

## Highlights of the November Sky...

--- 4<sup>th</sup> ---

Daylight-Saving Time ends at 2am. Set clocks back one hour.

PM: Mars is  $\frac{1}{2}^\circ$  away from the star Delta ( $\delta$ ) Capricornus.

--- 7<sup>th</sup> ---

New Moon  
11:02 am EST

--- 11<sup>th</sup> ---

DUSK: Saturn and a waxing crescent Moon are less than  $4^\circ$  apart.

--- 14<sup>th</sup> ---

DAWN: Venus, once again the Morning Star, and Spica, the brightest star in Virgo, are only separated by  $1^\circ$  low in the east-southeastern.

--- 15<sup>th</sup> ---

First Quarter Moon  
9:54 am EST

PM: The Moon is  $3^\circ$  to the lower right of Mars.

--- 17<sup>th</sup> ---

PM: The Leonid meteor shower peaks in the early evening, but the best chances to see meteors are in the early morning hours.

--- 23<sup>rd</sup> ---

Full Moon  
12:39 am EST

PM: The Moon and Aldebaran, in Taurus, rise less than  $3^\circ$  apart in the east-northeast. Watch them grow apart through out the night.

--- 29<sup>th</sup> ---

AM: Regulus, the brightest star and heart of Leo, will be about  $2^\circ$  to the lower right of the Moon.

Last Quarter Moon  
7:19 pm EST

# Prime Focus

A Publication of the Kalamazoo Astronomical Society

★ ★ ★ November 2018 ★ ★ ★

## This Months KAS Events

General Meeting: Friday, November 2 @ 7:00 pm

*Kalamazoo Area Math & Science Center - See Page 12 for Details*

Field Trip: Saturday, November 3 @ 5:00 pm

*Abrams Planetarium - See Page 3 for Details*

Board Meeting: Sunday, November 11 @ 5:00 pm

*Sunnyside Church - 2800 Gull Road - All Members Welcome*

## Inside the Newsletter...

October Meeting Minutes.....	p. 2
Board Meeting Minutes.....	p. 2
Bill Nichols.....	p. 3
Field Trip to Abrams.....	p. 3
Observations.....	p. 4
NASA Night Sky Notes.....	p. 4
Astrophotography Night Highlights...	p. 5
Chasing Comets.....	p. 7
November Night Sky.....	p. 10
KAS Board & Announcements.....	p. 11
General Meeting Preview.....	p. 12



★ ★ ★ [www.kasonline.org](http://www.kasonline.org) ★ ★ ★

# OCTOBER

## Meeting Minutes

The general meeting of the Kalamazoo Astronomical Society was brought to order by President Richard Bell on Friday, October 5, 2018 at 7:14 pm EDT. Approximately 27 members and guests were in attendance at the Kalamazoo Area Math & Science Center (KAMSC).

Richard began with a brief President's Report. He encouraged members to volunteer for at least one of three upcoming outreach opportunities. These include WMU Youth Day on October 6<sup>th</sup>, Spooky Science Saturday on October 13<sup>th</sup>, and Crane Fest on October 13<sup>th</sup> and 14<sup>th</sup>. There were no new updates with the KAS Remote Telescope in Arizona. We are still in standby mood until Mike Patton brings the telescope back online.

The October meeting has long been devoted to the art of astrophotography and this year was no different. Unfortunately, only two KAS members in attendance shared their cosmic portraits as part of *Astrophotography Night*. However, some members did submit images to share in their absence. These include Mike Melwiki and Roger Williams. Roger reported that he hasn't done any deep sky imaging since moving and building a small observatory. He has done some solar system imaging though. He captured the ISS Solar Transit on March 4<sup>th</sup> as well as images of Jupiter, Saturn, and Mars (with and without a global dust storm). Mike Melwiki is rarely able to attend meetings due to his work schedule, but did submit images of M33, M51, NGC 891, and M42 for us to enjoy. They were all taken with his William Optics 132mm refractor and ZWO ASI294MC Pro camera. Mike Sinclair shared two images on behalf of his former student, Emma Piper. Emma interned at Yellowstone National Park last summer and found the time to snap some shots of the Moon and Milky Way.

Richard shared portraits of the aurora and Milky Way taken in years past, but processed differently. Old images can become new again as you learn different techniques, he said. Deep sky targets he captured over the past year were taken from Richland Township Park (during the Messier Marathon) and North Fulton Cemetery (his "secret" dark-sky site). Richard concluded with his favorite images of the Great American Eclipse on August 21, 2017. Eric Schreur had an especially productive year thanks to the new permanent pier he installed in his backyard and an upgraded telescope. The pier is surrounded by a garden, so he calls it "Sternegarten" (German for star garden). Eric also took images from Boon Hill, a dark-sky site near Cadillac owned by his friend Doug Bock. Other wide-field images and one time lapse movie were taken from locations like Pictured Rocks National Lakeshore and Isle Royale National Park.

Special thanks to Jean DeMott for supplying the traditional October snack of apple cider and donuts! Members shared observing reports and current astronomical news before the meeting concluded at 8:58 pm.

# BOARD

## Meeting Minutes

The Kalamazoo Astronomical Society Board met on October 21, 2018 at Sunnyside Church. In attendance were board members Richard Bell, Scott Macfarlane, Jack Price, Don Stilwell, and Roger Williams. Richard called the meeting to order at 5:05 pm. Don was keeping up with Treasurer duties in the absence of Rich Mather, but he had not received from Rich an updated summary. The Treasurer's Report was therefore skipped at this time.

Richard summarized November events, including the general meeting on November 2<sup>nd</sup> and a field trip to Abrams Planetarium on November 3<sup>rd</sup>. The general meeting will feature photography by Bill Davis, an associate professor of art at WMU and who makes photographs that use light in original ways.

