

Highlights of the October Sky...

--- 2nd ---
Last Quarter Moon
5:45 am EDT

--- 4th ---
AM: A waning crescent Moon and the Beehive Cluster (M44) in Cancer rise together in the east-northeast and climb higher before sunrise.

--- 5th ---
AM: The Moon is about 7° to the right of Regulus in Leo.

--- 8th ---
New Moon
11:47 pm EDT

--- 11th ---
DUSK: A waxing crescent Moon is 3° above Jupiter in Libra.

--- 14th ---
DUSK: Centered on an arc between Jupiter and Mars are the Moon and Saturn separated by less than 2°.

--- 16th ---
First Quarter Moon
2:02 pm EDT

--- 17th ---
PM: A waxing gibbous Moon is 6° to the right of Mars.

--- 18th ---
PM: The Moon is now about 5.5° to the left of Mars.

--- 21st ---
AM: The Orionid meteor shower peaks, but is spoiled by the nearly Full Moon.

--- 24th ---
Full Moon
12:45 pm EDT

--- 26th ---
PM: A waning gibbous Moon spends the night near the Hyades cluster in Taurus.

--- 31st ---
PM: The Moon and Beehive Cluster are 4° apart.

Prime Focus

A Publication of the Kalamazoo Astronomical Society

★ ★ ★ October 2018 ★ ★ ★

This Months Events

General Meeting: Friday, October 5 @ 7:00 pm
Kalamazoo Area Math & Science Center - See Page 10 for Details

Observing Session: Saturday, October 6 @ 7:00 pm
Mars, Saturn & Autumn Galaxies - Kalamazoo Nature Center

Movie Night: Friday, October 12 @ TBD
Celebration Cinema Crossroads - See Page 5 for Details

Observing Session: Saturday, October 20 @ 7:00 pm
Moon, Mars, Uranus & Neptune - Kalamazoo Nature Center

Board Meeting: Sunday, October 21 @ 5:00 pm
Sunnyside Church - 2800 Gull Road - All Members Welcome

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★ ★ ★ www.kasonline.org ★ ★ ★

September Meeting Minutes

The general meeting of the Kalamazoo Astronomical Society was brought to order by President Richard Bell on Friday, September 7, 2018 at 7:05 pm EDT. Approximately 49 members and guests attended at the Kalamazoo Area Math & Science Center (KAMSC).

Richard began his President's Report with a brief update on the Remote Telescope. Mike Patton will bring the 'scope back online after the monsoon season hiatus. We hope the telescope will be fully functional at that time. Volunteers are needed for several upcoming community events (see page 9 for more information). Richard is in the process of redesigning our website, *KAS Online*, and is welcoming suggestions from the membership. Several members seemed interested in Richard's proposal of seeing *First Man* on its opening night of October 12th (full details are on page 5). Finally, Richard asked for programming thoughts and ideas for 2019. Interested in a specific topic or would you like to give a presentation? Contact him ASAP.

In a rare treat, Richard then got to present two Astronomical League Observing Awards. Both Joe Comiskey and Arya Jayatilaka successfully completed the Binocular Messier Program and were each presented with an official observing pin and certificate. Congratulations to both of you! All KAS members are encouraged to complete one or more of the A.L.'s numerous observing programs. A complete list with full details can be found [on their website](#).

Our guest speaker for the evening was Craig Whitford, the volunteer Meteorite Collections Coordinator at Abrams Planetarium. The title of Mr. Whitford's presentation was *Michigan's Extraterrestrial Visitors - Meteorites*. If a meteoroid, traveling at a typical speed of 45,000 mph, enters Earth's atmosphere it compresses and heats the gases which in turn heat the object, now known as a meteor, and produces a streak of light. Typically, the meteor dies a fiery death, but sometimes it will survive all the way to the surface and become a meteorite.

Meteorites are divided into three broad categories: iron (composed of nearly pure metallic nickel-iron), stony (silicate masses that resemble Earth rocks), and stony-iron (mixtures of iron and stone). When iron meteorites are sliced open, polished, and etched with nitric acid they reveal bands called Widmanstätten patterns. These patterns arise from crystals of nickel-iron alloys that have grown very large, indicating that the meteorite cooled from a molten state no faster than a few degrees per million years.

This reveals that some meteorites appear to be fragments of planetesimals that were large enough to grow hot from radioactive decay, melt, and differentiate with a metallic core, dense rocky mantle, and thin crust. Molten iron cores would have been well insulated by thick rocky mantle, so iron would cool slowly to produce Widmanstätten patterns. Collisions gradually break up such bodies and produce the different kinds of meteorites found on Earth and elsewhere in the solar system (such as Mars).

Chondrites are stony meteorites with volatile gases (i.e. water) removed. Most contain chondrules - rounded bits of glassy rock ranging from microscopic to as big as a pea. Some stony meteorites do not contain any chondrules, and are called achondrites. In addition to iron and stony meteorites, some are called stony-iron meteorites. These originate between the boundary of a planetesimal's iron core and rocky mantle.

