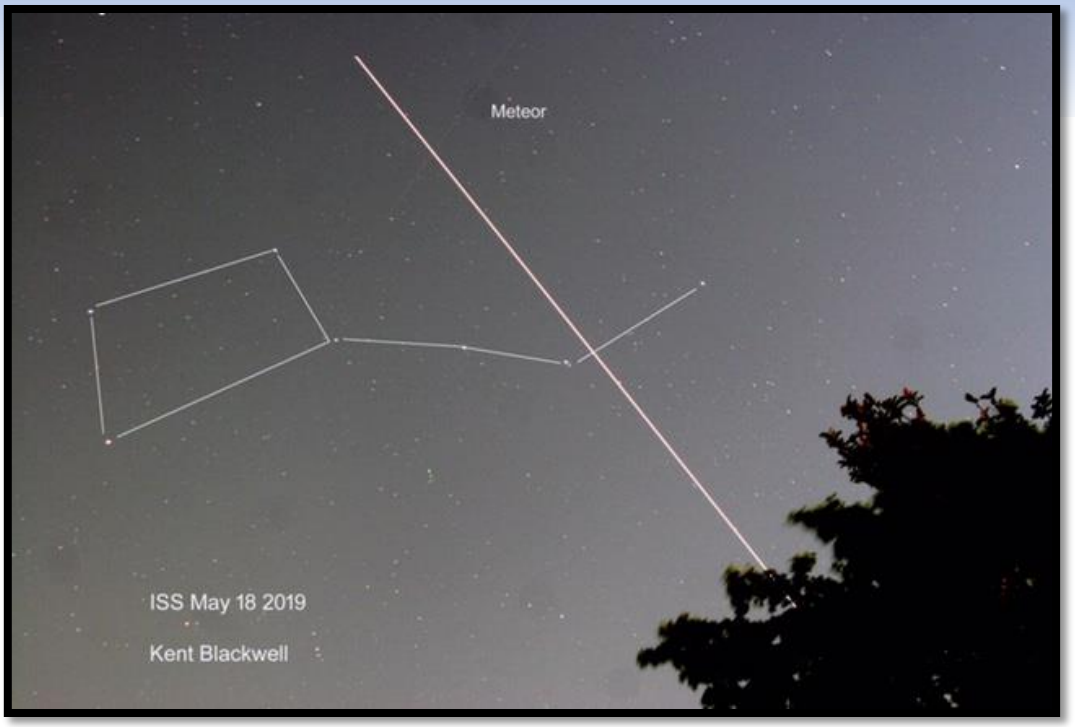
The International Space Station



Kent Blackwell captured this image of the ISS. Note the red color. Roy Diffrient suggests that it might be the solar panels reflecting the red color in our atmosphere at sunset.

Canon 20Da
28mm at f/4
20 second exposure ISO 400

Observers cont'd page 10

Looking Up! cont'd

full schedule of presentations at almost every club meeting. Our lineup is as follows:

June - George Reynolds, historical video: rocketry

July - Yours Truely, cooking for you (club picnic)

August - Dr. Kunio Sayanagi, Hampton University

September - Rich Roberts

October - Dr. William B. Moore, Hampton University

November - I will try to wrangle George Reynolds to give his telescope 101 course to assist anyone interested in purchasing a telescope for the holidays.

December - anniversary luncheon

To wrap up, I'll reiterate what George Reynolds mentioned in an email earlier this month about making sure our club members log events on the Night Sky Network. Fortunately for our club, Jim Tallman took it upon himself to set our club up on Night Sky Network a few years ago. Because of his hard work, our club has received many resources that we use at almost every event. To ensure that we keep getting those resources, our members just have to log the time they spend doing outreach events. That is the justification that NASA needs to send us more supplies. If you are unsure how to log your time, please ask one of the club officers and we will assist you.

If you really want to dive into the weeds and find out more information about NASA's Night Sky Network you can visit the Club Coordinator Resources and Management Tools page on their website. Here, you can find references and tools listed that aide the NSN Coordinators in their outreach and organization efforts: Night Sky Network

See you at the next club event and until then keep Looking Up!

