



# BACK BAY *Observer*

Sep  
2019

*The official newsletter of the Back Bay Amateur Astronomers*

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The clouds parted enough for some stargazing at Croatan Beach. George Reynolds and Russell Hippert treated guests to views of the moon, Jupiter, and Saturn.

## UPCOMING

- Sep 5 **BBAA Club Meeting**  
7:30-9PM  
TCC, Virginia Beach
- Sep 10 **Boardwalk Astro**  
6-11PM  
24<sup>th</sup> Street, Virginia Beach
- Sep 12 **Garden Stars**  
8-9:30PM  
Norfolk Botanical Gardens
- Sep 14 **Saturday SUN Day**  
10AM-1PM  
Elizabeth River Park

*For more information, go to*  
[www.backbayastro.org/](http://www.backbayastro.org/)

## **LOOKING UP!** *a message from the president*

*September's Looking Up Column by vice president, George Reynolds*

This has been a busy summer for astronomy outreach. The 50th anniversary of the Apollo 11 landing on the Moon inspired many activities. We had 11 events in July and 7 more scheduled in August. The lovely weather we had in July deteriorated in August to more cloudy and rainy nights, but we were still able to see Jupiter and Saturn on partly cloudy nights.

I hope the renewed emphasis on space exploration will inspire the next generation of scientists, engineers, and explorers. NASA is making plans to go back to the Moon in 2024, as a training ground and steppingstone to Mars manned missions. Our astronomy outreach events reach a lot of kids, young people, and adults. It is our fervent hope that the views they see of the stars and planets may kindle a spark in their minds to pursue science and astronomy as a vocation or an avocation.

Confession time: as a child, and all the way through high school, I wanted to

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*The BBAA is a member organization of the Astronomical League.*



This image of the moon was captured on August 10<sup>th</sup> with a Celestron NexStar 4SE and an iPhone 7 held to the eyepiece.

Photo by **Sarah Gartin**



### *Looking Up cont'd*

be a “scientist”. I loved science and math. I remember lying on my back in the grass, gazing up at the Milky Way, pondering the glory of God’s creation. I read science fiction voraciously. I was even a member of the Science Fiction Book Club. In college I started out majoring in chemistry, but changed majors my sophomore year, after Organic Chemistry and Calculus kicked me in the butt. After college I served in the Army as a medical supply officer, and after that I had a career in the computer field.

It wasn’t until the year 2000, at age 55, that I renewed my interest in astronomy. I bought a pair of binoculars and a planisphere and learned the constellations. I borrowed astronomy books from

the library. Then in November 2000, I attended my first BBAA meeting and joined that night. Following the examples of Ted Forte, Dale Carey, Georgie June, and others, I jumped feet-first into astronomy outreach, and have been doing it ever since. So for the past nineteen years, although I am not a *scientist*, I have been *doing science*, and encouraging others to get involved.

As such, I urge you and everyone to “Keep Looking Up”.

*-George Reynolds*



# Spot the Stars of the Summer Triangle

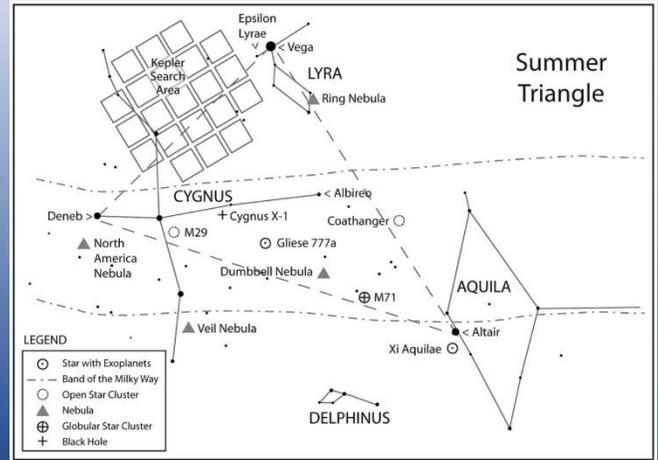
By David Prosper

September skies are a showcase for the **Summer Triangle**, its three stars gleaming directly overhead after sunset. The **equinox** ushers in the official change of seasons on September 23. **Jupiter** and **Saturn** maintain their vigil over the southern horizon, but set earlier each evening, while the terrestrial planets remain hidden.