In the first Follow-Up item, Richard reported that the remote telescope had been brought back online after replacement of a failed uninterruptible power supply. Richard anticipated having the opportunity to check out the operation of the instrument during the next month. Joe Borrello had helped with some software issues, and Richard still hoped to tie the all-sky camera and the observatory webcam into the internet. Still awaiting creation is a logo to associate with the remote facility. The Board looked over the remote telescope usage guidelines one more time, and after a motion by Don and a second by Richard voted unanimously to accept the agreement. The general meeting and Public Observing Session schedule were also checked again, and no schedule conflicts were obvious. It was agreed to accept the schedule and to handle any conflicts that arose as they occurred.

Under New Business, Richard brought forward several items to consider. He proposed that we order lapel pins based on the KAS logo, with a price of \$430 for 200 pins. The size would be suitable for attaching to a cap or jacket. After a motion by Scott and a second by Jack, all voted to order 200 pins. Since we sold out of caps to sell in the SkyShop, Richard also proposed ordering more of them. The favored model was available in black, navy, or khaki, with an embroidered logo. The price was \$14 per cap with a 1-time setup fee for the logo of \$100. Don moved to buy 20 of each color with an anticipated cost of about \$940 (shipping costs were not yet known precisely). After a second by Scott, all voted in favor of ordering the caps. Richard had one further item involving expenditures. In 2019, Dr. James Ashley will be in the area. He is a Planetary Scientist and Science Systems Engineer for the JPL Insight mission. Since he is also lecturing at other sites in the area, we have the opportunity to get him as the speaker at one of our meetings. With a motion by Richard and second by Jack, all voted in favor of authorizing \$300 to bring Dr. Ashley here.

Further New Business dealt with a number of outreach requests received by Richard for year 2019. Many of these came from Pierce Cedar Creek such as Moon observing

(January 19<sup>th</sup>), Barry County Science Festival (March 23<sup>rd</sup>), Family Science Night (June 19<sup>th</sup>), and a Perseids Party (August 10<sup>th</sup>). The August 10<sup>th</sup> date conflicts with a KAS function. Other requests were Hastings Family Science Night (February 20<sup>th</sup>), Richland Community Library Summer Kick-off (June 14<sup>th</sup> or 21<sup>st</sup>), and Barry County Builds at the Hastings Public Library (September 18<sup>th</sup>). One item remaining for 2018 is Family Fun Day at the Air Zoo on December 28<sup>th</sup> from 11am – 3pm. Richard mentioned that with his new working hours, he could not make it to as many of these events as previously. Don volunteered to cover the Pierce Cedar Creek event on January 19<sup>th</sup>, but it was clear that we would need more volunteers from the membership at large to cover many of these requests. In a final item involving schedules, Richard reminded the Board that the 50th anniversary of Apollo 11 occurs in 2019. He invited ideas to celebrate the occasion.

In Other Business, it was reported that the club PST solar telescope has major problems. After further analysis of the problem, we will need to decide on a repair-or-replace action plan.

With the conclusion of business, the meeting was adjourned at 6:28 pm. The next meeting was set for Sunnyside on November 11, 2018 at 5pm.

*Respectfully submitted by Roger Williams*

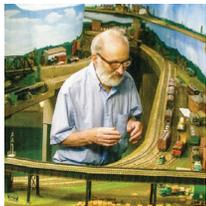
— In Memoriam —

## Bill Nichols

December 17, 1938 - June 25, 2018

William (Bill) Nichols of Schoolcraft, passed away June 25, 2018 at age 79. Bill was a member of the KAS from about 1994 - 2004. He invited members to observe from his home on VW Ave. on at least one occasion in 1997. Bill helped pour the concrete floor that Owl Observatory now sits on. In his memory his wife of 47 years, Sheila, has donated his classic Meade 10-inch LX200 to the KAS.

Bill was a 1956 graduate of Schoolcraft High School, attended Western Michigan University, and was a graduate of Coyne Electrical & Radio School in Chicago. Bill worked as a Central Office Technician for General Telephone Company (GTE) for 27 years, retiring in 1991 when it was Verizon.



Bill built three trimaran sailboats. The last one was 33 feet long and 24 feet wide. He and Sheila, crossed the Atlantic Ocean in 1992. They used a sextant, taking sun sites at noon on calm, sunny days to keep in practice in case the GPS failed. They sailed back across the ocean to the Caribbean.

Bill built a large model train layout in his basement. He conducted many operating sessions requiring 8-12 people to run the trains. Bill wanted more room for his trains, so he built an addition to the house. You can [read his full biography](#) online.



## Field Trip To East Lansing

On **November 3<sup>rd</sup>**, KAS members will take another field trip to Abrams Planetarium, located on the campus of Michigan State University in East Lansing. We'll enjoy a show featuring their state-of-the-art Digistar 6 projector. Our itinerary will include:

1. **Meet in State Systems Radio parking lot** for carpooling between 4:45 - 4:55 pm.

*State Systems Radio is located at 5066 Sprinkle Road, located just south of Kilgore Road on the west side of Sprinkle.*

2. Depart for East Lansing at 5:00 pm.
3. Stop for dinner at [Turkeyville](#) at 6:00 pm.
4. Arrive at [Abrams Planetarium](#) at ~7:30 pm.
5. Abrams Planetarium show at 8:00 pm. *Admission paid by the KAS (members only).*

Preview: **Mayan Archaeoastronomy**

*In a feast of colors and sounds, **Mayan Archaeoastronomy: Observers of the Universe** makes a tour of 6 Mayan temples: San Gervasio, Chichen Itzá, Uxmal, Edzná, Palenque and Bonampak where the spectator dives into a Mayan world of knowledge about the importance of the orientations of its temples in relation to the movement of some stars like the Sun, the Moon and Venus.*

5. Depart for Kalamazoo at ~9:30 pm
6. Arrive in Kalamazoo at ~11:00 pm.

For last minute details please attend the general meeting on November 2<sup>nd</sup>. If you are unable to attend the meeting but would like to go on the field trip then please [contact us](#) ASAP. If the weather is really bad (heavy rain or snow, severe thunderstorms, etc.) we will notify everyone that has signed up of a cancellation.