Recovered meteorites are regarded as a "find" or a "fall." A fall is a meteorite that is found right after falling, and the location can be pegged to a certain falling meteor by triangulated observations by witnesses. A find is a meteorite that has been found years after reaching Earth's surface. Iron meteorites account for 5.7% of all falls. Chondrites are by far the most common type of meteorite. They make up 85.7% of all recovered falls. Achondrites account for 7.1%, while stony-irons are only 1.5% of all falls (that's why they're the really pricey ones).

Thanks to geologic and weathering processes, Earth does not have the heavily cratered surface as observed on other solid bodies in the solar system. Earth does have its fair share of impact craters though. One of the most famous is Meteor Crater in northern Arizona. It formed about 50,000 years ago by the impact of an iron meteorite 150-feet in diameter, resulting in a crater that is 4,100-feet across and 570-feet deep. Many fragments have been recovered around the crater, but nothing has ever been found *beneath* the crater.

The Kamil Crater was discovered in 2008 by Vincenzo de Michele using Google Earth! It is located in southwestern Egypt, only 0.4-mile north of the Sudan border. It is about 147-feet wide and estimated to be less than 5,000 years old. Meteor fragments totaling 1,800-lbs were recovered during an expedition in 2010. The Carancas Crater formed after a H4-5 chondritic meteorite (estimated to originally be 10-feet in diameter) impacted Earth's surface on September 15, 2007. The event occurred near the village of Carancas in



Craig A. Whitford, who volunteers as the Meteorite Collections Coordinator at Abrams Planetarium, was our guest speaker at the general meeting on September 7th.

Peru, close to the Bolivian border and Lake Titicaca. The crater is 43-feet wide and 15-feet deep.

Believe it or not, there is an impact crater located in Calvin Township in Cass County! It is known as [Calvin Crater](#) and was discovered by Randall Milstein of the Michigan Geological Survey while examining data from about 100 test wells drilled in the area. Unfortunately, the crater is not exposed to the surface but lies about 100 to 400 feet below today's ground level. The crater is 5 miles in diameter and is estimated to be 450 ± 10 million years old.

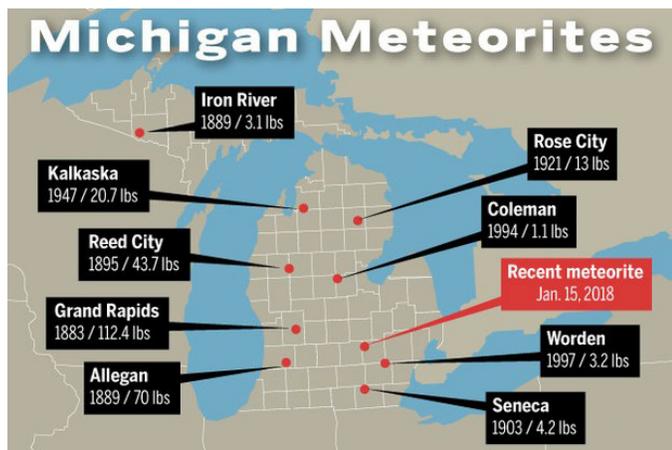
Mr. Whitford then went through all Michigan meteorites discovered (thus far) in chronological order (9 out of 10 of them were on display during the meeting):

The **Grand Rapids meteorite** was discovered on May 15, 1883 by Michael Clancy, a contractor, while making an excavation for building purposes on land belonging to the Catholic Church. It was found 3 feet below the natural level of the ground and wedged between two large boulders. It has an iron/nickel composition and weighs 114-lbs.

The **Iron River meteorite** is the only meteorite recovered in the Upper Peninsula to date. It was found in 1889 by Peter Peterson, then a boy of age 6, while helping his father clear a field of stones. He came across one much heavier for its size than the others. Seventy-five years later (1965), Ellsworth Peterson, son of Peter, sat in his home in Lansing and read a story about a meteorite found near Kalkaska, requested the stone be sent to him and he brought it into the Abrams Planetarium for positive identification. It is an iron meteorite (appropriately enough) weighing 3.13-lbs.

The **Reed City meteorite** was found by Ernest Ruppert, a small farmer and junk dealer on his farm while plowing in September, 1895. It was on display in a hotel window in Reed City where Prof. Walter Barrows saw it in December, 1898. This is also an iron/nickel meteorite with a weight of 44-lbs.

The **Allegan meteorite** fell on Thomas Hill, located on Saugatuck Road at about 8am on July 10, 1899. According to Walter Price, this stone came from the northwest and passed within 40-feet of where he was working, striking the ground about 10-rods (165-feet) beyond, in sand, and burying itself to the depth of about a foot and a half. This is an ordinary chondrite meteorite weighing 70.55-lbs.



Fragments of the **Rose City meteorite** were found the day after a brilliant meteor was observed (with detonations) moving from the north-northwest to the south-southeast over the northeast portion of the lower peninsula. A woman reportedly thought bombs were being dropped on the Rose City area! Three stones (all ordinary chondrites) of 3.25-lbs, 7-lbs and 13-lbs, fell about 9-miles northeast of Rose City.