The bright three points of the **Summer Triangle** are among the first stars you can see after sunset: Deneb, Vega, and Altair. The Summer Triangle is called an **asterism**, as it's not an official constellation, but still a striking group of stars. However, the Triangle is the key to spotting multiple constellations! Its three stars are themselves the brightest in their respective constellations: Deneb, in Cygnus the Swan; Vega, in Lyra the Harp; and Altair, in Aquila the Eagle. That alone would be impressive, but the Summer Triangle also contains two small constellations inside its lines, Vulpecula the Fox and Sagitta the Arrow. There is even another small constellation just outside its borders: diminutive Delphinus the Dolphin. The Summer Triangle is huge!

The **equinox** occurs on September 23, officially ushering in autumn for folks in the Northern Hemisphere and bringing with it longer nights and shorter days, a change many stargazers appreciate. Right before sunrise on the 23<sup>rd</sup>, look for Deneb - the Summer Triangle's last visible point - flickering right above the western horizon, almost as if saying goodbye to summer.

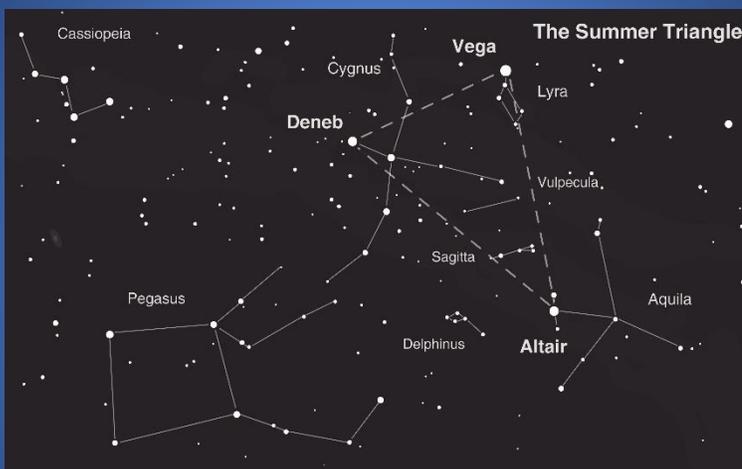
The Summer Triangle region is home to many important



*Once you spot the Summer Triangle, you can explore the cosmic treasures found in this busy region of the Milky Way. Make sure to "Take a Trip Around the Triangle" before it sets this fall! Find the full handout at [bit.ly/TriangleTrip](https://bit.ly/TriangleTrip)*

astronomical discoveries. Cygnus X-1, the first confirmed black hole, was initially detected here by x-ray equipment on board a sounding rocket launched in 1964. NASA's Kepler Mission, which revolutionized our understanding of exoplanets, discovered thousands of planet candidates within its initial field of view in Cygnus. The Dumbbell Nebula (M27), the first planetary nebula discovered, was spotted by Charles Messier in the diminutive constellation Vulpecula way back in 1764!

Planet watchers can easily find **Jupiter** and **Saturn** shining in the south after sunset, with Jupiter to the right and brighter than Saturn. At the beginning of September, Jupiter sets shortly after midnight, with Saturn following a couple of hours later, around 2:00am. By month's end the gas giant duo are setting noticeably earlier: Jupiter sets right before 10:30pm, with Saturn following just after midnight. Thankfully for planet watchers, earlier fall sunsets help these giant worlds remain in view for a bit longer. The terrestrial planets, Mars, Venus, and Mercury, remain hidden in the Sun's glare for the entire month.



*This wider view of the area around the Summer Triangle includes another nearby asterism: the Great Square of Pegasus.*

# DREAMS Come True

By Kayla Robinson

This summer, I took another step in my career and interned at the Katherine Johnson Independent Verification & Validation (IV&V) Facility in Fairmont, West Virginia. Not many have heard of this small NASA center; it was established in 1993 as a result of recommendations made after the Challenger accident and tragedy.

For me, the summer quickly became a whirlwind of firsts: first internship, first time living on my own, first time being away from home and family for so long. I had to adapt to dorm life in a small, hilly town with a population of less than 20,000 - an enormous change from my home in the large and diverse coastal city of Virginia Beach.

Turns out the whole “small town” vibe ended up being perfect for my first time away from home. With less than 300 employees total at IV&V, I was able to see the same faces at work every single day and develop meaningful relationships. The size and intimacy of the workplace allowed me and the 18 other summer interns to become a family. Many of us came from different



backgrounds, but each person felt like they belonged and were a vital piece of the enormous puzzle that is NASA.