# Observations

by **Richard S. Bell**

The 2018 season of Public Observing Sessions at the Kalamazoo Nature Center unceremoniously ended with three cancellations in a row. As I recall, our 2017 season suffered a similar fate. We still have some astronomically-related events left this year. First, is the general meeting on November 2<sup>nd</sup>. Professor Bill Davis, from WMU, will provide a unique insight into light pollution. Not only has he photographed unwanted light in West Michigan, but he's recently traveled to Peru and Las Vegas to capture both a spoiled and unspoiled night sky. Join us on November 2<sup>nd</sup> for this special presentation.

Members will then venture to East Lansing on November 3<sup>rd</sup> and enjoy a show at Abrams Planetarium. Full details appear on page 3. We had to cancel last year's excursion thanks to a weather delay in MSU's home game. Plans are already being made for our Annual Meeting & Holiday Party on December 7<sup>th</sup>. As described in Aaron Roman's article beginning on page 7, December 8<sup>th</sup> would be an excellent time to head under the stars and view Comet Wirtanen. We don't have anything official planned, but perhaps an impromptu viewing session will take shape at the Holiday Party if skies cooperate.

And that's it for 2018! The general meeting and observing session schedule for 2019 is beginning to take shape, but I'm always looking for input on guest speakers for meetings or any other type of KAS activity. Contact me anytime with your thoughts.

I have also been thinking ahead to other astronomical things to do next year. Don't worry, we do have events planned for the Total Lunar Eclipse on January 20<sup>th</sup> and the Transit of Mercury on November 11<sup>th</sup>. I'm thinking things to do outside of Michigan. One thought is to head to Rockland, New York and attend the [Northeast Astronomy Forum](#) (NEAF) on April 6<sup>th</sup> and 7<sup>th</sup>. I attended NEAF once in 2012 and have been wanting to return ever since. For an amateur astronomer, it's Candyland! Every astronomy product you can think of is on display; plus they have several top quality guest speakers.

Another idea is to attend the 40th annual [Texas Star Party](#) (TSP), held at the magnificent Prude Ranch near Fort Davis, Texas. TSP 2019 will held from April 28<sup>th</sup> - May 5<sup>th</sup>. I've attended TSP three times thus far and would love to return to make it four. The skies are inky black, they have lots of vendors, and great speakers. Not to mention tons and tons of other things to do in the area, such as visit McDonald Observatory and check out the 9.2-meter Hobby-Eberly Telescope. Yet another thought is to visit [Bryce Canyon](#) or [Natural Bridges](#) National Park in Utah. Skies are also incredibly clear and transparent there.

How about you? Do you have any astronomical vacation plans in 2019? Share them at an upcoming meeting. Perhaps we can get a group together and share the fun!



## NASA Night Sky Notes...

### November's Dance of the Planets

by  
**Jane Houston Jones & David Prosper**

November's crisp autumn skies bring great views of our planetary neighbors. The Moon pairs up with Saturn and Mars in the evenings, and mornings feature eye-catching arrangements with dazzling Venus. Stargazers wanting a challenge can observe a notable opposition by asteroid 3 Juno on the 17<sup>th</sup> and watch for a few bright Leonid meteors.

Red **Mars** gleams high in the southern sky after sunset. Saturn sits westward in the constellation Sagittarius. A young crescent Moon passes near **Saturn** on the 10<sup>th</sup> and 11<sup>th</sup>. On the 15<sup>th</sup> a first quarter Moon skims by Mars, coming within 1° of the planet. The red planet receives a new visitor on November 26<sup>th</sup>, when NASA's InSight mission lands and begins its investigation of the planet's interior. News briefings and commentary will be [streamed live](#).

Two bright planets hang low over the western horizon after sunset as November begins: **Jupiter** and **Mercury**. They may be hard to see, but binoculars and an unobstructed western horizon will help determined observers spot them right after sunset. Both disappear into the Sun's glare by mid-month.

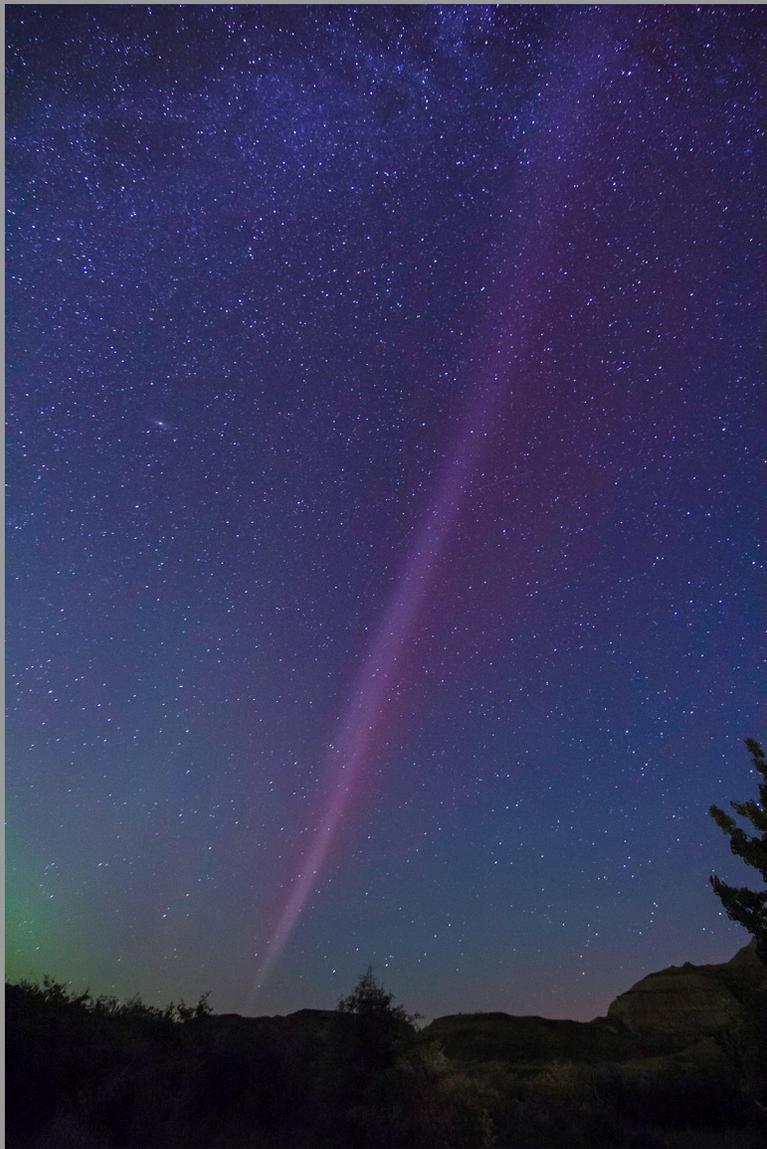
Early risers are treated to brilliant **Venus** sparkling in the eastern sky before dawn, easily outshining everything except the Sun and Moon. On November 6<sup>th</sup>, find a location with clear view of the eastern horizon to spot Venus next to a thin crescent Moon, making a triangle with the bright star Spica. The following mornings watch Venus move up towards Spica, coming within 2° of the star by the second full week of November. Venus will be up three hours before sunrise by month's end – a huge change in just weeks! Telescopic observers are treated to a large, 61" wide, yet razor-thin crescent at November's beginning, shrinking to 41" across by the end of the month as its crescent waxes.