The **Seneca Township meteorite** was found in a corn field in 1923 but was reputed to have fallen in June, 1903, but the corrosion present makes this unlikely. This is another iron meteorite weighing in at 25.35-lbs.

The **Kalkaska meteorite** was discovered by Arthur R. Sieting in 1947 or 1948 while working his field. He heard the cultivator blades strike metal. Upon locating the object, it turned out to be heavier than suspected. His brother-in-law saw the object and took it to MSU. In 1964, Mr. Sieting donated it to the University collection. This iron meteorite weighs 20.72-lbs.

Tom Hagon recovered a single pyramidal stone that had penetrated the roof of his house on October 20, 1994. Known as the **Coleman meteorite**, it was recovered within 12 hours of observations of a bolide accompanied by a sonic boom at 1:52 am. Classified as an L6 chondrite, it weighs only 1.03-lbs.

Numerous individuals in south-central Michigan reported a daylight meteor around 5:00-5:15 pm EDT with loud sonic booms or thunder. Duane Foster and his sons were working in their backyard when they heard a whistling sound passing over head in front of their house. Upon entering their garage, they found plaster dust, pieces of drywall and insulation. Then they noticed the top of the son's car was dented and a rock and two chips on the cement floor. Known as the **Worden meteorite**, it is an L5 chondrite weighing 3.42-lbs.

Hundreds of people from seven states observed a very bright fireball over the skies of southeast Michigan around 8:10 pm on January 16, 2018. Many noted a sonic boom or thunder. Several pieces were recovered from the frozen lake surfaces within Hamburg Township over the next few days. The U.S. Geological Survey recorded a 2.0 magnitude earthquake. The fragments recovered from this H4 chondrite, known as the **Hamburg meteorite**, total about 2.2-lbs.

Mr. Whitford spent the remainder of his presentation discussing the new meteorite exhibit coming to Abrams Planetarium. *Michigan Meteorites and Beyond: Bringing the Solar System Down to Earth* is set to debut in 2020.

Scott Macfarlane and Don Stilwell shared some of their experiences at Cherry Springs State Park in Pennsylvania back in July after the snack break. They said the first two nights (July 12th and 13th) were humid, but the skies were still exceedingly better than normal conditions in southwest Michigan. The skies were to cloud up after that so they spent some time in Pittsburgh. Turning to astronomical news, Jean DeMott mentioned the mysterious pressure leak on the International Space Station. Rumor has it that the leak may have been caused by a drill! Richard mentioned that the phenomena known as [STEVE](#) is actually a form of sky glow and not associated with aurora. After a little more discussion, the meeting concluded at 9:04 pm.

Board Meeting Minutes

After a summer break, the Kalamazoo Astronomical Society Board met on September 16, 2018 at Sunnyside Church. Those in attendance were board members Richard Bell, Joe Comiskey, Jean DeMott, Lydia Hoff, Scott Macfarlane, Jack Price, and Roger Williams. KAS member Mike Patton was also present. Richard called the meeting to order at 5:07 pm.

The meeting began as usual with a brief perusal of the Treasurer's Report, which had been e-mailed by Rich Mather. There were a few questions about which savings were designated to the Remote Telescope. Richard suggested that we should now officially end fundraising for the Remote Telescope, since all of the planned significant expenditures had been done, and a maintenance fund had been set aside.

Following the Treasurer's Report, Richard summarized the planned September - October events, including Public Observing Sessions on September 29th and October 6th. The general meeting on October 5th will feature member astrophotography.

Follow-up discussion of items from the last meeting began with an update of the Remote Telescope Project. It appears that the telescope is ready for operation as soon as the monsoon season has passed. Richard had contacted Observatory Solutions about the time and manner in which we will pay the amount still owed for their work, but there had been no response as yet.

The primary item in this category was the editing of Remote Telescope Usage Guidelines. Richard had e-mailed to board members a first draft and a revised version. Mike asked to have some more language dealing with time allocation and usage scheduling. Specifically, he asked that requests for telescope time be submitted only by e-mail (not telephone) and that the time be allocated in four-hour blocks using Arizona time. He asked that time be scheduled no more than 60 days in advance and no later than 8am Eastern Time on the day of use. A few other grammatical issues affecting clarity were also discussed. Richard and Jean agreed to make further revisions to the agreement to cover the points raised

Follow-up discussion continued with a summary of planned

outreach activities, including a Wednesday, September 19th appearance at Hastings Public Library (Richard & Jean) and WMU Youth Day at the Seelye Center on October 6th (overseen by Jack, but in need of 3-4 helpers). Spooky Science Saturday at Kingman Museum (October 13th) conflicts with Crane Fest (October 13th and 14th). Richard preferred Spooky Science Saturday, while Jack (10/13) and Scott (10/14) offered to attend Crane Fest.