Shawn Loescher

Jupiter Shines in June

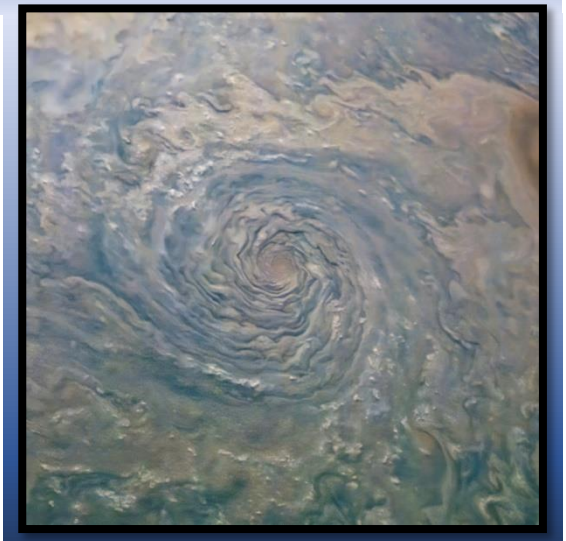
By David Prosper

Jupiter stakes its claim as the king of the planets in June, shining bright all night. **Saturn** trails behind Jupiter, and the **Moon** passes by both planets mid-month. **Mercury** puts on its best evening appearance in 2019 late in the month, outshining nearby **Mars** at sunset.

Jupiter is visible almost the entire evening this month. Earth will be between Jupiter and the Sun on June 10, meaning Jupiter is at **opposition**. On that date, Jupiter rises in the east as the Sun sets in the west, remaining visible the entire night. Jupiter will be one of the brightest objects in the night sky, shining at magnitude -2.6. Its four largest moons and cloud bands are easily spotted with even a small telescope.

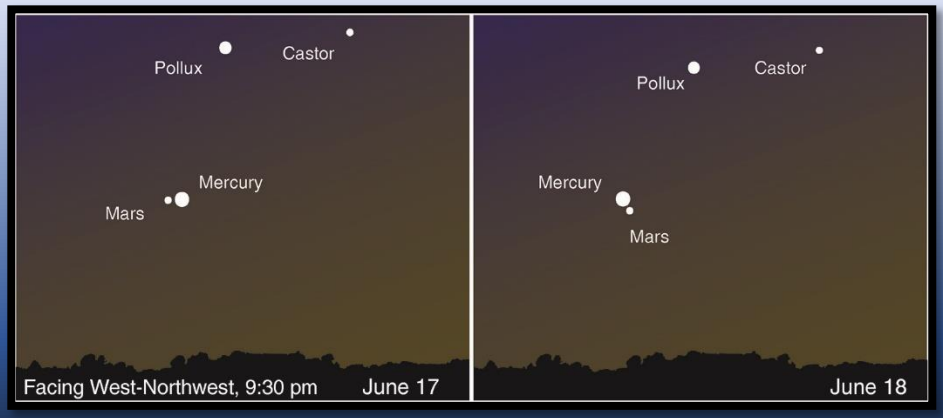
What if your sky is cloudy or you don't have a telescope? See far more of Jupiter than we can observe from Earth with NASA's **Juno** mission! Juno has been orbiting Jupiter since 2016, swooping mere thousands of miles above its cloud tops in its extremely elliptical polar orbits, which take the probe over 5 million miles away at its furthest point! These extreme orbits minimize Juno's exposure to Jupiter's powerful radiation as it studies the gas giant's internal structure, especially its intense magnetic fields. Juno's hardy JunoCam instrument takes incredible photos of Jupiter's raging storms during its flybys. All of the images are available to the public, and citizen scientists are doing amazing things with them. You can too! Find out more at bit.ly/JunoCam

Saturn rises about two hours after Jupiter and is visible before midnight. The ringed planet rises earlier each evening as its own opposition approaches in July. The **Moon** appears near both gas giants mid-month. The Moon's tour begins on June 16 as it approaches Jupiter, and its visit ends on June 19 after swinging past Saturn.



A giant storm in Jupiter's north polar region, captured by JunoCam on February 4, 2019. Image processing performed by citizen scientists Gerald Eichstädt and Seán Doran.
Source: bit.ly/JupiterSpiral

Mercury is back in evening skies and will be highest after sunset on June 23, just two days after the summer solstice! Spot it low in the western horizon, close to the much dimmer and redder **Mars**. This is your best chance this year to spot Mercury in the evening, and nearly your last chance to see Mars, too! The two smallest planets of our solar system pass close to each other the evenings of June 17-18, coming within just ¼ degree, or half the width of a full Moon, making for a potentially great landscape photo at twilight.



Mars and Mercury after sunset the evenings of June 17-18. Image created with assistance from Stellarium.