Observers looking for a challenge can hunt asteroid **3 Juno**, so named because it was the third asteroid discovered. Juno travels through the constellation Eridanus and rises in the east after sunset. On November 17<sup>th</sup>, Juno is at opposition and shines at magnitude 7.4, its brightest showing since 1983! Look for Juno near the 4.7 magnitude double star 32 Eridani in the nights leading up to opposition. It is bright enough to spot through binoculars, but still appears as a star-like point of light. If you aren't sure if you have identified Juno, try sketching or photographing its star field, then return to the same area over the next several days to spot its movement.

The **Leonids** are expected to peak on the night of the 17<sup>th</sup> through the morning of the 18<sup>th</sup>. This meteor shower has brought "meteor storms" as recently as 2002, but a storm is not expected this year. All but the brightest meteors will be drowned out by a waxing gibbous Moon.

Stay warm and enjoy this month's dance of the planets!

# Astrophotography Night Highlights



## STEVE from Dinosaur Provincial Park

*Richard Bell*

Richard and Jean DeMott were thrilled when the aurora borealis made an appearance while camping at Dinosaur Provincial Park in Alberta, Canada. Curiously, one band seemed to arc across the sky and revealed a purplish color in time exposure images. They assumed, as people have for centuries, this was a peculiar form of aurora.

A Facebook group called Alberta Aurora Chasers initially attributed the phenomenon to a proton aurora and erroneously called them "proton arcs." Physics professor Eric Donovan from the University of Calgary suspected that was not the case since proton auroras are not visible. The name "Steve" was then suggested. It comes from the 2006 animated comedy movie *Over the Hedge*, in which its characters chose that name for something unknown. The term now stands for Strong Thermal Emission Velocity Enhancement (STEVE).

A new study published on August 20<sup>th</sup> in *Geophysical Research Letters* now concludes that STEVE "is clearly distinct from the aurora." Its exact cause is still unknown.

*Details:* Canon 550D (T2i) and Tokina 11-18mm zoom lens (set at 11mm and f/2.8) on a stationary Monfrotto tripod. Exposure time is 25 seconds at ISO 3200. Taken on August 28, 2014 at 11:06 pm MDT.

## Great Nebula in Orion (M42 & M43)

*Eric Schreur*

One of the most famous deep sky objects, the Orion Nebula is easily found below the hunter's angled belt in his sword. At a distance of 1,344 light-years, it is the closest region of massive star formation to Earth. It spans about 24 light-years and has enough material to create an estimated 10,000 sun-like stars.

*Details:* Celestron 9.25-inch SCT and Canon 60Da camera. Eric stacked twenty-five 30-second exposures (at ISO 800) taken from his backyard in Kalamazoo on March 3, 2018.



## Triangulum Galaxy (M33)

*Mike Melwki*

M33 is the third largest galaxy in the Local Group of Galaxies, behind the Andromeda Galaxy (M31) and Milky Way. It is between 2.38 and 3.07 million light-years away and 60,000 light-years in diameter.

*Details:* William Optics 132mm (f/7) triplet apochromatic refractor and ZWO ASI294MC Pro cooled CMOS camera on a Celestron CGX German Equatorial Mount. Mike combined thirty-seven 5-minute exposures taken on August 23, 2018, making the equivalent exposure 185 minutes.



# Astrophotography Night Highlights



## Great Hercules Cluster (M13)

*Eric Schreur*

One of the most viewed deep sky objects, discovered by Edmond Halley in 1714, M13 is 22,200 light-years away and contains an estimated 300,000 stars. It spans 145 light-years and is about 11.65 billion years old.

*Details:* Celestron 9.25-inch SCT and Canon 60Da camera. Eric stacked nineteen 90-second exposures (at ISO 1800) taken from his backyard in Kalamazoo.



## ISS Solar Transit

*Roger Williams*

The International Space Station crossed the face of the Sun, as seen from a narrow path through southwest Michigan, on March 4, 2018. Roger combined 18 separate images to create this composite image.

*Details:* Coronado MaxScope 70 and Lumenera SKYnyx 2-1 camera on an Orion Atlas German equatorial mount.

## The Lagoon Nebula (M8)

*Richard Bell*

This massive region of star formation is located 4,310 light-years away in the constellation Sagittarius. It has an angular size of 90' x 40' which translates to actual dimension of 110 x 50 light-years.