Joe reported on his efforts to rehab a classic Coulter 8-inch Dobsonian telescope that had been gifted to the club. He had brought it to working order with the only expense being a Telrad finder. However, his plan to replace the rudimentary focuser with a spare rack-and-pinion model was stymied by the inability of this part to reach focus. A purchased low-profile focuser would do the trick, but at a cost greater than the total spent thus far. Joe asked how much more should be spent on this and whether we should use it as another telescope to be borrowed temporarily by members, or we should sell it. The Board consensus was that we should try to sell it in its current form and let the buyer decide what to do about the focuser.

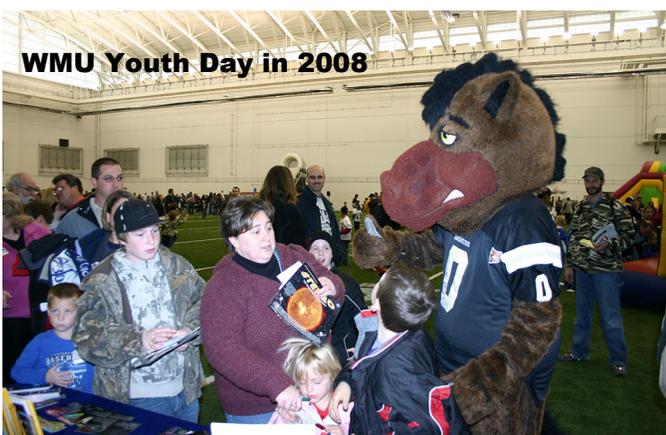
In the category of New Business, Richard proposed a KAS Movie Night to see *First Man* at Celebration Cinema IMAX on Friday, October 12th, at about 8 pm (the schedule was not yet known with certainty). There was enough interest that Richard agreed to get more detailed information. Richard also listed a proposed schedule for general meetings and observing sessions in 2019. The deviations from first Friday of the month for general meetings were January 11th (to get farther from the New Year's holiday), July 12th (farther from Independence Day), and September 13th (avoid conflicts with KAMSC). No one had objections to this schedule or to the proposed Public Observing dates. The Board will look over the schedule before the next meeting.

Additional events of interest during 2019 include a total lunar eclipse (January 20th), February Freeze Out (February 2nd), Messier Marathon (March 9th), and a transit of Mercury (November 11th). The theme of the 2019 Library Summer Reading Program in Michigan will be "A Universe of Stories," and Jean emphasized the opportunities for KAS to be involved in this.

In Other Business, Mike reported that the Arizona community were considering the formation of a consortium of users to obtain insurance at an affordable price (quotes obtained so far were prohibitively expensive). This could be of interest to KAS if it is successful. Mike also mentioned the lower prices available these days for custom-designed promotional materials (as with Richard's personalized shirt). Richard said that he was already working on ideas.

With no further business, the meeting was adjourned at 7:00 pm. The next meeting was set for Sunnyside on October 21st at 5 pm.

Respectfully submitted by Roger Williams





Observations

by **Richard S. Bell**

Who wants to get out of the house and have a little astronomical fun in October? *Astrophotography Night*, a long standing KAS tradition, returns after a one-year hiatus on October 5th. Members will share their best imaging pursuits over the past couple of years. Hopefully some of our newer shutterbugs will be able to attend and share their cosmic pics. Our last two Public Observing Sessions of 2018 will be held on October 6th and 20th. Too many of you haven't attended a single session this year. What gives? You've only got two chances left, so here's hoping the weather cooperates.

As seen in the column to your right, we're planning a fun outing on Friday, October 12th. The last time we saw a movie in a theater as a group was for *Contact* in 1997! Holy moly, that's 21 years ago! Time sure does fly by fast. *First Man* is currently scoring an 88% on Rotten Tomatoes, so it should make for an enjoyable gathering. If you plan to attend please drop me a note (if you haven't already done so and/or if you cannot attend the October General Meeting).

Here's another possibility for a group outing in October:



This play is being held at the Williamston Theatre (near East Lansing) at 8pm on Thursdays, Fridays, and Saturdays from September 20th - October 21st. There are also performances at 3pm on Saturdays and 2pm on Sundays. Here's a synopsis from [their website](#):

Astonishing discoveries await Henrietta Leavitt as she maps distant stars in galaxies beyond our own. This brilliant, headstrong pioneer must struggle, though, for recognition in the man's world of turn-of-the-century astronomy. In this exquisite blend of science, history, family ties, and fragile love, a passionate young woman must map her own passage through a society determined to keep a woman in her place. A stunningly beautiful tale, based on the true story and science of early 20th century female "computers" at Harvard Observatory.

Doesn't this all sound like great fun? Join us and help keep the "Society" in Kalamazoo Astronomical Society!



Kalamazoo Astronomical Society

MOVIE NIGHT

Friday, October 12th @ TBA

Celebration Cinema Crossroads

The Apollo XI mission of landing human beings on the surface of the Moon and returning them safely to Earth is one of the greatest feats of engineering and exploration in history. Next year marks the 50th anniversary of this incredible achievement. What better way to begin the celebration by watching a movie based on Neil Armstrong's journey from Earth to the Moon together?