My summer project involved improving a script that automated weekly and monthly reports. I went into my internship pretty much never touching a scripting language and knowing nothing at all about the relevant project tracking tools used at the agency. But I was there to learn. The first couple of weeks were spent figuring out how to teach myself the new scripting language. Thankfully, I also had great resources at hand that made learning easier.

I came a long way from the first day, when the job title and description seemed long, confusing, and overwhelming. A lot of the first conversations between interns started with, "I'm not really sure what I'm going to be doing here, but..." and some of us even questioned if we were the right ones for the job. We soon realized that the resources to learn all the skills we needed were already there; all we had to have was a good attitude and work ethic. We were chosen for a reason.

After ten weeks, my whirlwind of firsts produced a lifetime of memories, amazing friendships, and valuable lessons learned. I saw, firsthand, what can happen after not giving up, being brave, and venturing out of my comfort zone: dreams come true.

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**Kayla Dio Robinson** is a student at Norfolk State University majoring in Computer & Information Science.

Outside of school, she likes to stay involved in anything space-related and is the secretary of the Back Bay Amateur Astronomers club. She also enjoys reading and creating art, astrophotography, and music.



**The Devil's Dictionary** by Ambrose Bierce consists of common words followed by humorous and satirical definitions.

The following “daffy-nishuns” are a few of George Reynold’s contributions to:

### **The Devil's Dictionary: The Astronomy Edition**

**dark adaptation** - getting ready to become involved in occultation

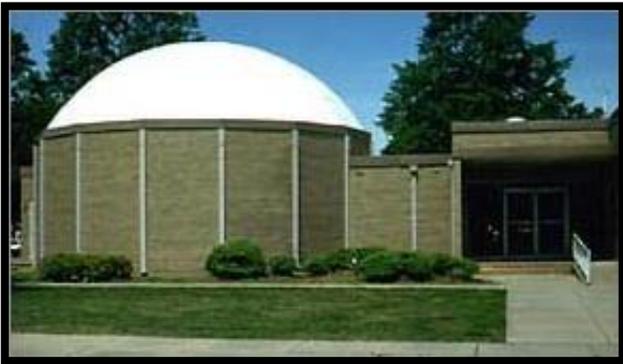
**Cassegrain** - a bulk container of seed

**dew** - moisture that collects on objects due to atmospheric humidity

**dew dew** - stuff that drops on your telescope from birds flying over

**libration** - the act of checking out books to read

**chromatic aberration** - wearing wildly colorful or garish clothing to a star party



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

For reservations call 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/>

## **Club Meeting**

Our August meeting was at TCC in Virginia Beach. Following normal business, members watched the video “Cosmic Collisions.”

Our next regular club meeting will be held on September 5<sup>th</sup>. Club member Rich Roberts will give a presentation on stellar spectra and how it’s used to classify stars.

**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.

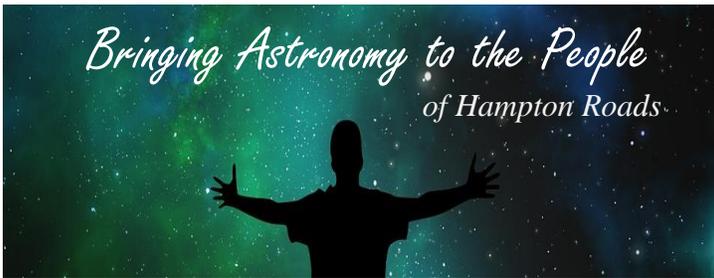
Occasionally, we meet at either TCC’s planetarium on the first floor, or at the Plaza Middle School planetarium.

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



**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/event/s/planetarium-shows/evening/>



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.



## Bad Weather Blues

Due to miserable weather, we were forced to cancel our two most popular events in August:

Boardwalk Astronomy  
and Skywatch.

Whoever has been buying new equipment and compromising our skies may be publicly shamed at the next meeting.

# Staunton River Star Party October 21-27



Did you know that there are people among you that like to stay up all night and gaze at the night sky? Well, there are! They’re called amateur astronomers, although there are some professionals that join us as well. Twice a year, we come together at Staunton River State Park to look at stars, galaxies, planets, comets, and all sorts of other wondrous things! If this sounds like fun, or you have a possible interest, please join us!”