*Details:* Stellarvue 130mm apochromatic refractor with a modified Canon 600D camera on an Astro-Physics Mach1GTO German Equatorial Mount. It is a 49 minute total exposure from North Fulton Cemetery.



## Waxing Gibbous Moon

*Emma Piper*

The Moon is an ideal target for a budding astrophotographer. It is easy to frame and focus on. Emma, a KAMSC alumnus, took this image while interning at Yellowstone National Park last summer.

*Details:* Taken with a standard DSLR camera and telephoto lens on a stationary tripod.



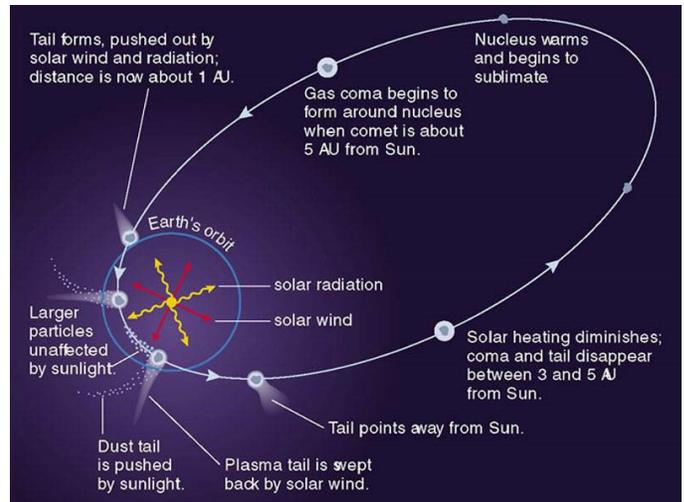
# Chasing Comets

by **Aaron Roman**

This December we will have a unique opportunity to follow the rise and fade of one of our most beloved night sky objects. A particularly bright comet will be visiting our part of the solar system. 46P/Wirtanen will be visible starting in the southern sky and moving through the constellation Cetus in early December. Throughout the month it will quickly climb toward the zenith and brighten significantly as it passes directly between two well-known open clusters, the Pleiades and Hyades. Finally, it will settle into Ursa Major around the New Year and slowly fade, not to return until its next visit in 5.4 years. See the comet's path on page 9.

This comet was first observed by Carl Wirtanen on January 17, 1948 at Lick Observatory. It has been followed every cycle since then (except for one Sun-obscured year) by many agencies and research groups including NASA and European Space Agency (ESA). The ESA even originally planned to target Wirtanen for their Rosetta mission. With any luck this cycle will prove exciting, as this comet tends to be more volatile than other comets. Passing only 0.077 AU (11.6 million km) from Earth means that observations around the world will be possible at all interest levels.

On the morning of September 6<sup>th</sup>, I set out at 4am to find another comet, 21P/Giacobini-Zinner in Auriga. I hadn't seen a comet in many years and had never observed one through a telescope before. Having spent the last year chasing after Messier objects, I was interested in expanding my observing experience. That Thursday morning, I found myself looking at a slightly different type of "faint fuzzy". The object that I saw through my 10" reflector telescope was



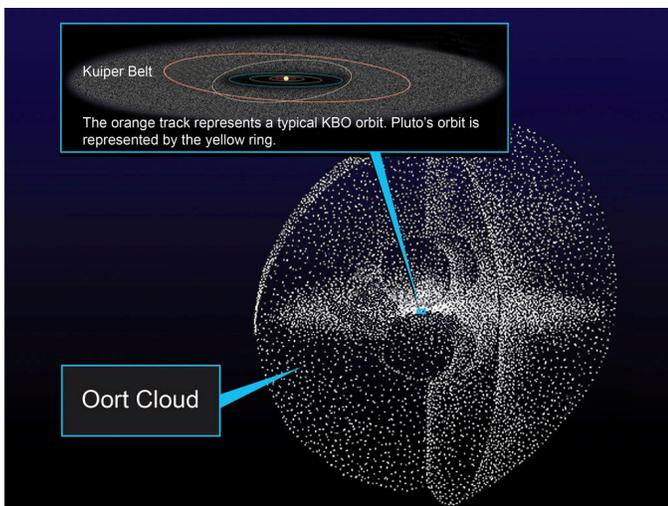
**Comet nuclei are frozen and inactive when far from the Sun. Only when they venture into the inner solar system do their volatile gases sublimate (directly from the solid to gas phase). The expelled gases form a coma, a tenuous atmosphere surrounding a comet nucleus, which extends outward due to radiation (light) pressure and solar wind particles from the Sun.**

unique compared to the other objects that I was used to seeing. It was not an elliptically shaped galaxy nor a round 'lacy' globular cluster. It was fuzzy but stretched out and the whole thing was centered on a nucleus. Having seen hundreds of photographs of comets, I knew exactly what the view in my eyepiece was. At +7.1 magnitude it was an easy target for my telescope. I also had my binoculars with me, though at only (10x) magnification, they didn't give a view much better than a blurred star.

**Quick Note about Visual Magnitude:** It is the brightness of an object +/- from Zero. One example such as Jupiter (-1.80) is brighter than the North Star (+2.00). So, a bright object will be a larger minus and a dimmer object will be a larger plus.

## Comets 101

Comets come from two different regions in our Solar System. Intermediate period comets originate from the Kuiper Belt and are defined as having a 50 to 200-year cycle. The long period orbits that originate in the Oort Cloud can exceed 100,000 years. Any comet that we see from Earth has been gravitationally nudged out of one of these regions and into an extreme elliptical orbit. Unlike planets that have circular orbits around the Sun, a comet's orbit travels from the outer reaches of the solar system to plummet towards the Sun (many impacting straight into the Sun). These odd shaped orbits may start beyond Neptune but they all end with relatively close passes to the Sun.