You are invited to Celebration Cinema Crossroads on Friday, October 12th. Exact showtimes will not be known until Tuesday, October 9th, but we hope to see the showing closest to 8pm. The current plan is to see the movie on the big IMAX screen, but we could also consider seeing the movie in a regular theater. The IMAX theater has a seating capacity of 300 people, so there should be plenty of room for all those that wish to attend. If you do plan to join us, please contact us by Monday, October 8th. We are seeking a volunteer to purchase all the tickets together on the 9th so we can sit together. Final plans will be made at the October General Meeting.

Here's the official synopsis:



On the heels of their six-time Academy Award-winning smash, *La La Land*, Oscar-winning director Damien Chazelle and star Ryan Gosling reteam for Universal Pictures' *First Man*, the riveting story of NASA's mission to land a man on the Moon, focusing on Neil Armstrong and the years 1961-1969. A visceral, first-person account, based on the book by James R. Hansen, the movie will explore the sacrifices and the cost — on Armstrong and on the nation — of one of the most dangerous missions in history. Written by Academy Award winner Josh Singer (*Spotlight*), the drama is produced by Wyck Godfrey & Marty Bowen (*The Twilight Saga, The Fault in Our Stars*) through their Temple Hill Entertainment banner, alongside Chazelle and Gosling. Isaac Klausner (*The Fault in Our Stars*) executive produces.



Observe the Moon

by **Jane Houston Jones & Jessica Stoller-Conrad**

This year's International Observe the Moon Night is on October 20th. Look for astronomy clubs and science centers in your area inviting you to view the Moon at their star parties that evening!

On October 20th, the 11-day-old waxing gibbous Moon will rise in the late afternoon and set before dawn. Sunlight will reveal most of the lunar surface and the Moon will be visible all night long. You can observe the Moon's features whether you're observing with the unaided eye, through binoculars or through a telescope.

Here are a few of the Moon's features you might spot on the evening of October 20th:

Sinus Iridum — Latin for "Bay of Rainbows" — is the little half circle visible on the western side of the Moon near the lunar terminator — the line between light and dark. Another feature, the Jura Mountains, ring the Moon's western edge. You can see them catch the morning Sun.

Just south of the Sinus Iridum you can see a large, flat plain called the Mare Imbrium. This feature is called a mare — Latin for "sea" — because early astronomers mistook it for a sea on Moon's surface. Because the Moon will be



approaching full, the large craters Copernicus and Tycho will also take center stage.

Copernicus is 58 miles (93 kilometers) across. Although its impact crater rays — seen as lines leading out from the crater — will be much more visible at Full Moon, you will still be able to see them on October 20th. Tycho, on the other hand, lies in a field of craters near the southern edge of the visible surface of the Moon. At 53 miles (85 kilometers) across, it's a little smaller than Copernicus. However, its massive ray system spans more than 932 miles (1500 kilometers)!

And if you're very observant on the 20th, you'll be able to check off all six of the Apollo lunar landing site locations, too!

In addition to the Moon, we'll be able to observe two meteor showers this month: the Orionids and the Southern Taurids. Although both will have low rates of meteors, they'll be visible in the same part of the sky.

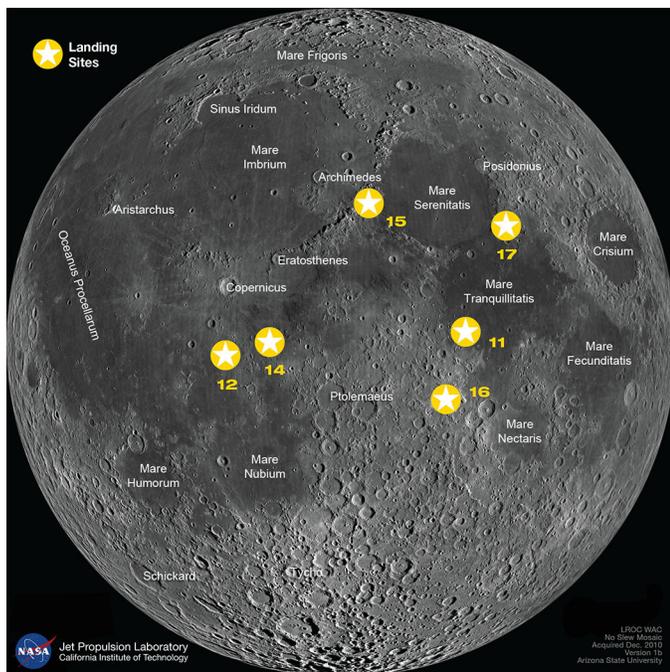
The Orionids peak on October 21st, but they are active from October 16th to October 30th. Start looking at about 10 p.m. and you can continue to look until 5 a.m. With the bright moonlight you may see only five to 10 swift and faint Orionids per hour.

If you see a slow, bright meteor, that's from the Taurid meteor shower. The Taurids radiate from the nearby constellation Taurus, the Bull. Taurids are active from Sept. 10 through November 20th, so you may see both a slow Taurid and a fast Orionid piercing your sky this month. You'll be lucky to see five Taurids per hour on the peak night of October 10th.