This article was distributed by NASA Night Sky Network
Visit https://nightsky.jpl.nasa.gov/

Meteorology and Astronomy

By Sarah Gartin

Meteorology and astronomy go hand in hand when it comes to the amateur astronomer. Whether we are observing the night sky or looking at the sun through a protective filter, the weather will always be the first obstacle that we need to confront when it comes to celestial viewing. Everything from stormy skies to the clearest of nights will impact our sky observations in either a negative or positive manner. Whether we set off for a quiet night under the stars, or plan months in advance for a large cosmic event, it is in our best interest to become quite familiar with weather and how unpredictable it can be.

Thankfully we live in a time of instant information via our mobile phones, which is an immense help to all of us. I have a few apps that I definitely would recommend to anyone in the community to utilize in their own personal forecasting of night sky events.

First and foremost, I recommend that any level of astronomer download some satellite and radar apps. These phone apps will show you real time data of both clouds and weather systems tracking across the continental U.S. (Please note that I use an iPhone, however these apps seem to be pretty universal for android and other types of mobile phones.)

The app "MyRadar" will show you weather systems and precipitation in real time as they move in or out of our area. You can look at the current run time of the app and see that we may not have any current weather in our area, but by later on in the evening a system with heavy rains and storms may be moving eastward toward our location. Instances like these may force us to prepare for a shift in weather.

Along with a good radar app, you should also install another integral app such as "NOAA Now." This is a great tool to see that oh-so-important cloud coverage that we try very hard to avoid. The weather may be precipitation free, but there still may be pesky clouds around to be on the lookout for. These apps run on a loop, so

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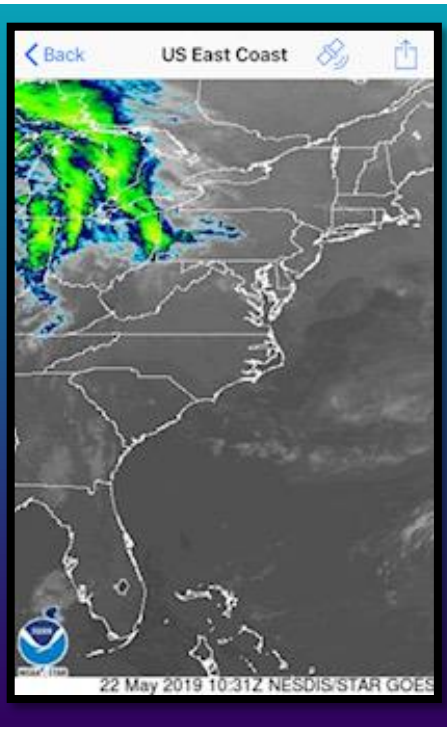
Left: Screenshot from MyRadar app displays where active precipitation is moving.

Right: Screenshot from NOAA Now app shows storm systems, active precipitation, as well as some lower to mid-level cloud coverage.

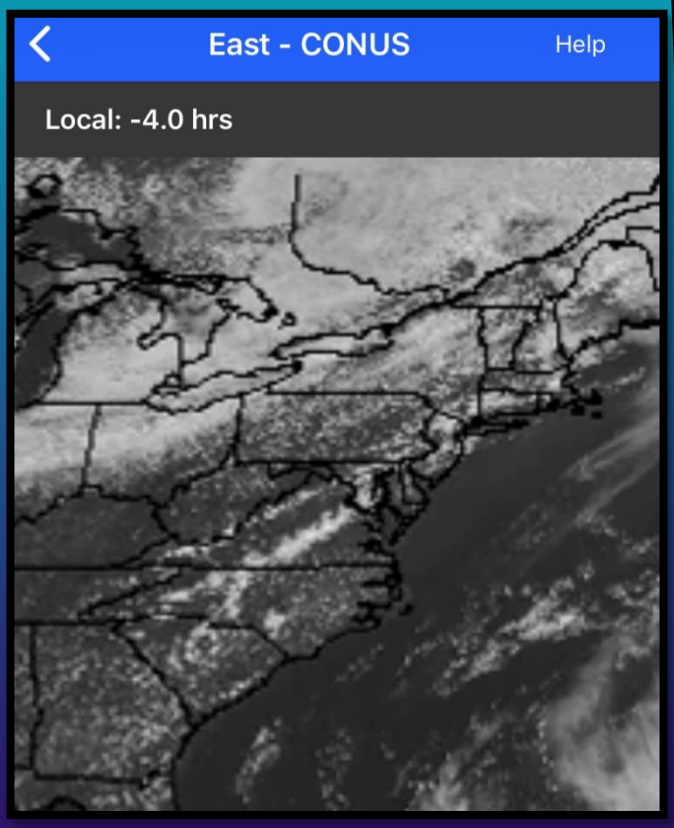


it gives a nice example of where and how the cloud decks are moving. You may be able to do a little forecasting yourself and predict that cloud coverage will be moving away from your area during your viewing window!