**Most short period comets come from the Kuiper Belt, a region of the solar system that extends about 30 to 50 AU from the Sun. Long period comets originate from the Oort Cloud, a spherical collection of icy bodies that could extend from 10,000 to 100,000 AU from the Sun.**



**Rolando Ligustri took this image of 46P/Wirtanen on October 18, 2018 using a telescope at Siding Spring Observatory in Australia.**

Aphelion - furthest distance of a planet's, asteroid's or comet's orbit from Sun.

Perihelion - meaning closest approach of a planet's, asteroid's or comet's orbit to the Sun.

There is a third group of comets. These are the "short period" comets that are contained by the orbit of Jupiter. Wirtanen is an example of one of these. It probably originally started as having a "normal" comet orbit. But due to the massive gravitational influence of Jupiter it became a captured object. It now has a very short 5.4-year cycle that still has a perihelion near the Sun but does not go further out than Jupiter's orbit at aphelion.

No matter the neighborhood from which these objects originate, they are all composed of various amounts of dust and ice. As the comet approaches the warmer regions of the solar system those ices start to sublimate. Gasses eject from the surface (nucleus) of the comet to form a halo around the nucleus. Comets usually have two tails. A gaseous tail will be pushed by solar wind away from the Sun. A primarily dusty tail will trend in similar direction but will trail slightly away from the direction of travel of the comet. These tails leave dusty rivers floating in space long after the comet has moved on. Earth passes through these dust rivers where we experience a meteor shower. If you enjoyed the Perseids this August, it is remnant of 109P/Swift-Tuttle, a 133-year comet last reaching perihelion in 1992.

The most memorable comet in recent history (at least in the Northern Hemisphere) was probably Hale-Bopp in 1997 (formerly C/1995 O1). It is a long period comet (2,533 years) having had a magnitude -1.7 at its closest approach. As a teenager I remember going out with my family in the early evening. We parked the car on the side of a quiet Ohio road and watched as twilight set in. Over the cornfields and orchards that spectacular comet came into view.

The most famous comet may be 1P/Halley. The last time it was visible from Earth was in 1986. I was a young kid climbing to the top of a Colorado mountain with my Dad and sister. It was only magnitude +6.2 at its brightest and the best tool we had was a pair of binoculars. So even though my

sister and I swear to this day that we saw it, I can't really say for sure that we did.

If you are interested, I really enjoy [Gary Seronik's Articles](#).

What makes this December's comet such a special event is that it will be accessible. Wirtanen will be visible all month. You can enjoy it throughout the evening so there is no need to get up at crazy hours if you want to see it. And because it gets dark so early in December, this makes sharing this experience with school aged kids and your working friends easy.

I also really like this simulation:

<https://www.youtube.com/watch?v=eI-ci99XLAM>

### **So, how excited should I be for this comet?**

If you are comet nerd, you are probably already falling out of your chair. For the rest of us, it will be cool. It will reach magnitude +3.8 at its brightest. Being not quite as bright as the North Star (Polaris), maybe doesn't inspire an "Ooo and aaaah!" response, but still absolutely worth taking time for. The last bright comet of this magnitude was in 2013 (C/2011 L4 PANSTARRS), so these events don't happen very often. Also consider this, C/2011 didn't even rise until 5 o'clock in the morning so even if you caught it on your way to work, it was completely compromised by an increasingly brightening sky.

### **What type of equipment should I use?**

A good pair of binoculars could be best as they will provide a comfortable wide-angle field of view. Of course, it will be an easy target for any telescope, though you may not get the entire tail in a single field of view. Keeping your magnification under (75x) should be fine for viewing much of the tail.

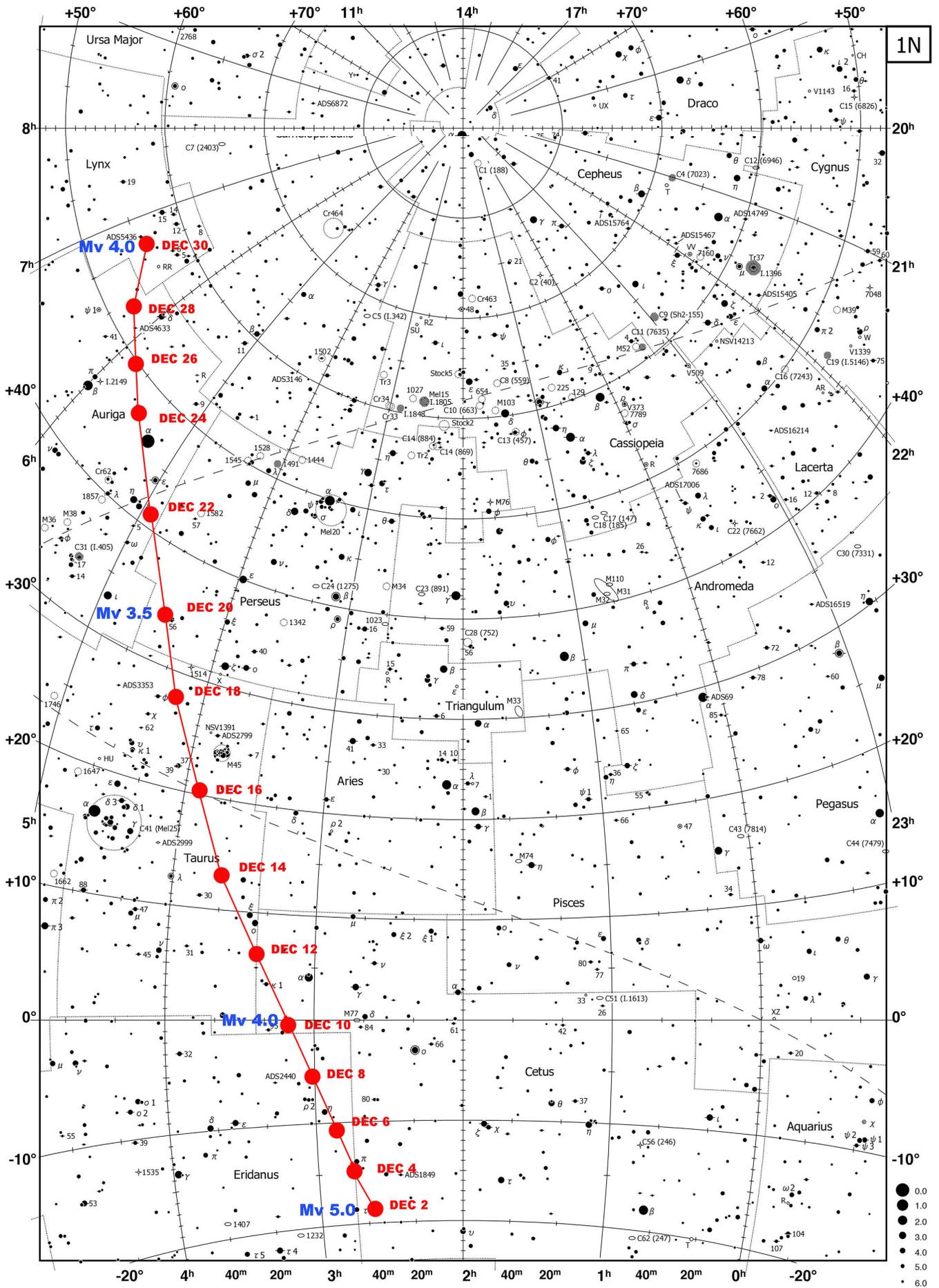
### **Yeah, Aaron, but should I pick up a comet filter?**