<http://chaosastro.org/starparty>

# Drop it Like it's Hot

By Rich Roberts

One of my favorite star classes must listen to Snoop Dogg because they like to smoke and at random, unpredictable times, they “drop it like it’s hot.” The class is named for R Cornae Borealis (RCB stars), which is easily found inside the ring of the northern crown. RCB stars are hydrogen deficient (generally less than 1%) and rich in helium and in carbon. In extreme cases, the helium concentrations can be as high as 90%. They tend to be either F or G spectral types with the exception of lacking hydrogen absorption lines, which gives them a strong yellow tint. R CrB itself is one of the most brilliantly yellow stars I’ve observed. As a GenXer, it reminds me of Big Bird, although my Millennial friends would probably go with Pikachu. The light curve of a RCB star looks like a nova (the stars that go boom) in reverse. They stay at their maximum brightness for unspecified periods of time and then rapidly fade several visual magnitudes in a matter of hours to days. After the star fades, it will slowly and erratically brighten over weeks, months, or possibly even years, back to its maximum brightness. Many brilliant scientists have tried to model the timing of their fades and their return to strength, but none have found any success. RCBs are very rare. 109 RCBs are known to exist in the Milky Way and 17 more in the Magellanic Clouds. Eight RCBs are within my observing limits - U Aqr, R CrB, UV Cas, AO Her, V0745 Lyr, SV Sge, SU Tau, and Z UMi - and I observe them every chance I get.

RCB fadings are caused by mass ejections from the star. Large amounts of carbon get released from the surface like smoke rising from a smoldering fire. The surface temperature range of an F to G type star runs from 7500K to 6000K, which is far too hot for the carbon ejecta to coalesce. The surface temperature of these stars remain about the same during these events, so the carbon “smoke” must get blown far enough away from the star by radiation pressure to get below 1500K.

At this point, the ejecta will condense into a vast carbon cloud around the star and block a portion of its light. As the cloud slowly disperses, the star will brighten back to full strength as less and less of its light gets blocked.

The mechanisms of how these stars come about is not entirely clear and our current stellar evolutionary theory does not produce them. Two main theories about their formation exist, and both may actually be correct and explain the different chemical compositions found in these stars. The first mechanical is known as the “born again” model in which a dying post-asymptotic giant branch (post-AGB) star undergoes a final helium shell flash due to extra material/dust falling onto it. The other theory requires a carbon-oxygen white dwarf star to merge with a helium white dwarf. This theory seems favored by most current astrophysicists. Helium white dwarfs are relatively rare, but then again, so are RCB stars. Only one RCB star (DY Cen) is known to have a companion. Since most stars are known to be binary pairs, this does help the white dwarf merger theory.

As scarce as RCBs are, I recently discovered a sub-class of these stars exists, which takes rarity to a new level, the “Hot RCBs.” Four Hot RCBs are currently known to exist, three in the Milky Way (DY Cen, MV Sgr, and V348 Sgr) and one in the Large Magellanic Cloud (HV 2671). These stars exhibit similar behaviors as regular RCBs, but can have surface temperatures in the range of 15,000 to 25,000K. Trying to figure out how these stars come about has proven to be a bigger challenge than their cooler cousins. To complicate things even further, these four stars appear to be further divisible into two smaller sub-classes. One sub-class containing DY Cen and MV Sgr and the other containing V348 Sgr and HV2671. At first this seems

*Continued next page*

like a problem, but I personally think this is a good result which can shed more light on our eccentric regular RCBs.

One common thread across all four of the Hot RCBs is that their maximum brightness is fading over time. DY Cen is dimming by 2.5 V per century; MV Sgr by 1.3 V/century; V348 Sgr by 1.3 V/century; and HV 2671 by 0.7 V/century. This leads many to believe Hot CRBs are currently evolving into something else. Most likely they are either transitioning into regular RCBs or represent some sort of post-RCB phase evolution. So, let's revisit the current RCB evolutionary models.

DY Cen and MV Sgr are both 98% helium. The only way to get to such an extreme helium state is through some sort of WD merger. This model creates an envelope around the merged WD, which should persist for a few thousand years. This envelope would likely accrete onto the merged WD which would lead to high temperatures and the envelope could cause RCB type

fadings. DY Cen showed minima in 1987, 1901, 1924, 1929 and 1930. Since 1958, no RCB type behaviors have been observed and it's actually getting hotter. Is this star no longer an RCB? Was it a regular RCB in the past and turn into a hot RCB as it heated up? Did it evolve into something else? We're not entirely sure.