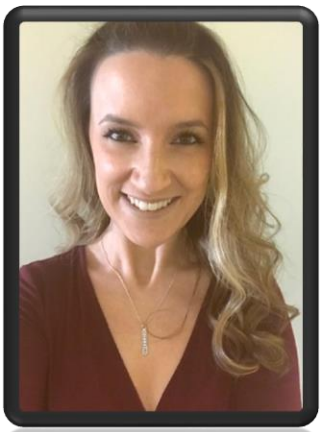
Both of the apps mentioned so far are great for observing what is currently going on weather-wise above your head, but it is always good to keep tabs on longer range forecasting through the local news sources and other helpful apps such as "Weather Bug" and "AccuWeather." Three-day forecasts are the perfect window to start paying close attention when it comes to upcoming astronomy events. As you close in on your time frame, the forecast is less like to drastically shift and the predictions become more solid. It is good to note that there are always situations that are outliers and the forecasts can totally bust too. Weather is highly unpredictable and there are so many factors that can impact it.

Another good weather tip is to be familiar with the differences between high and low pressure. Low pressure is usually associated with more developing cloud cover, precipitation, and sometimes storms. High pressure will bring in descending air which usually decreases cloud formation and is associated with more favorable weather. During the summer months clear skies will lead to hotter days, yet cooler nights. In the winter months clear dark skies will yield some very chilly temperatures. Be aware of where the high and low pressure systems are currently, or where they will be before a night of stargazing and/or astrophotography.

Having a myriad of forecasting sources at your fingertips help make your nights so much easier to plan and predict those clear dark skies….or clouds!



Screenshot from Satellite Weather Loops shows current run time of cloud coverage.



Sarah Gartin is a U.S. Navy veteran who served from 2008-2011 as an Aerographer's Mate. During her time on active duty, she worked in the meteorology and oceanography field, observing and writing forecasts for U.S. naval ships which assisted with their operations at home and abroad.

After the Navy, Sarah became a government contractor and now works on the JEB Little Creek base. She is a member of Back Bay Amateur Astronomers and has a huge passion for astrophysics and astronomy. She spends her free time exploring a multitude of her interests and talents like creating art and selling paintings. She also has a large passion for archery, hunting, fishing, nature, and the great outdoors overall.

New BBAA Website Content:

Getting Started in Astronomy

While going through the old server, we found an old BBAA page with Nick Anderson's tips on getting involved in the hobby. The advice is excellent and has been revived for the new website. Click the following link if you're ready to dive into the world of amateur astronomy.

➡ Getting Started in Astronomy

A Messier Marathon Manual

"Messier Marathon" is a term describing an attempt to find as many Messier objects as possible in one night. While you have some time before the optimum viewing window, you can start preparing now. Click the following link for information and tips:

➡ Messier Marathon Manual

Register for ALCon 2019

50th Anniversary of the First Moon Landing

July 25-29

Kennedy Space Center and Southern Skies

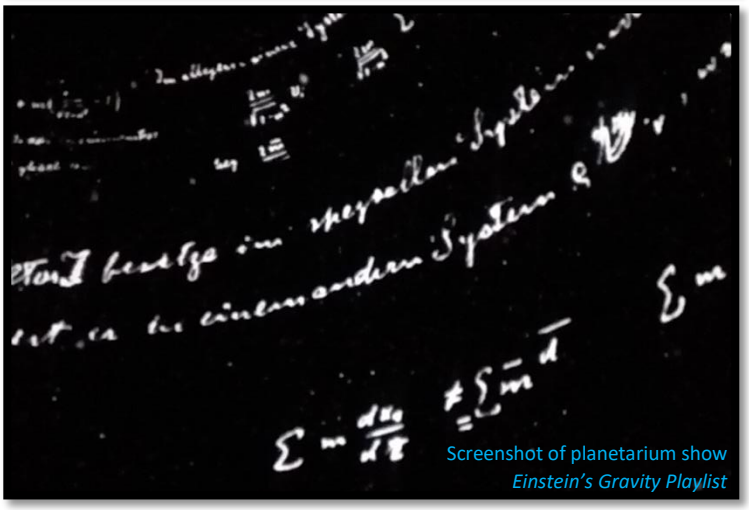
Cruise to the Bahamas.

https://alcon2019.astroleague.org/

Club Meeting

We met for our monthly meeting on May 2nd at TCC Virginia Beach. After normal business, club member Prof. Ken Broun treated the club to the planetarium show, *Einstein's Gravity Playlist*.