Well, here's the thing. I don't really know what to tell you. From one vendor:

*a narrow band-pass filter (25 nm), isolates the 501 nm OIII line and both C2 lines at 511 nm and 514 nm. The high contrast of the filter reveals the delicate ionized tail of gaseous comets, allowing you to see their full extent. The Comet Filter also helps you to better distinguish gaseous comets from dusty comets, which normally show little contrast gain.*

Great right? Well that bit about dusty comets... they don't ionize in a light spectrum that a filter would be any help. I love my narrow pass nebula filter, but like my wife likes to remind me, "...but is it \$100 better?"

For the best views you may want to consider going out on a moon free weekend (Saturday the 8<sup>th</sup>) as it will be much darker. The closest approach will be on December 16<sup>th</sup> (2:45 am, Sunday morning) passing right in between the Pleiades and Hyades. Some may enjoy sharing a Christmas evening viewing with a 9pm moonrise. Since 46P/Wirtanen has been reasonably visible since early October, now is a great time to start following it!



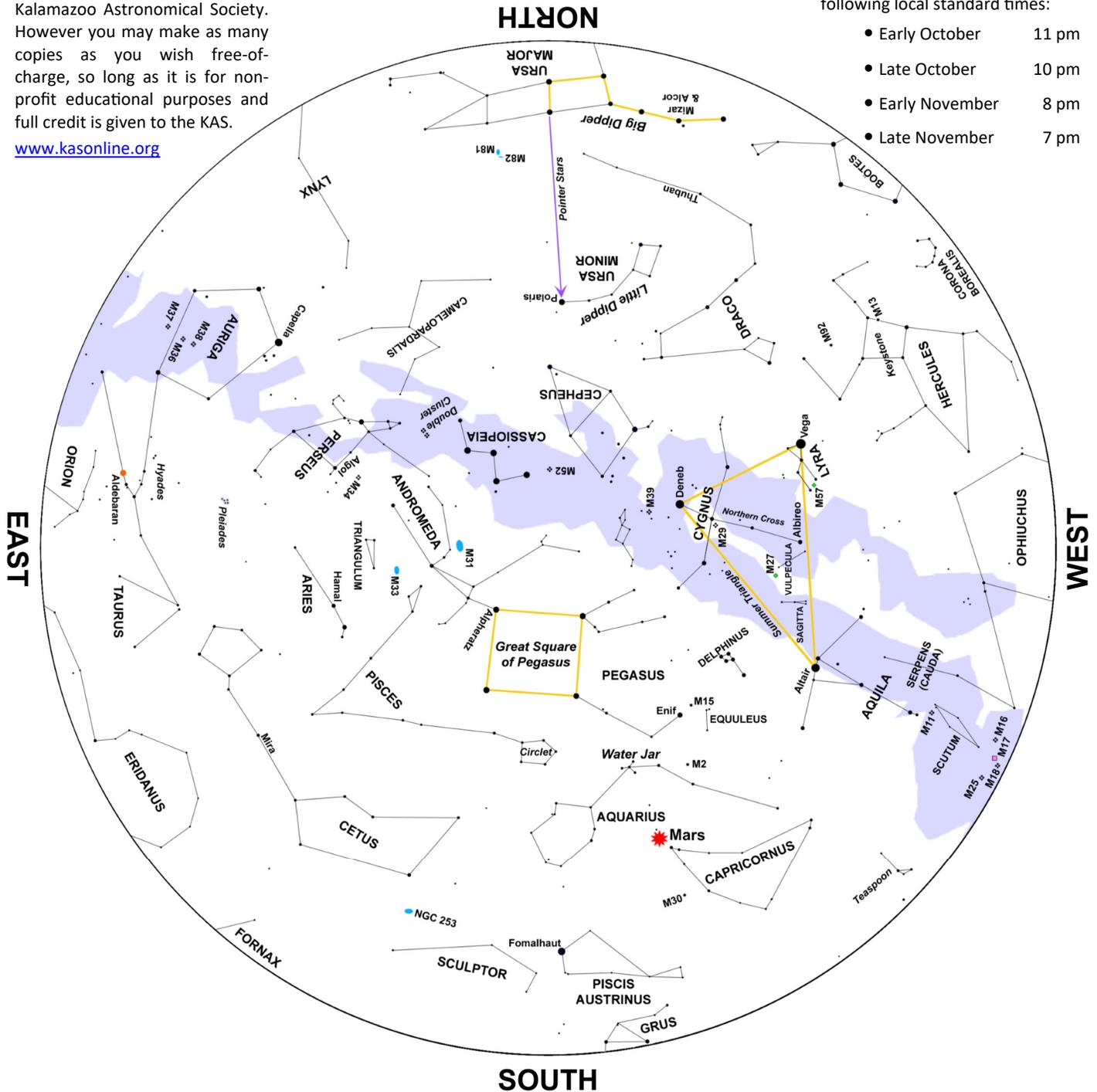
# — November Night Sky —

This star map is property of the Kalamazoo Astronomical Society. However you may make as many copies as you wish free-of-charge, so long as it is for non-profit educational purposes and full credit is given to the KAS.