You can also still catch the great lineup of bright planets in October, with Jupiter, Saturn and Mars lining up with the Moon again this month. And early birds can even catch Venus just before dawn!

You can find out more about International Observe the Moon Night at <https://moon.nasa.gov/observe>.

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



This image shows some of the features you might see if you closely observe the Moon. The stars represent the six Apollo landing sites on the Moon. Credit: NASA/GSFC/Arizona State University (modified by NASA/JPL-Caltech)

Membership of the Kalamazoo Astronomical Society. . .

1.	Griffin Abbott	Family	2018	84.	Melissa Kohler	Family	2018
2.	Thomas Abraham	Senior	2018	85.	Kirk & Angela Korista	Family	2018
3.	Christina Allen	Regular	2018	86.	Srinivasa Kota	Family	2018
4.	Jan Andersen	Senior	2019	87.	Zosha Kuiper	Student	2018
5.	Paul Asmus	Senior	2019	88.	Jim Kurtz	Regular	2018
6.	Timothy Bailey	Family	2019	89.	Tim Kurtz	Regular	2018
7.	Harold Ballen	Senior	2019	90.	Cal & Jean Lamoreaux	Family	2018
8.	Susan Baskerville	Regular	2018	91.	John Lee	Senior Family	2018
9.	Richard Bell	Lifetime	n/a	92.	Dale Reed Lighthizer	Family	2018
10.	Jonathan Berndt	Senior	2019	93.	Teresa Lindsey-Houston	Family	2019
11.	Karen & Peter Berzins	Senior Family	2019	94.	Keith Longjohn	Senior	2018
12.	Charles Bibart	Senior	2018	95.	Andrew Loveless	Family	2018
13.	Betty Bledsoe	Senior	2019	96.	Gary & Phyllis Lubbert	Family	2019
14.	Jack & Lorrie Bley	Family	2019	97.	Chuck Lund	Senior	2018
15.	Joseph & Patti Borrello	Family	2019	98.	Scott Macfarlane	Family	2019
16.	Matthew Borton	Regular	2019	99.	Dale E. Mais	Senior	2020
17.	Tommy Brown	Regular	2018	100.	Phillip & Linda Marshall	Senior Family	2018
18.	Eddie Bryant	Regular	2018	101.	Jon Towne & Bobbi Martindale	Family	2019
19.	Otto Buder	Senior	2018	102.	Richard Mather	Senior	2018
20.	Jason Burke	Regular	2019	103.	Randy & Michelle Matson	Family	2018
21.	Phyllis Buskirk	Lifetime	n/a	104.	Raul & Carrie Maysonet	Family	2018
22.	Michael Bussey	Regular	2018	105.	Joe McJilton	Regular	2019
23.	Beverly Byle	Senior	2018	106.	Paul McKinley	Senior	2019
24.	Joseph Cain	Family	2019	107.	Michael J. Melwiki	Regular	2018
25.	Dale A. Campbell	Regular	2018	108.	Cecilia Messenger	Student	2018
26.	David Carpenter	Family	2018	109.	Chris Miller	Regular	2018
27.	Mike Chaffee	Family	2018	110.	John Miller	Regular	2019
28.	Tonya Chase	Regular	2019	111.	Mark & Ninah Miller	Family	2018
29.	Sarve Cherukuri	Senior	2018	112.	Dave & Carol Mitchell	Senior Family	2019
30.	Jason Combs	Regular	2018	113.	Katie Morgan	Regular	2019
31.	Joe & Ellen Comiskey	Family	2019	114.	David Murphy	Family	2018
32.	Roark Consolatti	Senior	2019	115.	Ryan Nehring	Family	2018
33.	Michael Cook	Family	2018	116.	Bill Nigg	Lifetime	n/a
34.	Harry Cotterill	Senior	2018	117.	Richard Olsen	Regular	2019
35.	Greg Cowles	Regular	2018	118.	Jim & Christene Oorbeck	Family	2018
36.	Robert Cox	Regular	2018	119.	Amy Ohrstrom	Regular	2018
37.	Brian Crittendon	Regular	2019	120.	Charles Overberger	Regular	2018