Full meeting minutes are posted on our website. Our next meeting is June 6th and will be held in Rm JC-16.



Screenshot of planetarium show *Einstein's Gravity Playlist*

The Back Bay Amateur Astronomers meet on the first Thursday of each month from 7:30 – 9pm.

Typically, we meet at TCC Virginia Beach on the second floor of **Building J—the Science Building**, in room JC-11. (June meeting will be held in JC-16)

Occasionally, we meet at either TCC's planetarium on the first floor, or at the Plaza Middle School planetarium.

All meetings are free and open to the public. After normal business, there is usually a presentation.

DF Cygni

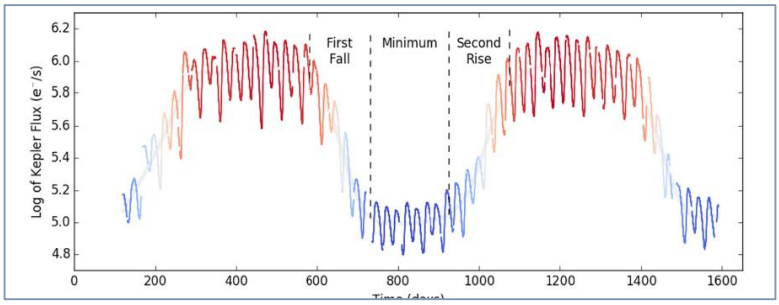
By Rich Roberts

DF Cygni (is an archetypal RVb type star discovered by Margaret Harwood in 1926. She discovered the star while serving as the Director of the Maria Mitchell Observatory in Nantucket, MA using a 7.5 inch Cooke triplet refractor. She continued to observe the star for several years and published her results in 1937. She calculated a regular short double period of 49.8 days and a longer secondary period of 790 +/- 10 days. She also noted that the spectrum near maximum resembled that of R SCT (R Scuti, the brightest and most widely observed of the RV Tau variable type stars) based on observations from the Mount Wilson Observatory (Harwood, 1937).

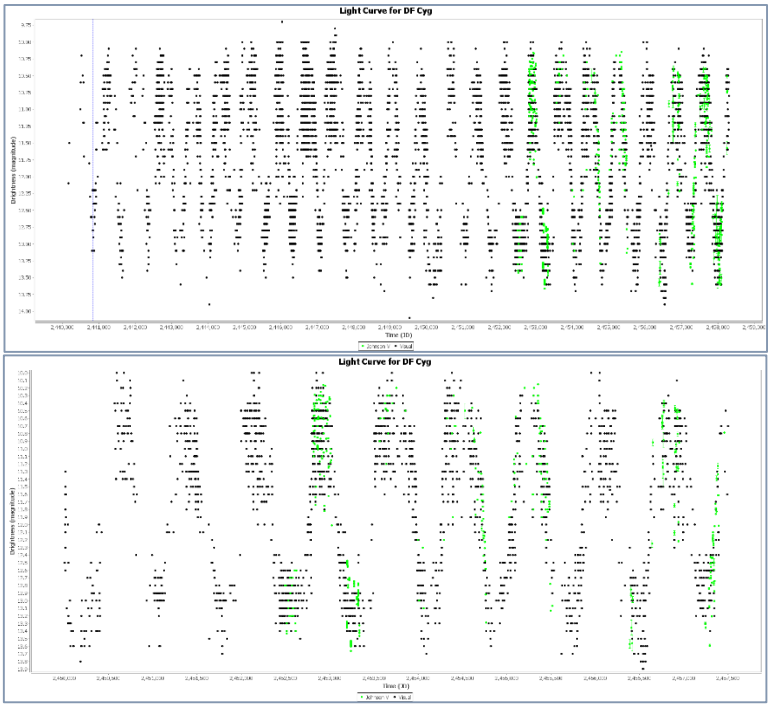
DF Cygni has been regularly observed by AAVSO (American Association of Variable Star Observers) members since October 1968 with 6,855 observations in the AID (AAVSO International Database), of which 5,340 are visual. Bodi et al (2016) did a study which compared the accuracy of the AAVSO data relative to the precise photometry done by *Kepler* over the telescope's four year mission. DF Cygni was the only RV Tau Type star in the *Kepler* field. The visual data submitted by 110 amateur astronomers had a typical precision of +/- 0.3 magnitudes. Both Fourier and wavelet analysis on the Kepler and AAVSO data yielded remarkably similar results and highlights the importance of and usefulness of our continued work.