[www.kasonline.org](http://www.kasonline.org)

This map represents the sky at the following local standard times:

- Early October 11 pm
- Late October 10 pm
- Early November 8 pm
- Late November 7 pm



Watch Mars move past Delta ( $\delta$ ) Capricorni between November 3<sup>rd</sup> and 6<sup>th</sup>. The Red Planet comes closest to the star on the 4<sup>th</sup>, when they'll only be  $\frac{1}{2}^\circ$  apart.

Look toward the southwestern sky at dusk on November 11<sup>th</sup> to see Saturn and a waxing crescent Moon only  $4^\circ$  apart -

easily fitting into the field-of-view of a pair of  $7\times 50$  or  $10\times 50$  binoculars.

Venus, now in the east-southeastern sky before sunrise as the Morning Star, will only be  $1^\circ$  from Spica, the brightest star in Virgo on November 14<sup>th</sup>.

The Moon, barely past first quarter, will

hang  $3^\circ$  to the lower right of Mars on November 15<sup>th</sup>.

The nearly Full Moon and Aldebaran rise together less than  $3^\circ$  apart in the east-northeast on the evening of November 23<sup>rd</sup>. The Moon, now just shy of last quarter, will skirt within  $2^\circ$  of Regulus on the morning of November 29<sup>th</sup>.

## KAS BOARD

### PRESIDENT

Richard S. Bell

### VICE PRESIDENT

Jack Price

### TREASURER

Rich Mather

### SECRETARY/ALCOR

Roger Williams

### PUBLICITY MANAGER

Joe Comiskey

### MEMBERS-AT-LARGE

Jean De Mott

Lydia Hoff

Scott Macfarlane

Don Stilwell

[E-MAIL a BOARD MEMBER](#)



November 2018

Page 11

# Moving? New E-mail?

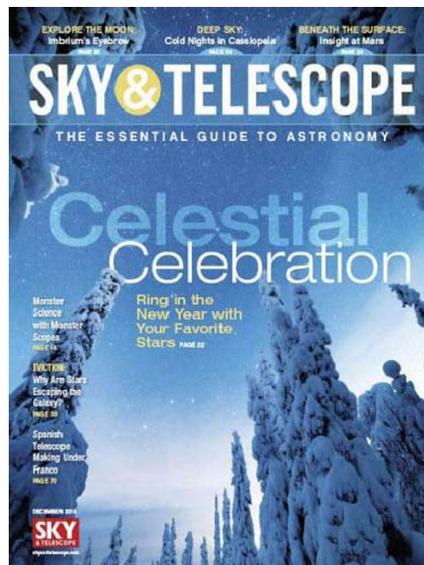
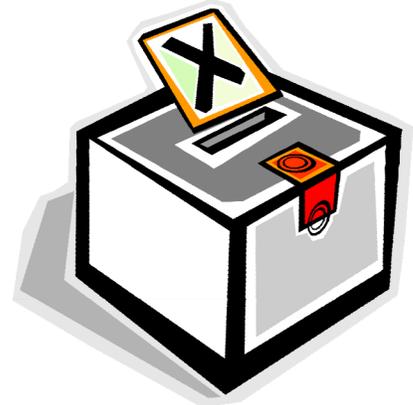


Have you recently moved and/or changed your e-mail address? If so please [let us know](#) ASAP.

If you are moving out of town before your membership expires please contact us anyway. You paid for a years worth (or more) of newsletters and that's what you'll get!

## The KAS Needs You!

Opening nominations for 2019 KAS Officers and At-Large Board Members will take place at the November General Meeting. Please [send us](#) your nominations if you are unable to attend the meeting. Ask not what the KAS can do for you, but what you can do for the KAS!



### **S & T Subscription Discount**

One of the many benefits of KAS membership is a **\$10 discount** on a one year subscription to the premiere astronomical magazine, *Sky & Telescope*. A regular one year subscription costs \$42.95; you pay only **\$32.95**. It's like receiving two free issues!

To take advantage, bring a check (made payable to [Sky Publishing](#)) to the next general meeting or [contact](#) KAS Treasurer **Rich Mather** for more information. First-time subscribers must pay through the KAS to receive the discount.

# General Meeting Preview



## NO DARK in SIGHT

presented by **Bill Davis**

WMU Associate Professor of Art

Professor Davis shares his story about trekking to photograph unnaturally bright sites in the naturally dark night. Funded by various grants and awards, Davis launched his project in 2016 to exhibit artwork about the loss of natural darkness and the devolutionary normalization of artificial light. Backpacking with professional-grade camera equipment in the U.S. and abroad, Davis also traveled to diametrically oppositional sites to contrast his message: Las Vegas (the brightest place on night earth) and Cusco, Peru (the historically sacred center of natural light and dark night worship). His photographs invite viewers to consider their relationship with light and imagine the power of slowly vanishing and naturally dark nights. "No Dark in Sight" is a touchstone for the pathos of contemporary culture and ethos of ancient ritual.

**Friday, November 2 @ 7:00 pm**

***Kalamazoo Area Math & Science Center***

*600 West Vine, Suite 400 • Use Dutton St. Entrance*

– *Dutton Entrance Locked by 7:10 pm* –

Kalamazoo Astronomical Society  
c/o KAMSC  
600 West Vine, Suite 400  
Kalamazoo, MI 49008

STAMP