V348 Sgr and HV2671 are a little less extreme. Their composition is more in-line with the central star of a planetary nebula (40-50% He, 40-50% C, 5-10% O). We also find  $C_{60}$  in these stars like we do in planetary nebula central stars. This leads more credence to the post-AGB helium shell flash model. Maybe these types of hot RCBs have more recently underwent a helium shell flash and are still hot. Helium fusion does require temperatures consistent with hot RCBs. A hot RCB could cool into a regular RCB star and eventually make itself into a regular WD after it finishes ejecting all of its mass. Again, we just don't know. That's why we need to keep our eye on these things.

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**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.



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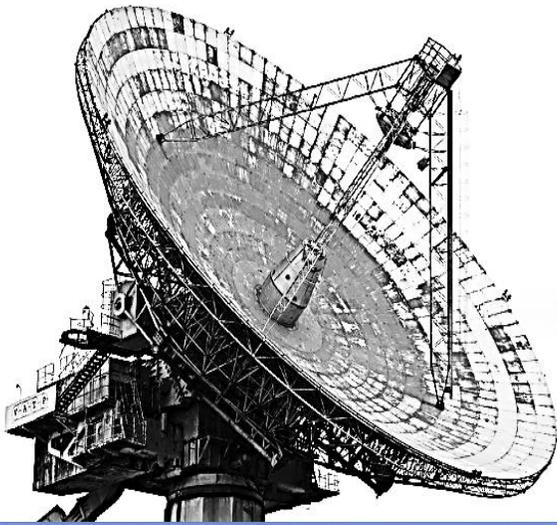
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*Tell us about it!*

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](mailto:editor@backbayastro.org)

# Upcoming BBAA Events

## September

<b>Sep 5</b>	7:30-9PM	TCC Virginia Beach, Science Bldg J	<b>BBAA Club Meeting</b>	Club business, then presentation by Rich Roberts
<b>Sep 10</b>	6-11PM	24 <sup>th</sup> Street Boardwalk, Virginia Beach	<b>Boardwalk Astronomy</b>	Public observing
<b>Sep 12</b>	8-9:30	Norfolk Botanical Gardens	<b>Garden Stars</b>	Public observing
<b>Sep 14</b>	10AM-1PM	Elizabeth River Park, Chesapeake	<b>Saturday "SUN"day</b>	Public solar viewing
<b>Sep 21</b>	7-11PM	Northwest River Park, Chesapeake	<b>Skywatch</b>	Public observing
<b>Sep 27</b>	Dusk-Dawn	Cornland Park, Chesapeake	<b>Cornwatch</b>	BBAA members-only observing
<b>Sep 28</b>	8-10PM	Chippokes Plantation, Surry	<b>Chippokes Under the Stars</b>	Public observing
<b>Sep 28</b>	Dusk-Dawn	Chippokes Plantation, Surry	<b>Nightwatch</b>	BBAA members-only observing

## October

<b>Oct 3</b>	7:30-9PM	TCC Virginia Beach, Science Bldg J	<b>BBAA Club Meeting</b>	Club business, then presentation by Dr. William Moore
<b>Oct 5</b>			<b>International Observe the Moon Night</b>	(currently, no planned event)
<b>Oct 8</b>	7:30-9PM	Norfolk Botanical Gardens	<b>Garden Stars</b>	Public observing
<b>Oct 12</b>	10AM-1PM	Elizabeth River Park, Chesapeake	<b>Saturday "SUN"day</b>	Public solar viewing
<b>Oct 12</b>	6:30-8PM	Sandpiper Rd, Virginia Beach	<b>Griffin Family Reunion</b>	Private family observing session
<b>Oct 17</b>	6-8PM	Greenbrier Intermediate School	<b>Greenbrier STEAM Night</b>	Public observing +/- indoor display
<b>Oct 19</b>	6:30- 10:30PM	Northwest River Park, Chesapeake	<b>Skywatch</b>	Public observing
<b>Oct 25</b>	Dusk-Dawn	Cornland Park, Chesapeake	<b>Cornwatch</b>	BBAA members-only observing
<b>Oct 26</b>	Dusk-Dawn	Chippokes Plantation, Surry	<b>Nightwatch</b>	BBAA members-only observing

Check for details, updates, cancellations, and more on our website  
[www.backbayastro.org](http://www.backbayastro.org)  
 Click on our [event calendar](#).