DF Cygni displays the alternating shallow and deep minima which is typical of RVb stars. The cause of this behavior is not well understood. The two main hypotheses for this behavior is that the stars are either double-mode pulsators or that they are exhibiting low-dimension chaos (Percy, 2007). Vega (2017) suggests the long period minima is due to an opaque dust which blocks ~90% of the system's flux at minima and would account for the star's IR excess.

Next is a graph from the *Kepler* data showing flux vs time over two long period cycles and really shows the dual periodicity, which is a defining characteristic of this class star.



Here are light curves from the AAVSO data. The first light curve is all the data and the second is just 10 cycles (about 7500 days).



Looking at these curves, it is easy to think you're looking at a Mira. A DCDFT* scan or a WWZ** analysis performed on data from these time scales will only result

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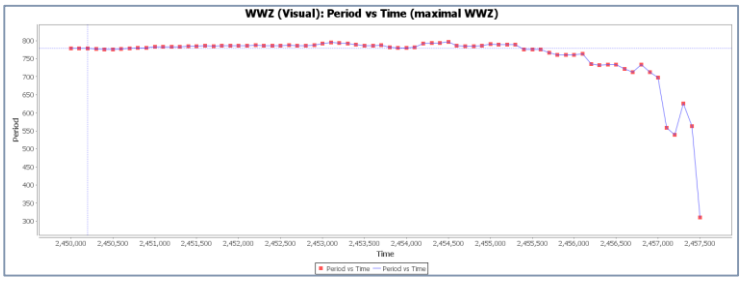
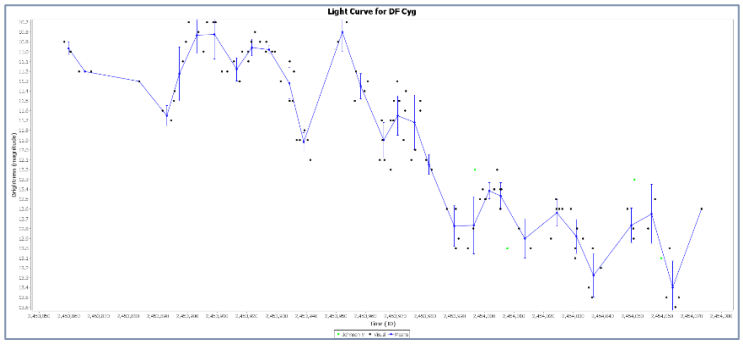
*DCDFT: Data Compressed Discrete Fourier Transform, a mathematical technique to test sample functions for signal strength on desired parameters.

**WWZ: Weighted Wavelet Z-transform. Similar to Fourier Transforms but introduces a time-series component of the parameter being analyzed.

in the long period showing up. Folding these light curves into phase plots using the period in VSX, 50.08 days, will result in a garbled mess on these time scales. The period of 778.1 days is required in order to get a workable phase plot.



By truncating the light curve into a part of single cycle, the short period becomes more evident. For this light curve, I chose the epoch as a date when the cycle was clearly past the long period peak (JD 2,453,858) and ended it before the long period minimum (JD 2,454,076). This 218 day period of the light curve is as follows:



This 218 day light curve is a little noisy, but you can clearly see there is oscillation occurring as the longer term trend descends towards its minimum brightness. The trend line is a five day binned average to help show the trend. Both DCDFT and WWZ analysis for this 218 day stretch of the light curve showed a period of 55 days, which is higher than the known period, but understandable based on the scatter of these data points.

DF Cygni is located at 19h48m53.94s RA and 43d02m02.14s, which makes it well placed for observers in mid-northern latitudes during the summer and fall months. It is easy to find lying near the western edge of the Northern Cross, just south of Delta Cygni. It is a fairly bright star which ranges from ~10.5 to 13 magnitude.