38.	Scott & Lisa Crummel	Family	2019	121.	Mike Patton	Regular	2018
39.	Kalman & Becky Csia	Family	2018	122.	Thomas M. Peters	Senior Family	2018
40.	Matt Dean	Regular	2018	123.	Mike Potter	Regular	2018
41.	Jean DeMott	Regular	2018	124.	Jack & Ruth Price	Family	2018
42.	Sue DeNise	Regular	2019	125.	David Puzycki	Regular	2018
43.	Matthew DePriest	Family	2018	126.	Sam Qualls	Regular	2018
44.	Srinivas Dhara	Family	2018	127.	Jonathan Reck	Regular	2018
45.	Joshua Dickey	Family	2018	128.	Phillip Relich	Regular	2018
46.	Richard Dirrenberger	Senior Family	2018	129.	Christopher Roberts	Regular	2018
47.	David Doan	Senior Family	2018	130.	Andrew C. Robins	Regular	2019
48.	Kristi & Steve Durbin	Family	2018	131.	David & Keira Rockwell	Family	2018
49.	Fred E. Dutton	Senior	2019	132.	Florence Roe	Senior	2018
50.	James Dyer	Senior Family	2018	133.	Aaron Roman	Family	2018
51.	Clifton E. Ealy Jr.	Senior	2018	134.	Eric Schreur	Regular	2018
52.	Fred Espenak	Honorary	n/a	135.	Frank & Susan Severance	Family	2018
53.	Joseph Evankovich	Regular	2018	136.	Diane Schear	Regular	2019
54.	Tanja Fagan	Family	2018	137.	Rick Shields	Senior	2018
55.	Bill Finger	Family	2018	138.	Lloyd Simons	Family	2019
56.	Bradley Franks	Student	2019	139.	Michael & Karen Sinclair	Family	2018
57.	Martha & Ron Gammill	Family	2018	140.	Greg Sirna	Regular	2019
58.	Dave Garten	Family	2018	141.	Merri Moore & David Smullen	Family	2018
59.	Brendan & Dee Gauthier	Senior Family	2019	142.	Don Stilwell	Family	2019
60.	Kalina Angell & Rob Gauthier	Family	2020	143.	Stephanie Stratton	Regular	2019
61.	Tom George	Regular	2019	144.	Eric R. Sullivan	Regular	2018
62.	Dick & Jackie Gillespie	Senior Family	2018	145.	Brian & Terri Swisher	Family	2018
63.	Manisha Golas	Regular	2018	146.	Renée Szostek	Regular	2018
64.	Tony Gurczynski	Senior	2019	147.	David Taylor	Regular	2018
65.	Alexander Hanchar	Senior	2019	148.	Josh Taylor-Lehman	Family	2019
66.	Brady Harnishfeger	Family	2018	149.	Gary & Karen Theisen	Family	2018
67.	Robert & Barbara Havira	Senior Family	2018	150.	Henry & Martha Upjohn	Family	2018
68.	Alec Hays	Student	2018	151.	Michael Vandever	Senior	2019
69.	David Heinrich	Senior Family	2018	152.	Patricia Villalobos	Family	2019
70.	Geoffrey Hickok	Senior	2018	153.	John Vollmer	Regular	2018
71.	Christopher & Lydia Hodshire	Family	2019	154.	Jim Vukelich	Senior	2018
72.	Lydia Hoff	Regular	2018	155.	Robert Wade	Supporting	2018
73.	John Hooper	Family	2018	156.	Brian Walesh	Family	2019
74.	Nicholas Hotra	Senior	2018	157.	Philip B. Wareham	Regular	2018
75.	Will Howard	Family	2018	158.	Katelyn Waters	Student	2018
76.	Arya Jayatilaka	Family	2019	159.	Jay Wehrly	Family	2018
77.	Eric Jeska	Regular	2019	160.	Katie & Duane Weller	Family	2019
78.	Dean Johnson	Regular	2018	161.	Bob White	Senior	2019
79.	Kevin Jung	Regular	2018	162.	Roger & Molly Williams	Family	2018
80.	Daniel Keto	Regular	2019	163.	Sheryl Willis	Regular	2018
81.	Rodney & Marlene Kinne	Senior Family	2019	164.	Klay & Karen Woodworth	Family	2018
82.	Jessica Kingsley	Family	2018	165.	David Woolf	Family	2018
83.	Mark Kinsey	Family	2018				