Continued coverage of DF Cygni is recommended. For one, the nature of RV Tau stars is not completely understood. They are rare stars concentrated across the plane of the Milky Way. Also, these stars are in their final transition from the AGB (Asymptotic Giant Branch, an evolutional phase of a star as it nears the end of its life) toward becoming a white dwarf. It is believed that stars do not spend a lot of time (relative to a star's lifetime, probably a few thousand years) making this transition through the instability strip of the H-R diagram. It is possible we may see one make this transition.

This article by Rich Roberts was originally published by AAVSO. Visit website for source material: https://www.aavso.org/lpv-season-2019

Rich Roberts has been fascinated by Astronomy since a child and hopes his 15 month old son develops a similar passion. He has a B.S. in Physics from Virginia Tech and a MBA from Averett University. After college, he served in the Navy as a submarine officer aboard USS MINNEAPOLIS-ST PAUL and a Liaison Officer for CJTF-HOA in Djibouti, Africa. He now works as an account executive in the building automation industry and spends clear nights visually recording variable star magnitudes with his 11" SCT in Carrollton, VA.

Bringing Astronomy to the People

of Hampton Roads

The Back Bay Amateur Astronomers, Inc. is a 501(c)(3) nonprofit organization dedicated to astronomy outreach.

We are a 100% volunteer-run organization that relies on our dedicated members to *"bring astronomy to the people of Hampton Roads."*

Anyone who has volunteered at one of our events can tell you that it is incredibly rewarding to show the moon to someone who has never seen it through a telescope. You never know whom you'll inspire to become the next great astrophysicist. At the very least, you may instill within someone a passion to look up at the sky.

Please help us achieve our mission and sign up to volunteer. **All experience levels welcome.**

See our monthly calendar for events.

Photo by Vincent Pendleton.

Telescopes and Tailgates

Skywatch at Northwest River Park was packed with guests May 25th. Perhaps the club's interview with "Chesa-sneak-peek," along with beautiful weather, lured in a crowd.

International Astronomy Day

Despite mostly cloudy skies, International Astronomy Day at Central Library in Virginia Beach was a success. Many people stopped by to view the sun (for a short time), make a constellation, and to learn about our astronomy outreach efforts in the Hampton Raods area.

Our younger guests make constellations with star & gem stickers on black paper.

The sun made an appearance briefly and allowed our guests to view a small sunspot.

Despite a rather gloomy weather forecast the sky remained clear all during the lunar occultation of M44, The Beehive star cluster in Cancer, on May 10th. I set up a small 4” f/8 refractor telescope riding atop a Vixen motorized equatorial mount, keeping the brightly lit portion of the moon out of the field of view as the moon swallowed up stars in the cluster one by one. Robert Hitt and Stan Hubbard joined to to watch the event from my VIrginia Beach backyard. We finished the night splitting some double stars, one 1.2” pair which exceeded Dawes Limit for a 4” telescope. It was a fun night, indeed.

-Kent Blackwell

Rich Roberts took this shot of the moon by holding his phone to the eyepiece.
C11 with a 40mm EP (70x magnification, 1 deg FOV) and a 50% ND filter.

Taken at the Fall Staunton River Star Party 2018, this is M27, aka NGC 6853, or more commonly, the "Dumbbell Nebula." The Dumbbell or Apple Core Nebula is a planetary nebula in the Constellation Vulpecula at a distance 1,360 light years. This was the first planetary nebula discovered by Charles Messier in 1764.

Vixen VMC200L, Vixen SXD2, Canon T6i, Backyard EOS

-David Read

Star Quest

Green Bank

Star Quest XVI

Optical Star Party &

Conference

June 26th - June 29th, 2019

http://greenbankstarquest.org/

Astronomers Without Borders
ONE PEOPLE + ONE SKY

It's Time To Enter the 2019 Lunar Selfies Contest!

Invite the moon into your portraits! Join our free photo contest providing an opportunity for photographers to take an artistic portrait(s) of the moon anytime during an entire lunar cycle.

The contest runs from February 19, 2019 to July 21, 2019 inspiring young and old alike to go outdoors and record the beautiful silvery-orb of the moon in the sky, framed with objects in the foreground like trees, buildings, sculptures, and people. Have fun and be creative!

Clike here for more information and to upload your photo: Astronomers Without Borders
Winning images will be featured in an online gallery and prizes will be awarded.

Enter soon! Contest Closes on July 21st

The Chesapeake Planetarium offers free programs to the general public on Thursday nights at 8:00.