Thank you for being apart of the KAS!

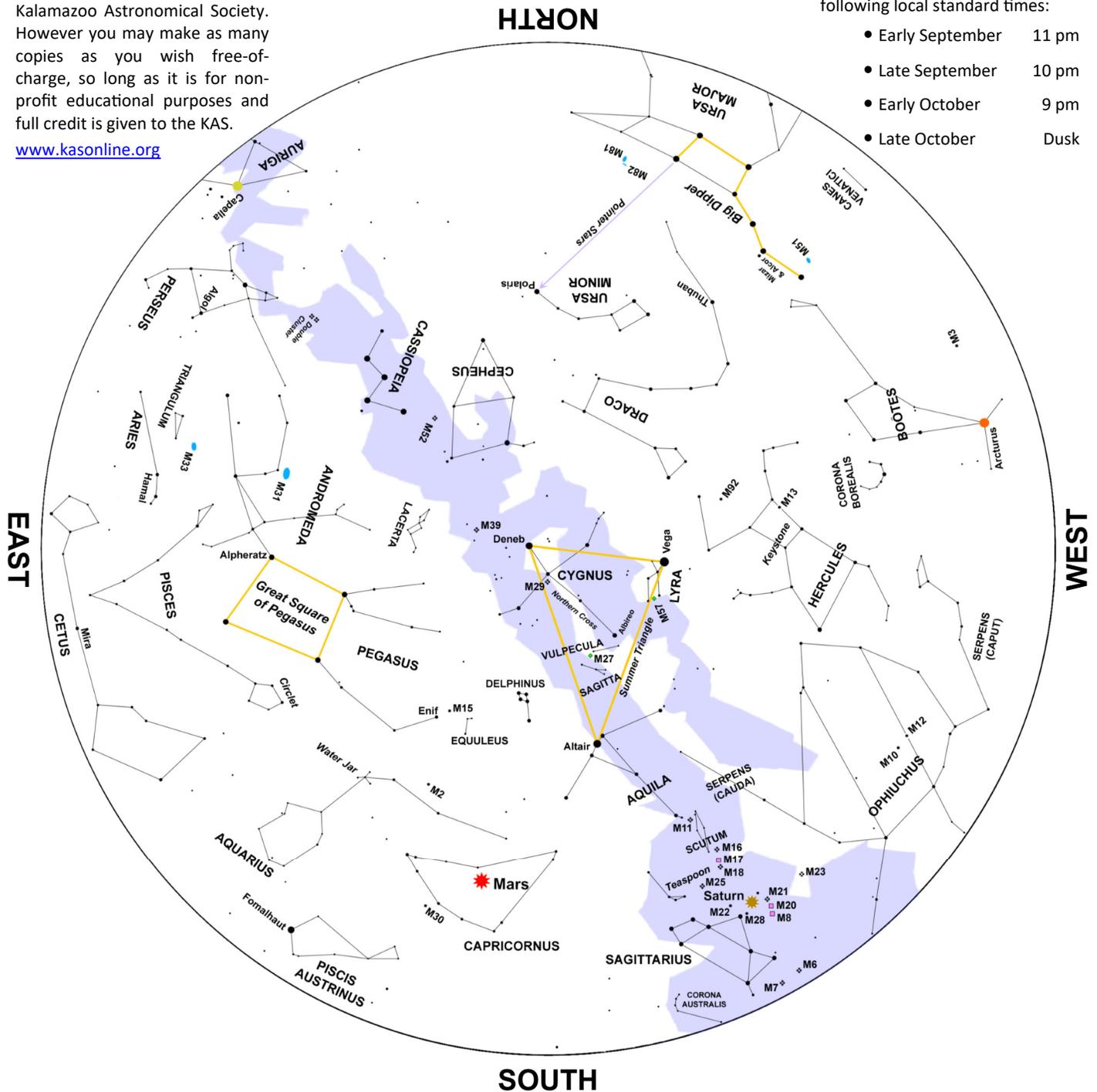
— October Night Sky —

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

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

- Early September 11 pm
- Late September 10 pm
- Early October 9 pm
- Late October Dusk



A waning crescent Moon and the Beehive Cluster (M44) will be visible together in the eastern sky for a few hours before sunrise on October 4th. Both Moon and cluster will easily fit in the field-of-view of 10×50 binoculars.

The Moon, now a waxing crescent, will be 3° to the upper right of Jupiter on the

evening of October 11th. Binoculars will enhance earthshine on the Moon and might even reveal some of Jupiter's Galilean moons!

After sunset on October 14th, the Moon has now moved within 2° of Saturn. Jupiter and Mars anchor at either end to complete a graceful celestial arc.

Witness a waxing gibbous Moon 5° to the right of Mars on October 17th and 6° to the Red Planet's left on October 18th.

The Hyades cluster, in Taurus, hosts a waning gibbous Moon on the night of October 26th. The Moon, now at last quarter, ends its month-long tour back in Cancer within 4° of the Beehive Cluster.

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October 2018

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Share the Sky! Volunteers Needed For...



WMU Youth Day

Saturday, October 6th @ 9:00 - 11:30 am
Seelye Center (next to Bronco Stadium)

Spooky Science Saturday

Saturday, October 13th @ 11:00 am - 3:00 pm
Kingman Museum

Crane Fest

Saturday, October 13th & Sunday, October 14th
12:00 - 7:00 pm (both days)
Kiwanis Youth Conservation Area

Please [contact us](#) for more information and/or to volunteer. We need you!



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Simply click on the link provided above and begin shopping on Orion's website. Purchasing their products through the link gives the KAS a commission.



Public Observing Sessions



Saturday, October 6th

Highlights: Mars, Saturn & Galaxies of Autumn

Saturday, October 20th

Highlights: Moon, Mars, Uranus & Neptune

Gates Open: 7:00 pm • Observing Begins: 7:30 pm

Kalamazoo Nature Center

— 7000 N. Westnedge Ave. —

General Meeting Preview



ASTROPHOTOGRAPHY *Night*

The tradition continues! Every October the general meeting of the Kalamazoo Astronomical Society is devoted to astrophotography, the art of photographing the night sky. Over the years, KAS shutterbugs have traveled to exotic places, ascended to dizzying heights, or just hung out at the Kalamazoo Nature Center and other locales, working the graveyard shift with their impressive array of camera gear. Now they are ready to show their artistic wares. So come on out for what always proves to be one of our best meetings of the year!

Friday, October 5 @ 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