Due to limited seating, reservations are necessary and may be made by telephoning Chesapeake Public Schools between 8:00 a.m. and 4:00 p.m. weekdays. (757-547-0153)

For more details, visit:
https://cpschools.com/planetarium/public-programs/

Our friends at VPAS (Virginia Peninsula Astronomy/Stargazers) offer free star gazing at the Virginia Living Museum, beginning at sunset on **the second Saturday of every month.**

https://thevlm.org/events/planetarium-shows/evening/

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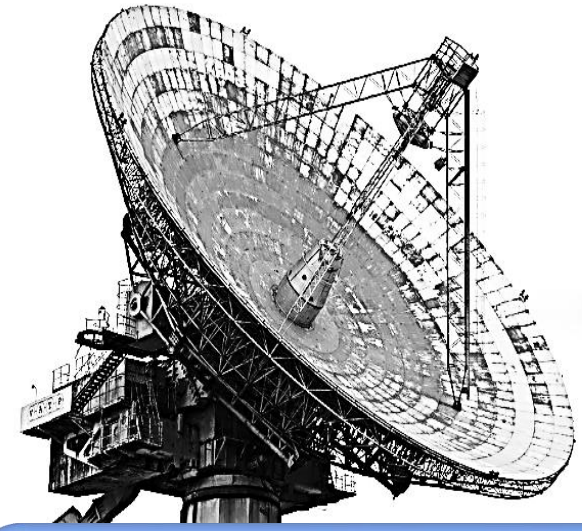
Secretary – Kayla Robinson: secretary@backbayastro.org



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TELL US ABOUT IT!

Whether you're a seasoned astro-photographer or a beginner enjoying your first view through a telescope, we'd love to hear about your experience at club events or doing astronomy-related activities on your own. Please submit your articles and/or photographs for publication in the Observer.

Email editor@backbayastro.org

Upcoming BBAA Events

June

Jun 1	dusk-dawn	Chippokes Plantation State Park, Surry	**Nightwatch**	BBAA members-only observing
Jun 6	7:30-9PM	TCC Virginia Beach, Science Building J	**BBAA Club Meeting**	Club business, followed by George Reynold's historical video on rocketry
Jun 7	Dusk-dawn	Cornland Park, Chesapeake	**Cornwatch**	BBAA members-only observing
Jun 7	9-10PM	Linkhorn Bay Apartments, VB	**Linkhorn Bay Astronomy Night**	Observing for apartment residents
Jun 8	8:15-10PM	Breezy Point Park, Naval Station Norfolk	**Little Astronomers**	Viewing event for military families
Jun 10	6-9PM	Elizabeth City State University, NC	**ECSU Kahn Planetarium Grand Opening**	Public observing
Jun 11	8:30-10PM	Norfolk Botanical Gardens	**Garden Stars**	Brief indoor presentation followed by public viewing
Jun 15	10AM-1PM	Elizabeth River Park, Chesapeake	**Saturday "SUN"day**	Public solar viewing
Jun 18	11:30AM-12:30PM	Great Neck Area Library, VB	**Sun Safety & Observing**	Public solar viewing
Jun 18	6-11PM	24th Street Boardwalk, Virginia Beach	**Boardwalk Astronomy**	Public observing
Jun 20	3-4PM	Moyock Public Library, Moyock, NC	**Summer Reading Program**	Kids grades K-5 presentation, solar viewing
Jun 25	11:30AM-12:30PM	Hertford Public Library, Winton, NC	**A Universe of Stories**	Presentation, solar viewing
Jun 28	Dusk-Dawn	Cornland Park, Chesapeake	**Cornwatch**	BBAA members-only observing
Jun 29	8PM-12AM	Northwest River Park, Chesapeake	**Skywatch**	Public observing

July

Jul 5	Dusk-dawn	Cornland Park, Chesapeake	**Cornwatch**	BBAA members-only observing
Jul 6	dusk-dawn	Chippokes Plantation State Park, Surry	**Nightwatch**	BBAA members-only observing
Jul 9	6-11PM	24th Street Boardwalk, Virginia Beach	**Boardwalk Astronomy**	Public observing
Jul 13	11AM-2PM	Elizabeth River Park, Chesapeake	**BBAA Annual Summer Picnic**	Members-only and their guests, dish-to-pass picnic

Check for details, updates, cancellations, and more on our website
www.backbayastro.org
Click on our **event calendar**.